DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 30, 1997

Mr. Gary Gill, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Gill:

SUBJECT: FINAL ENVIRONMENTAL ASSESSMENT KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
TMK: 2-2-02:66 (por) AND 67 (por)

The County of Maui Department of Parks and Recreation has reviewed the letters received during the comment period and reproduced in the final environmental assessment for the subject project, and is issuing a determination of a Finding of No Significant Impact (FONSI). Please publish notice of availability for this project in the August 8, 1997, *Environmental Notice*.

Enclosed is a completed OEQC Environmental Notice Publication form and four copies of the final EA.

If you have any questions, please call David Goode, Deputy Director of Department of Public Works and Waste Management, at 243-7845.

Sincerely,

HENRY OLIVA
Director

DR:HO:lc

Enclosures

s:\all\kiheicc\gill2

85

1997-08-08-MA-FEA-Kihei Community Center & Swimming Pool Complex

Kihei Community Center and Swimming Pool Complex

Department of Parks & Recreation

Final Environmental Assessment

Prepared for:
County of Maui
and Sato & Associates Inc.

Prepared by:
PBR HAWAII

July 1997

Kihei Community Center and Swimming Pool Complex

Department of Parks & Recreation

Final Environmental Assessment

Prepared for:
County of Maui
and Sato & Associates Inc.

Prepared by:
PBR HAWAII

July 1997

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

Figure

Follows Page

1.0

Introduction

1.0 INTRODUCTION

1.1 PROJECT SUMMARY

Project Name:	Kihei Community Center and Swimming Pool Complex
Applicant:	County of Maui Department of Parks and Recreation 1580-C Kaahumanu Avenue Wailuku, Hawaii 96793 Contact: Henry Oliva
Landowner:	Baldwin*Malama
Tax Map Key:	2-2-02: 66 (por) and 67 (por)
Project Area:	9 acres
Existing Use:	Vacant land
Proposed Use:	Recreational Uses: Community center facilities and swimming pools; including a Main Hall and two buildings with meeting rooms; a 25-yard by 50-meter competition pool, 25-yard by 25-meter warmup/teaching pool, 30-feet by 20-feet kiddie pool; and play field.
State Land Use District:	Urban District
Community Plan Designation:	Kihei-Makena Project District 5
County of Maui Zoning:	Kihei-Makena Project District 5
SMA:	The project is located within the Special Management Area.
Action Requested:	Environmental Assessment processed in compliance with Chapter 343, Hawai'i Revised Statutes and Hawai'i Administrative Rules, Title 11, DOH, Chapter 200. Also, Phase II-Project District 5 and SMA approval.
Approving Agency:	County of Maui Planning Commission
Agencies Consulted:	Various Agencies of the County of Maui and State of Hawaii

1.2 IDENTIFICATION OF PROPOSING AGENCY

In accordance with Chapter 343, HRS, the applicant for the project, mailing address, and primary contact person for the project is as follows:

County of Maui
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793
Contact: Henry Oliva
Phone: (808) 243-7230

1.3 IDENTIFICATION OF APPROVING AGENCY

In accordance with Subchapter 4, Section 11-200-4, Hawaii Administrative Rules, "the mayor, or an authorized representative, of the respective county whenever an action proposed only the use of county lands or county funds" shall be the final authority to accept a statement. Consequently, the Mayor of the County of Maui has designated the County's Planning Commission as the Approving Agency.

1.4 AGENCIES CONSULTED IN THE PREPARATION OF THE ENVIRONMENTAL ASSESSMENT

The following agencies and organizations have been consulted during the planning process and for the preparation of the Draft Environmental Assessment:

County of Maui
Planning Department
Department of Parks and Recreation
Department of Public Works
Police Department
Mayor

State of Hawai'i
State Land Use Commission
Department of Land and Natural Resources - Historic Preservation Division
Department of Transportation
State Department of Agriculture
Office of Environmental Quality Control

Federal
Federal Emergency Management Agency
U.S. Army Corps of Engineers
USDA Soil Conservation Service

2.0

General Description of the Action's Characteristics

2.0 GENERAL DESCRIPTION OF THE ACTION'S CHARACTERISTICS

2.1 TECHNICAL CHARACTERISTICS

2.1.1 Background

This environmental assessment (EA) is prepared to support applications for both a Special Management Area (SMA) Permit and Phase II for Project District 5 approval. SMA and Phase II approvals would allow the development of the subject property for a community recreational center.

The proposed development is located within the Piilani Village planned community in Kihei. Piilani Village is a master planned development with a mix of single-family and multi-family residential neighborhoods, parks, commercial center, and other amenities including open space buffers and bicycle/pedestrian paths. Land for the proposed community recreation center is being provided by Piilani Village (Malama*Baldwin) which would be owned and operated by the County of Maui for use by the public.

The project site is located along Lipoa Street across from Kihei Elementary School and Lokelani Intermediate School. The proposed uses for the site are a community center complex, a swimming pool complex, a play field, and concomitant uses such as parking, maintenance structures, and restrooms.

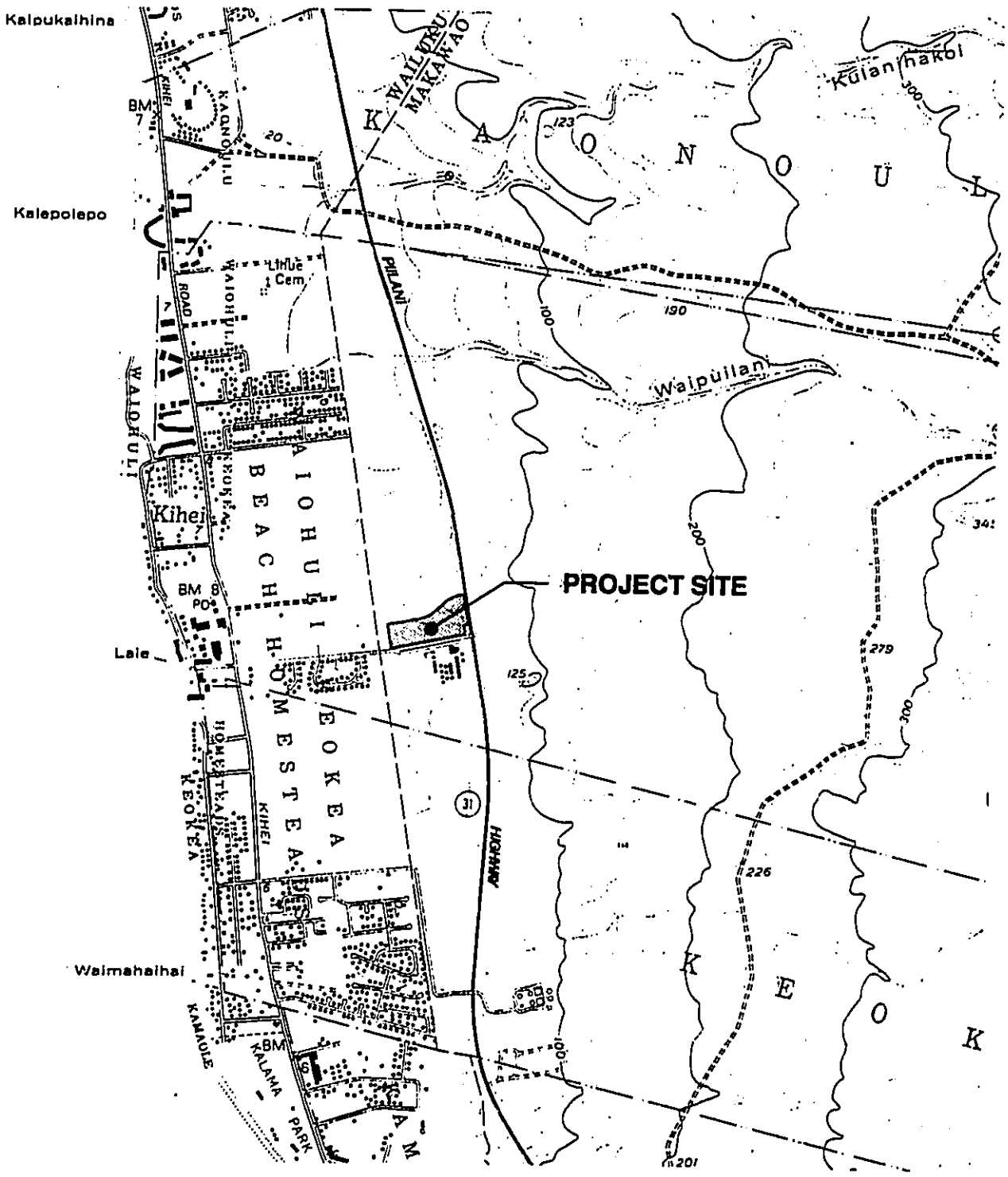
The subject property is located within the State Urban District. Project District Phase II and Special Management Area Permit approval are required from the County of Maui Planning Commission.

2.1.2 Description of the Property

The project area consists of 9 acres of vacant land located in Kihei, County of Maui (see Figure 1). The project area is bordered by Piilani Highway to the east, Lipoa Street and Kihei Elementary and Intermediate School to the south, Haggai Institute and a future North-South Collector Road to the west, and vacant lands (balance of Project District 5) to the north. The TMKs for the project area are 2-2-2:66 (por) and 67 (por) (see Figure 2).

The existing land use designations for the property are as follows:

a. State Land Use District - Urban (see Figure 3)
b. Kihei-Makena Community Plan - Project District 5 (see Figure 4)
c. Existing County Zoning - Project District 5 (see Figure 5)
d. Special Management Area - Applicable (see Figure 6)
e. Other Special Districts - N/A



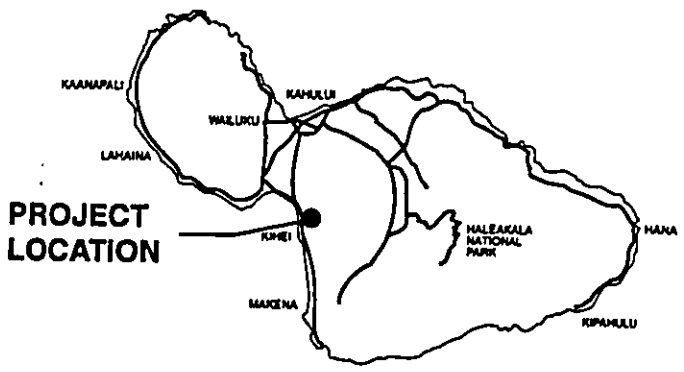


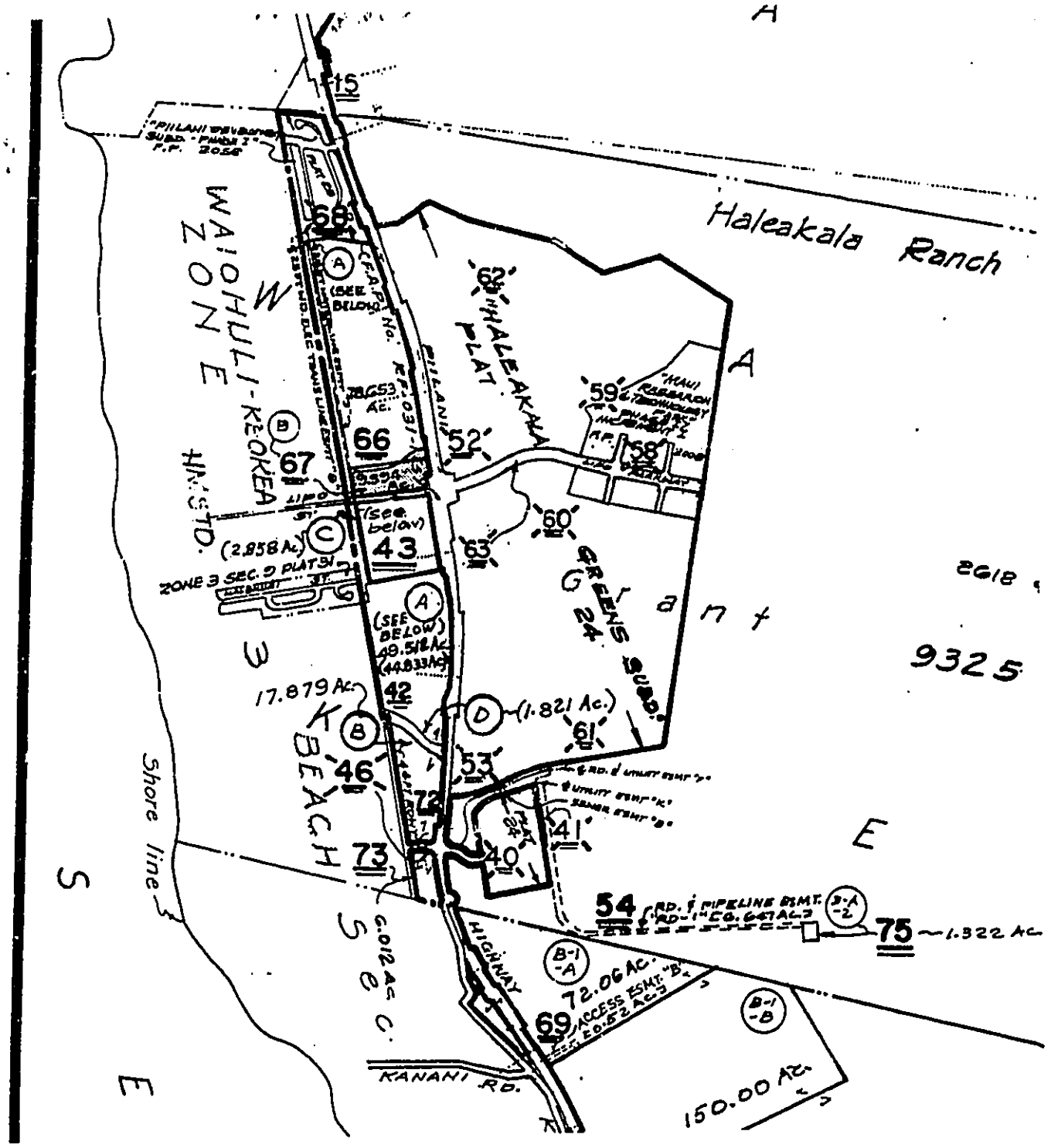
FIGURE 1
LOCATION MAP

Kihei Community Center and Swimming Pool Complex

0 1000 2000
FEET

May 1997

PBR HAWAII



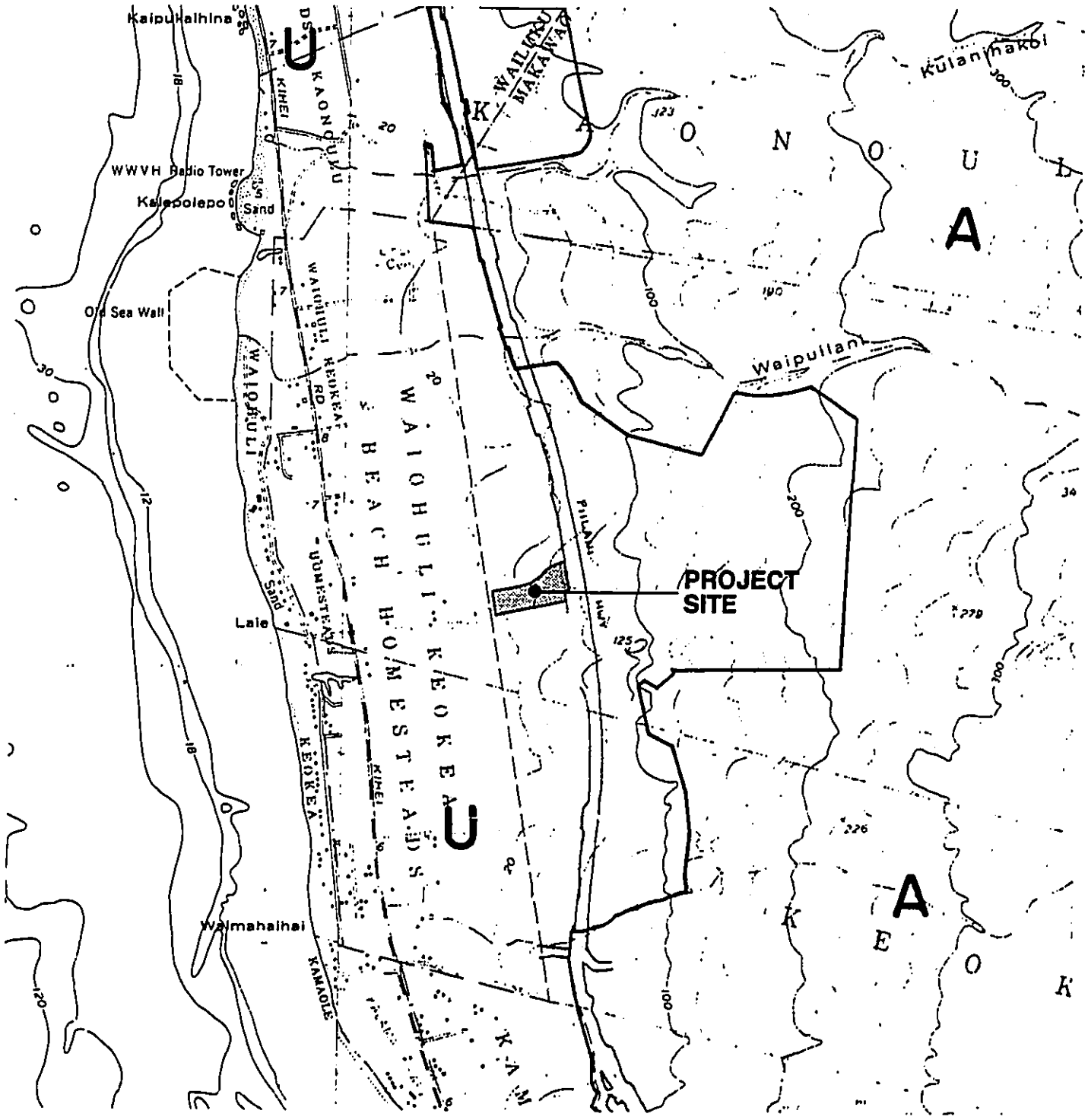
LEGEND

Project Site

FIGURE 2
TAX MAP KEYS/OWNERSHIP
Kihei Community Center and Swimming Pool Complex

0 1000 2000
FEET

May 1997



LEGEND

U	Urban
A	Agricultural

Source: Land Use Commission

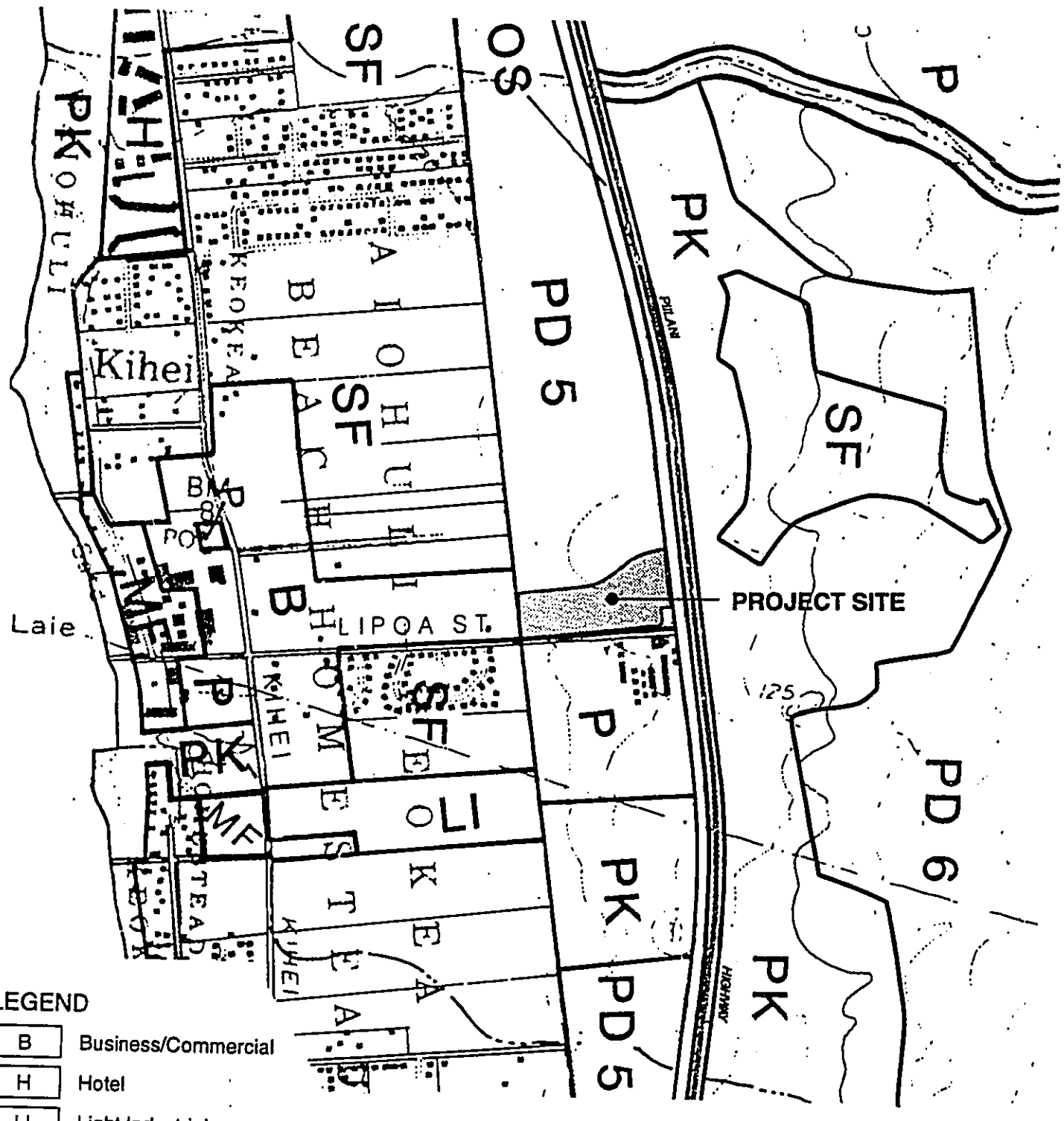
FIGURE 3
STATE LAND USE
DISTRICT BOUNDARY MAP

Kihei Community Center and Swimming Pool Complex

0 1000 2000
FEET

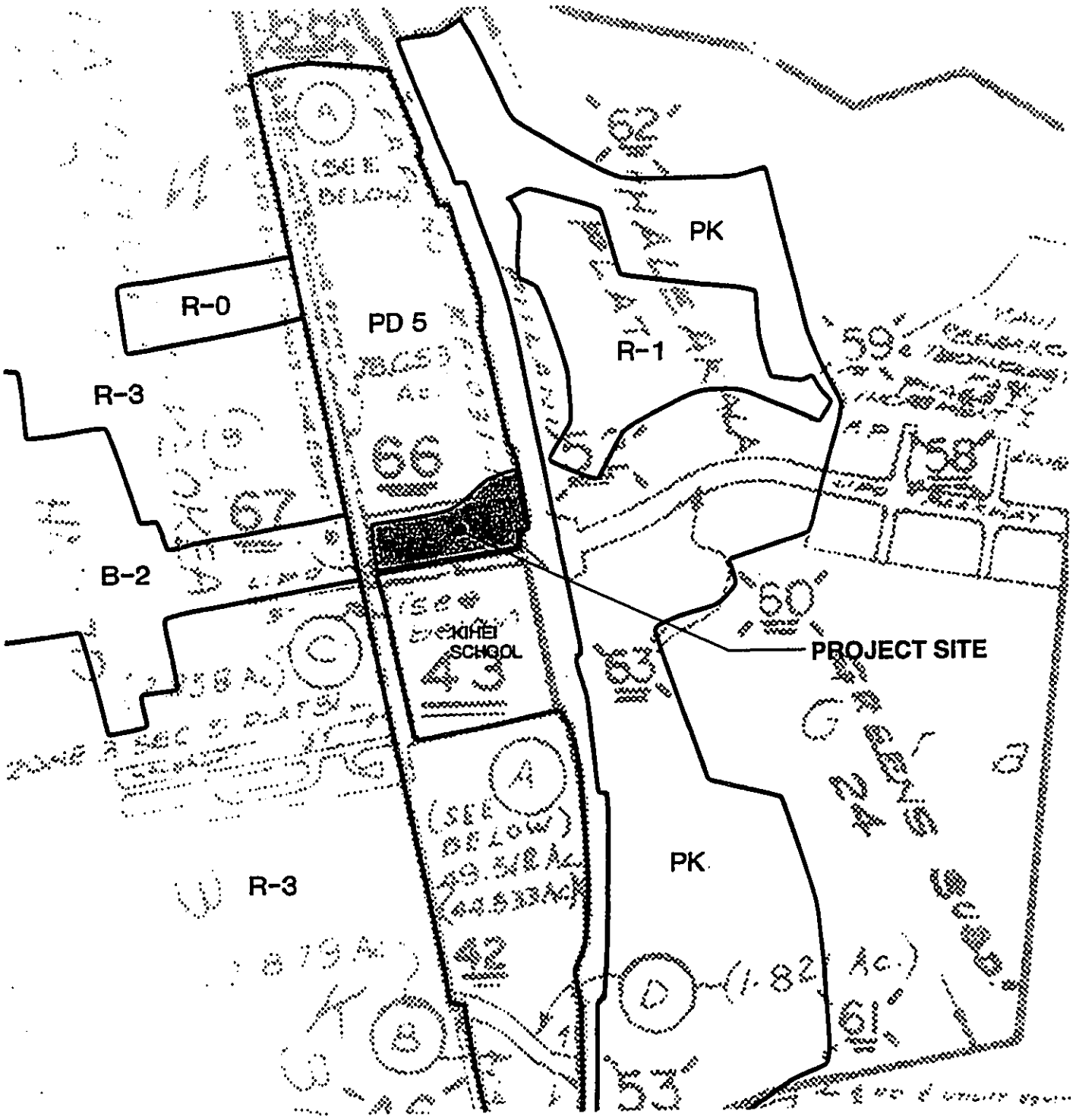
May 1997

PBR HAWAII



Source: Maui Community Plan of the County of Maui

FIGURE 4
MAUI COMMUNITY PLAN - KIHEI - MAKENA
Kihei Community Center and Swimming Pool Complex



LEGEND

B-2	Business
PD 5	Project District 5
PK	Park
R-0	Residential
R-1	Residential
R-3	Residential

Source: Maui Zoning Map of the County of Maui

FIGURE 5
ZONING MAP
Kihei Community Center
and Swimming Pool Complex

0 500 1000
FEET

May 1997

PBR HAWAII

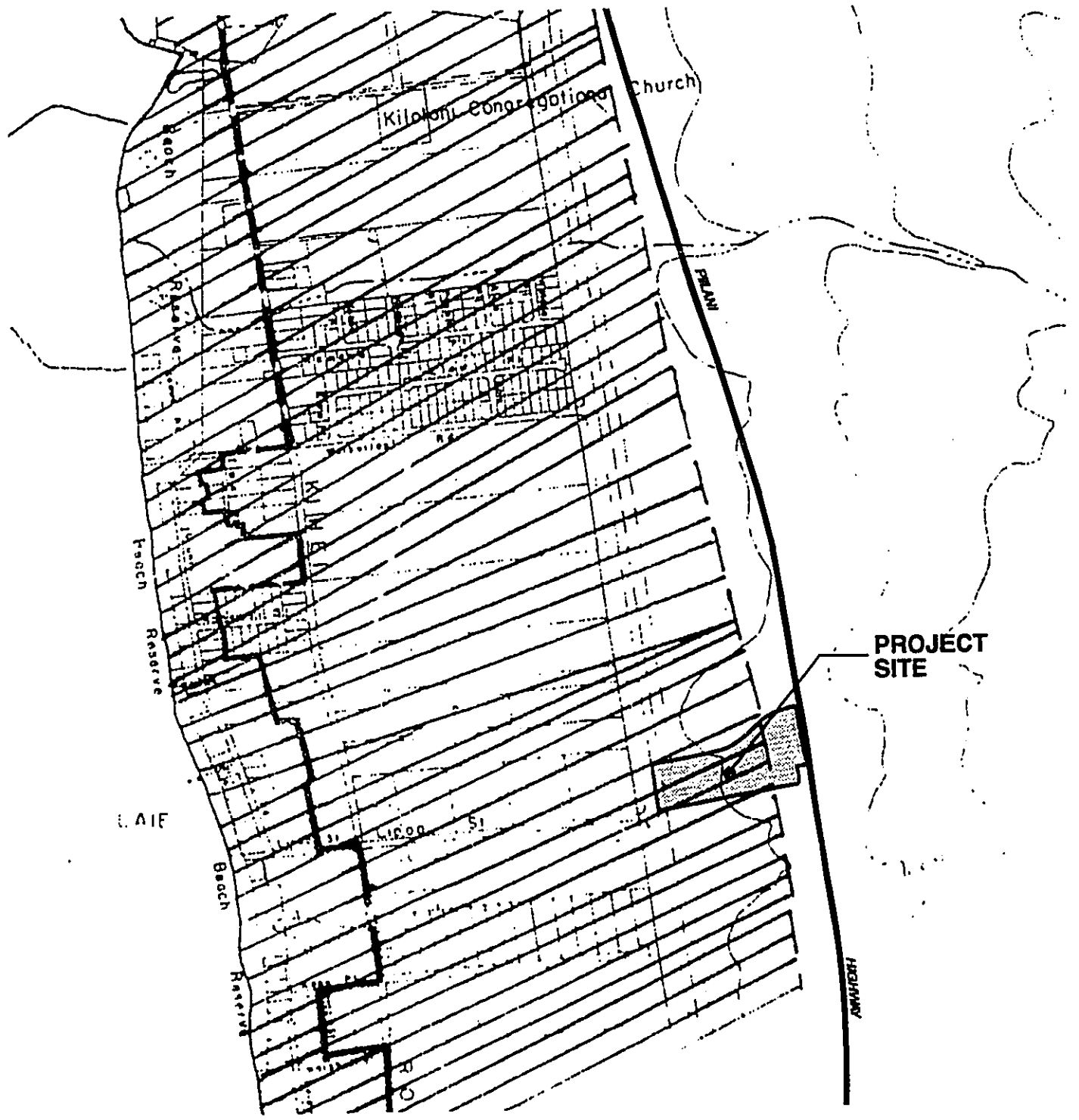


FIGURE 6
SPECIAL MANAGEMENT AREA MAP

Kihei Community Center and Swimming Pool Complex

LEGEND

Special Management Area

0 500 1000
FEET

May 1997

PBR HAWAII

2.1.3 Description of the Planning Area

Immediate surrounding land uses are primarily vacant lands to the north, Piilani Highway to the east, Lipoa Street and Kihei Elementary/Lokelani Intermediate School to the south, and Haggai Institute to the west.

The project area is located in central Kihei, generally adjacent to vacant land except for Kihei School and the Haggai Institute. Other major land uses in Kihei are single family residential, multi-family residential, resort, and commercial. Kihei's dry climate and white sand beaches make it a major tourist destination for the State. Kihei contains a relatively small business district, with community commercial complexes, which supports its visitor industry as well as the needs of its 15,000 residents.

2.1.4 *Description of the Project*

The proposed project will add to the variety of available community and recreational facilities for existing and future Kihei residents. The major program elements of the project include the following (see Figures 7-A and 7-B):

1. A community center complex comprised of a Main Hall of approximately 11,500 square feet and two lesser buildings, Buildings A and B, of approximately 2,050 square feet and 2,100 square feet respectively. The center shall be similar in scope and size to the Upcountry Community Center. The buildings shall be split face block on the exterior. Roofs shall be the same composition shingles as Upcountry with similar fascia treatment. The buildings shall have good natural lighting, and shall contain insulation and conserve volume to minimize air conditioning power bills.

   The Main Hall building shall include a large meeting room, kitchen facilities, restrooms, and a public address system. Building A shall contain a medium sized meeting room with separators to create smaller meeting areas as needed, a warm-up kitchen, and a maintenance/storage area. Building B shall contain a medium meeting room, which will also serve as the County Department of Parks and Recreation's office space, and restrooms. Also included is an exterior courtyard which offers a barbeque, patio, and dining area.

   All meeting rooms are planned to be fully air-conditioned and in compliance with American with Disabilities Act (ADA) requirements. The Main Hall shall be acoustically designed to minimize noise.

2. A swimming pool complex is planned with a 25-yard by 50-meter pool, a 25-yard by 25-meter warmup/teaching pool, a 20-feet by 30-feet kiddie pool, a Main Pool building, and a Multi-Purpose Building.

   The 50-meter pool will be designed to U.S. Swimming and Diving Standards and shall include:

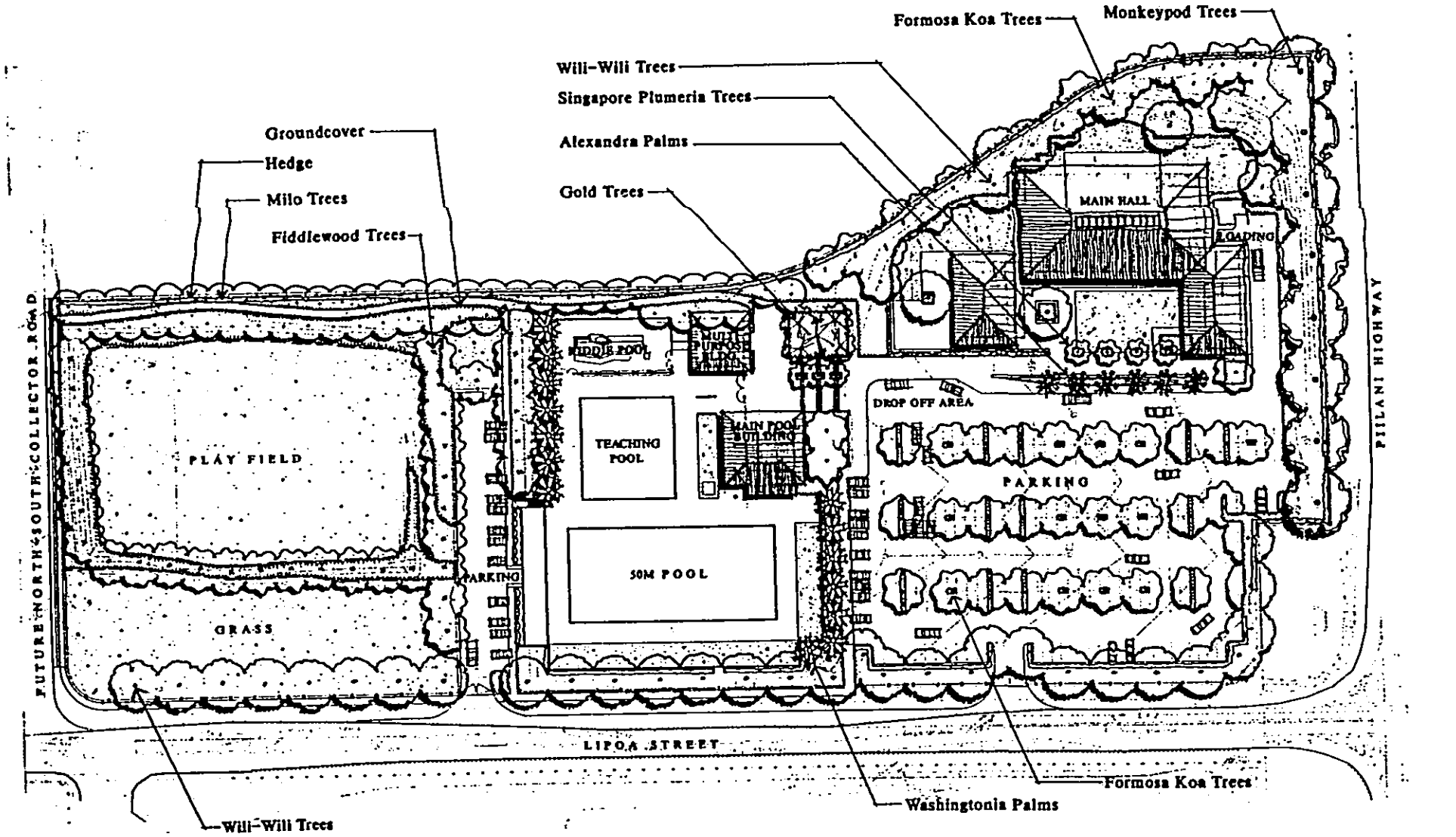
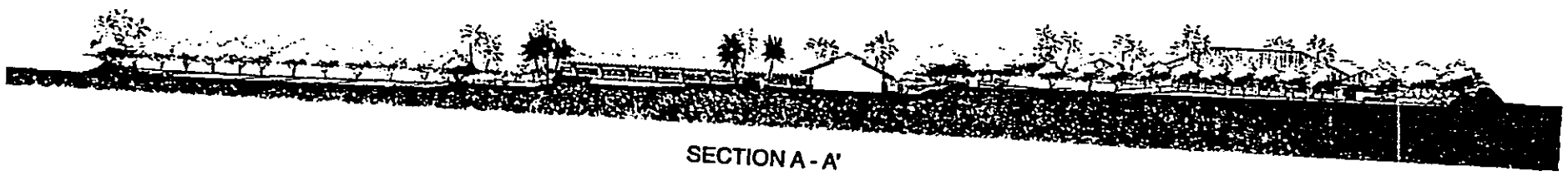


FIGURE 7-A
SITE PLAN
Kihei Community Center and Swimming Pool Complex

0 60 120
FEET

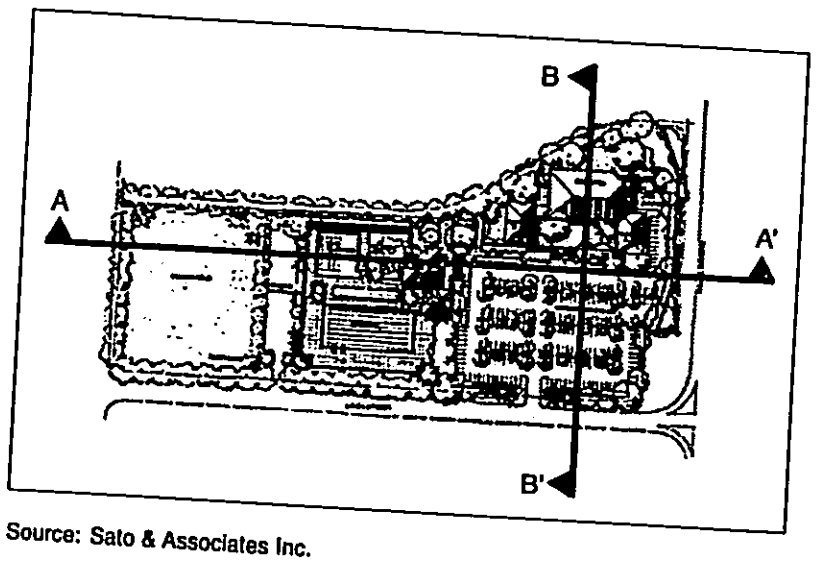
July 1997

Base source: Sato & Associates Inc.



SECTION A - A'

SECTION B - B'



Source: Sato & Associates Inc.

FIGURE 7-B
SITE ELEVATION
Kihei Community Center and Swimming Pool Complex

0 60 120
FEET

PBR HAWAII

- Eight lanes for competition swimming.
- A diving well to accommodate a one meter springboard and a three meter springboard.
- One 4-feet wide movable bulkhead.
- Striping out and lane markers with anchors for 25-yard and 50-meter competition.
- Graduated pool depth of six to eighteen feet.

The 25-meter warm-up/teaching pool shall have lane markers and striping, and shall have a graduated depth of four to six feet. The kiddie pool will be free form and shall have a graduated depth of zero to eighteen inches.

Separate pool filtration, sanitization and heating/cooling systems for each of the three pools are included. Adequate deck space for spectator stands and lifeguard stands also is included. Walls enclosing the Pool Complex shall be kept to a minimum.

The Main Pool Building will be approximately 55 feet by 55 feet and shall provide lockers, showers, restrooms, a public address system for the pools, and office space. It will be similar to that of the Upcountry Swimming Pool Complex. The building shall be split face block on the exterior. Roofs shall be the same composition shingles as Upcountry with similar fascia treatment.

The Multi-Purpose Building will be approximately 40 feet by 40 feet. The building shall be split face block on the exterior. Roofs shall be the same composition shingles as Upcountry with similar fascia treatment.

The positioning of the pools is determined from a functional use standpoint (i.e., competition swimming, diving and spectator viewing) with consideration for sun position, prevailing wind conditions, and minimizing cost for construction.

3. Two parking lots which meet County of Maui standards for pavement area, lighting and landscaping are also planned. A main parking lot that will provide approximately 218 stalls, a loading zone, and a drop-off area; and a secondary parking bay that will provide approximately 23 stalls.

   The main parking lot is located between the community center building and the pool complex, with a single entry/exit to Lipoa Street. The secondary parking bay separates the pool complex from the proposed play field with entry/exit via Lipoa Street.

4. A play field is planned for the makai third of the property. Its design will assume its potential for use as a drainage retention area and for overflow parking.

5. An irrigation system that will utilize reclaimed water provided by the Department of Public Works and Waste Management from the Kihei Wastewater Reclamation Facility for use when reclaimed water is available. A transmission system providing reclaimed water to the site will be developed as a future project being coordinated by the County of Maui.

6. A pedestrian/bike/cushman vehicle path located along the northern boundary.

7. On-site improvements including mobilization/demobilization, excavation, embankment, parking, paving, curbs, gutters, sidewalks, striping, signage, sewer lines, storm drains, water lines, and drainage with retention at play fields for on-site drainage.

8. Off-site improvements include drainage and roadway improvements.

2.1.5 Project Development Goals

The overall project goal established by the applicant is to create a new community center and meeting place with necessary support facilities for residents of Maui. Development of a new swimming pool complex is proposed for both casual recreation and competitive sport. The proposed play field is planned for additional recreational opportunities and as an on-site drainage facility.

2.1.6 Construction Activities

The proposed project will require the use of 9 acres of land area. Best Management Practices ("BMPs") will be implemented as applicable during construction to assure minimal impacts from wind and water borne soil erosion on the surrounding schools and neighborhood.

Construction of the proposed project will begin with development of the major infrastructure after the applicable grading and building permits are issued. Wind patterns will also be considered to minimize impacts from fugitive dust during the construction phases.

2.1.7 Development Timetable

Preliminary cost estimates of the various components are $2,437,500 for the Community Center (includes the Main Hall, Building A, Building B, courtyard, trellis); $3,778,500 for the Pool Complex (includes three pools, deck, Main Pool Building, and Multi-Purpose Building); and $2,445,000 for site improvements. The goal through additional value engineering during the design and competitive construction bidding is $6,800,000.

Final determination of pricing, development timetable, and projected costs will be identified during the entitlement review process. However, tentative estimates indicate that construction costs may have an impact on project phasing.

2.2 ECONOMIC CHARACTERISTICS

2.2.1 Employment

Presently there are no jobs generated by the subject property. The proposed project is expected to generate increased short-term direct and indirect employment during construction, as well as some new long-term employment on-site associated with management of the community center and swimming pool complex.

2.3 SOCIAL CHARACTERISTICS

2.3.1 Population

The population of the County of Maui has exhibited relatively strong growth over the past decade, with the 1990 population estimated at 100,504, a 41.8 percent increase over the 1980 population of 70,847. Growth in the County is expected to continue, with resident population projections to the years 2000 and 2010 estimated to be 124,562 and 145,872, respectively (County of Maui).

Just as the County's population has grown, the resident population of the region has increased dramatically in the last two decades. Population gains were especially pronounced in the 1970s as the rapidly developing visitor industry attracted many new residents. The current resident population of the Kihei-Makena region is estimated at 15,365. A projection of the resident population for the years 2000 and 2010 are 20,092 and 24,846 respectively (County of Maui).

The implementation of the proposed project is not expected to affect the resident population level. The Kihei Community Center and Swimming Pool Complex will provide recreational facilities to help meet the needs of Kihei's future population as it continues to grow into the future.

2.3.2 Other Community Facilities and Services

The proposed project is not expected to significantly affect other community facilities and services including medical, police and fire protection, and schools. However, the close proximity of Kihei School to the project will likely result in expansion of recreational opportunities available to students both during and after school.

2.4 CULTURAL AND HISTORIC CHARACTERISTICS

The property does not appear to contain plants or animals of traditional Hawaiian subsistence gathering value, and is not currently used for cultural or religious practices. Additionally, the site does not contain significant cultural or historic remains or resources (see Appendix D).

2.5 ENVIRONMENTAL CHARACTERISTICS

In general, there are no environmentally unique characteristics associated with the subject property. The site is not located in an environmentally sensitive zone such as a tsunami zone, erosion prone area, geologically hazardous land, estuary, potable groundwater recharge area, or area of sensitive flora and fauna habitat. The entire project is located in Flood Zone C, areas of minimal flooding (see Figure 8).

Vegetation on the project site consists primarily of buffelgrass with scattered kiawe and koa haole. Avifauna and mammals common to the project site are typical of species found in the urbanized Kihei area. Feral mammals found in the area include cats, rats, mice, and mongoose. Exotic species of birds common to the area include the Northern Cardinal, Common Mynah, Golden Plover, Spotted Dove, House Finch, Gray and Black Francolin, and the Blue Heron (see Appendix D).

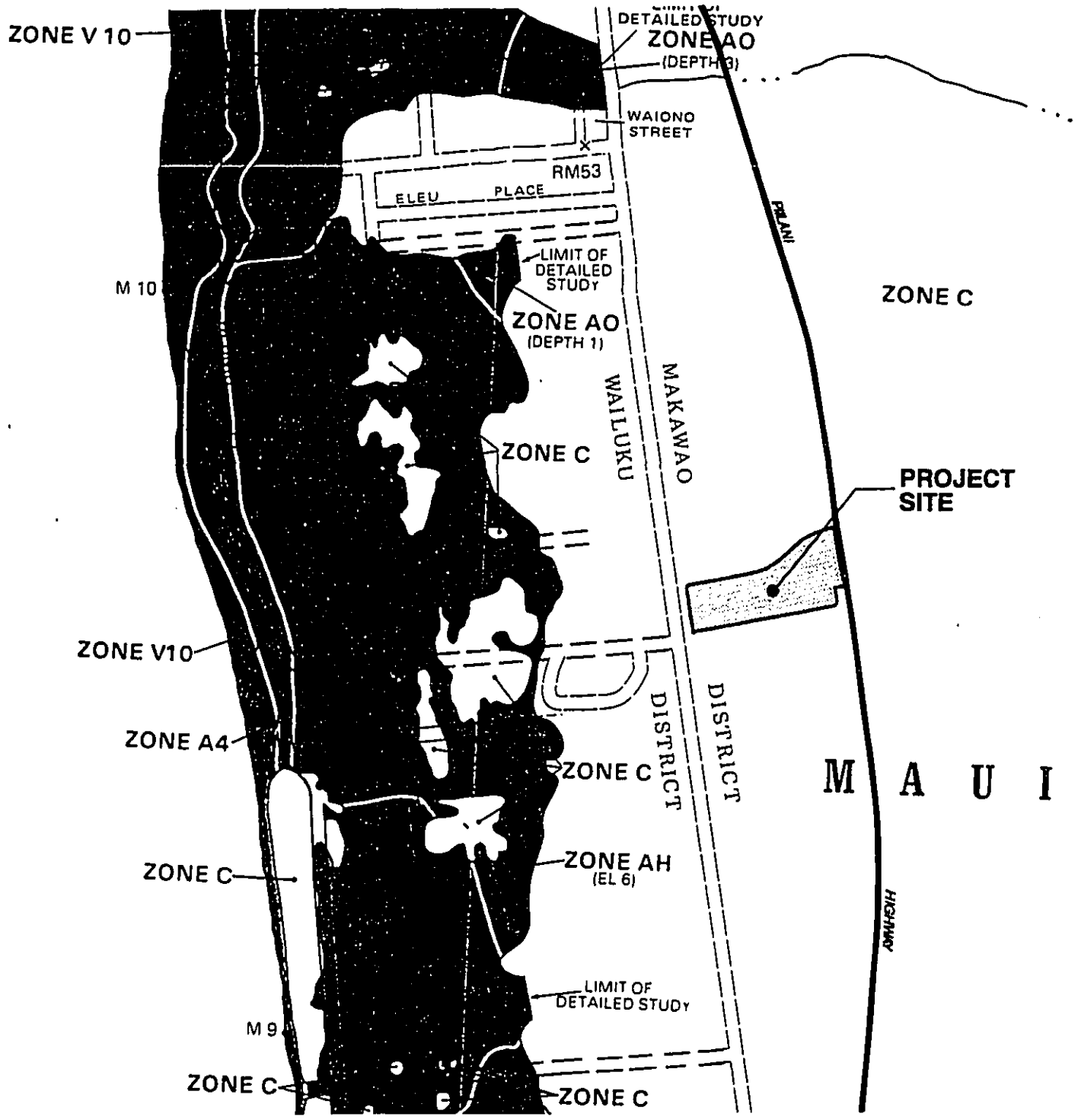
2.5.1 Soils

The United States Department of Agriculture, Soils Conservation Service, *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii*, 1972, identifies the soils in the project site as Waiakoa Series (W1D2) and Pulehu Series (PsA). Waiakoa extremely stony silty clay loam 3 to 25 percent consists of well-drained soils on uplands. Pulehu Series 0-3 percent consists of well drained soils on alluvial fans and stream terraces. Areas include gravelly, stony and gently sloping soils (see Appendix A).

The project site generally slopes from east to west. There is a mounded area with top elevation 80' MSL at the north east corner of the site. With the exception of this mounding, slopes range from 2 to 7 percent.

2.5.2 Drainage

There is an existing natural drainage way that passes through the proposed project site which accommodates the peak 50 year, one year storm runoff from the project site of approximately 5.3 cfs. Two 66-inch corrugated metal pipes cross under Piilani Highway and outlet onto the site at the southwest corner, near the Lipoa Street and Piilani Highway intersection. The offsite runoff surface flows through a drainage way and leaves the site at the southwest corner of the project site, at the future intersection of the North-South Collector and Lipoa Street. The flows then follow Lipoa Street west and enters an existing drainage system that is inadequate to handle these flows. The excess runoff that the existing system cannot handle flows down Lipoa Street and floods at South Kihei Road.



KEY

ZONE	EXPLANATION
C	Areas of minimal flooding. (No shading)

Source: National Flood Emergency Program, FEMA, 1989

FIGURE 8
FLOOD INSURANCE RATE MAP
Kihei Community Center and Swimming Pool Complex

0 500 1000
FEET

May 1997

PBR HAWAII

The drainage basin for the offsite runoff, which passes through the project site, is 340 acres with a 50 year, 6 hour duration peak discharge of 404 cfs. The 100 year peak flows are 551 cfs. Existing offsite flows from properties north of the project site generally flows in a west or north direction and do not enter the site.

Additional runoff generated from the developed site will be retained on site. Onsite improvements to permit infiltration of storm water into the ground will consist of retention basins and onsite retention in an underground percolation/piping system. Developed peak runoff volumes for a 50 year one hour storm duration is estimated at 35 cfs. The total increase due to development is 29.7 cfs, but these flows will not impact off-site properties.

Off-site

The County of Maui's Drainage Master Plan for the project area shows flows from the existing two (2) 66-inch diameter culverts passing under Piilani Highway to enter a concrete box culvert system and cross Lipoa Street at the future North-South Collector Road intersection and flow south approximately 600 feet to an existing 71-inch x 47-inch corrugated arched pipe culvert. From here, flows follow proposed concrete channels and outlet at the existing regulation reservoir makai of Kihei Road.

This system is proposed to be phased and presently is inadequate to handle the flows that pass through the project site.

Developed Improvements

Flows from the two (2) 66-inch diameter culverts at Piilani Highway are proposed to enter an underground 72-inch diameter drain line for a distance of approximately 700 linear feet. Runoff will then outlet within the project site and follow existing drainage patterns prior to leaving the project site.

The velocity and volume of the offsite flows will not increase and there will be no additional adverse effects resulting from the new development to adjacent and downstream properties.

The proposed 72-inch diameter drain line are interim improvements and can be incorporated into the County of Maui's Kihei Drainage Master Plan.

Conclusion

By retaining any additional runoff generated by the development of the Kihei Community Center and Swimming Pool Complex, and by allowing the existing offsite flows to pass through the site and leave with no increase in velocity or volume, the project has been designed so that no additional flows will impact adjacent and downstream properties.

2.5.3 Traffic

Existing Conditions

The project site is bordered by Piilani Highway on the east and Lipoa Street on the south. Piilani Highway is a two-lane, two-way State highway running north-south. Major intersections along Piilani Highway are signalized with separate left turn phases for north-south traffic. Lipoa Street is a two lane County road that is signalized at its intersection with Piilani Highway. The traffic characteristics of these two roadways is summarized in the table below.

Table 1: Traffic Characteristics of Piilani Highway and Lipoa Street

Roadway	Piilani Highway		Lipoa Street	
Direction	N. bound	S. bound	E. bound	W. bound
Location	N. of Lipoa		W. of Piilani	
Posted Speed Limit	45 mph		25 mph	
Ave. Daily Traffic	10,397	11,677	3,158	4,267
AM Peak Hr.	7:00 to 8:00	7:15 to 8:15	7:30 to 8:30	8:00 to 9:00
AM k-Factor	7.60%		6.29%	
AM Peak Hr. Traffic	830	866	194	281
PM Peak Hr.	3:30 to 4:30	4:15 to 5:15	4:30 to 5:30	3:45 to 4:45
PM Peak Hr. Traffic	809	1,005	246	383
PM k-Factor	8.15%		8.24%	

Source: *Traffic Survey Data, Islands of Maui, Molokai & Lanai*, 1993, Hawaii Department of Transportation

Morning and afternoon peak hour traffic volumes were obtained from traffic counts conducted May 1997. The peak hour traffic volumes at the study intersections and driveways serving the project are shown in Appendix B.

Operating conditions at an intersection are expressed as a qualitative index known as Level of Service (LOS) with letter designations ranging from A through F, with LOS A representing free flow operating conditions and LOS F representing over capacity conditions. Level of Service for signalized intersections are evaluated for overall intersection operations, while LOS for unsignalized intersections are evaluated for specific movements at the intersection.

The results of the LOS analysis for the signalized intersections are shown in Table 2 below, and for unsignalized intersections, Table 3 below.

Table 2: Existing Level of Service (LOS) Analysis for Signalized Intersections[1]

	AM Peak Hr		PM Peak Hr	
Intersection	V/C[2]	LOS	V/C[2]	LOS
Piilani Hwy at Lipoa St.	0.777	C	0.747	C

[1]See Appendix B for calculations
[2]V/C denotes Volume-to-Capacity ratio

Table 3: Existing Level of Service (LOS) Analysis for Unsignalized Intersections[1]

	AM Peak Hr		PM Peak Hr	
Intersection	Delay[2]	LOS	Delay[2]	LOS
Lipoa St. at Future N-S Collector Rd.	13.8	C	0.6	A
Lipoa St. at Drive A	Future Drive		Future Drive	
Lipoa St. at Drive B	Future Drive		Future Drive	

[1]See Appendix B for calculations
[2]Average seconds of delay per vehicle

Both intersections operate at LOS C or better during the peak hours. It should be noted that there are long queues for left turning vehicles into and out of Kihei School during the peak hours. Queues of 9 to 10 vehicles were observed several times. This is reflected in the LOS calculations in Appendix B. However, the total intersection delay is minimal because the through traffic movements have little or no delay. Therefore, the overall intersection operates at an acceptable level of service.

Projected Cumulative Traffic Conditions

Future traffic growth consists of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. The second component is estimated traffic that will be generated by other development projects in the vicinity of the proposed project.

Background Traffic Projections. Future background projections for the study intersections were estimated from traffic growth rate of traffic projections provided in the *South Kihei Master Traffic Plan* of 1996 and the *Draft Traffic Assessment Report for Kihei Road 'C'* of March 1997.

The *South Kihei Master Traffic Plan* provided an estimate of future trips produced by anticipated development in South Kihei. The design year for the study was 2005. The State Department of Transportation was contacted about traffic projections with the North-South Collector Road completed. Projections used for 2005 conditions with the proposed North-South Collector Road in place was unavailable.

The *Draft Traffic Assessment Report for Kihei Road 'C'* addressed the impacts of Road 'C' and made recommendations relative to the alignment and connection with Piilani Highway. The study also considered the following:

1. Traffic projections from the Traffic Plan were adjusted to reflect construction of the North-South Collector Road from Waipuilani Road to Halekuai Street. The North-South Collector is not extended beyond these streets for this study.

2. Traffic generated by development of Piilani North was included in the traffic projections.

3. The graphics indicated that Piilani Highway has been widened to four lanes (two lanes in each direction) with separate left turn lanes.

4. The intersection of Lipoa Street at North-South Collector was unsignalized.

5. The report graphics also indicated that the intersection of Lipoa Street at the North-South Collector was modified to accommodate the existing driveway to the schools.

The resulting 2005 cumulative peak hour traffic projections are shown in Appendix B.

Project-Related Traffic Conditions. Future traffic volumes generated by the project were determined using trip generation rates from the Institute of Transportation Engineers. The trip generation analysis and the resulting daily and peak hour volumes are summarized in Table 4. Trip generation rates for County Parks (Land Use Code 412) were used for estimating trips generated by the project.

Table 4: Trip Generation Calculations

Area (acres) 9		
Period	**Trips per Acre[1]**	**Trips**
Ave. Weekday Total	2.99	27
AM Peak Hr Total	2.87	26
% Inbound	72	19
% Outbound	28	7
PM Peak Hr Total	3.14	28
% Inbound	35	10
% Outbound	65	18

[1]Source: Institute of Transportation Engineers, *Trip Generation*, Fifth Edition, 1991

The project-related trips were distributed along the anticipated approach routes to the project site.

Recommendations

The level-of-service analysis for 2005 cumulative and cumulative plus project conditions are summarized in Tables 5 and 6.

The intersection of Piilani Highway at Lipoa Street was analyzed using the methodology for signalized intersections. This intersection is expected to operate at LOS 'A' during both peak hours with the widening to four lanes as indicated in the *Draft Traffic Assessment for Kihei Road 'C'* whether the project is built or not. An LOS analysis for the intersection with Piilani Highway as a two-lane roadway was also performed to determine conditions if Piilani Highway is not widened. The analysis determined that the LOS will be 'E' and the change in the V/C ratio is less than the 0.020 that defines the impact as significant. The calculations are provided in Appendix B.

Table 5: Level-of-Service Analysis for Signalized Intersections

	Weekday AM Peak Hour				Weekday PM Peak Hour			
	Without Proj.		With Proj.		Without Proj.		With Proj.	
Approach & Movement	V/C[1]	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Lipoa St. at Piilani Hwy[2]	0.541	A	0.542	A	0.582	A	0.585	A

[1]V/C denotes ratio of volume to capacity.
[2]LOS calculations assume that the North-South Collector has been completed and that Piilani Highway has been widened to four-lanes as shown in the *Draft Traffic Assessment Report for Kihei Road 'C'*. Calculations for Piilani Highway as a two-lane facility is provided in Appendix B.

The intersection of the North-South Collector at Lipoa Street and the driveways into the project were analyzed using the methodology for unsignalized intersections. The analysis was performed assuming the North-South Collector was constructed as a three-lane roadway and that Lipoa Street as three lanes. All intersections are expected to operate at LOS 'B' or better.

Table 6: Level-of-Service Analysis for Unsignalized Intersections

	Weekday AM Peak Hour				Weekday PM Peak Hour			
	Without Proj.		With Proj.		Without Proj.		With Proj.	
Approach & Movement	Delay[1]	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Lipoa St. at North-South Collector	5.6	B	5.7	B	3.5	A	3.5	A
Lipoa St. at Drive A	Future		0.1	A	Future		0.2	A
Lipoa St. at Drive B	Future		0.0	A	Future		0.0	A

[1]Delay shown is the average vehicle delay in seconds for the total intersection.

A traffic signal warrant analysis was performed for the intersection of Lipoa Street at the North-South Collector as part of the evaluation of potential mitigation measures. The traffic signal warrant analysis was performed using the warrants and procedures described in the *Manual of Uniform Traffic Control Devices* (MUTCD) published by the U.S. Department of Transportation, Federal Highway Administration.

There are eleven warrants described in the MUTCD. If the traffic conditions satisfy any of the warrants, then a traffic signal should be considered. The MUTCD and traffic manual clearly states that satisfaction of a warrant is not necessarily justification for a traffic signal. Delay, congestion, confusion or other evidence of the need of right-of-way assignment must be shown.

Traffic volumes for a full 12-hour period were not available so the warrants that require 8 to 12 hours volumes were not performed. As the intersection is currently configured, a traffic signal is warranted under the peak hour volume warrant (Warrant 11) for cumulative (without project conditions) because of the volume of traffic associated with the adjacent schools. The peak hour volume warrant is shown in Appendix B.

The warrant analysis is based on the northbound approach as currently configured. If this approach is modified to provide separate left, through and right-turn lanes (three lanes total), the traffic signal warrant is not satisfied. Conversion from a two-way to a four-way stop controlled intersection will further improve the operation of the intersection. As a four-way stop controlled intersection, this approach will operate at LOS 'B.' The calculations for this intersection as a four-way stop controlled intersection is presented in Appendix B.

A signal warrant analysis for Lipoa Street at Drive 'A' was also performed since it is anticipated the pool at the complex will be used by students of Kihei School and that they would cross at this driveway. This warrant analysis was performed using the criteria for school crossings and evaluated the warrants for a flashing beacon and a traffic signal. For a flashing beacon, three warrants must be satisfied. These warrants relate to minimum pedestrian/vehicular volumes, critical speed along the street, and distance to the nearest signal.

The minimum pedestrian volume is satisfied if more than 40 students use the crossing for two or more hours per day. It is reasonable to assume that this warrant would be satisfied. The critical speed is 35 mph whereas the posted speed along Lipoa Street is 25 mph. Therefore, this warrant is not satisfied. The minimum distance to the nearest traffic signal is 600 feet. The scaled distance between this driveway and the signal at Piilani Highway is approximately 400 feet. This warrant is not satisfied either. In conclusion, two of the three warrants required are not satisfied.

For a traffic signal, the minimum pedestrian warrant for a traffic signal is a minimum of 100 students using the crosswalk for two hours a day or 500 students per day versus 500 vehicles

per hour for two hours. It is possible that this warrant will be satisfied. The minimum distance to the nearest signal is the same for a flashing beacon. This warrant is not satisfied.

The results of the signal warrant analysis are:

1. A traffic signal is not warranted for the intersection of Lipoa Street at the North-South Collector if the intersection is modified to provide an additional northbound through lane. The intersection should be modified to provide an additional lane to accommodate northbound through traffic. Conversion from a two-way stop controlled intersection to a four-way stop controlled intersection would improve the LOS for all approaches to 'C' or better. Otherwise, the northbound approach will operate at LOS 'D.'

2. The warrants for a flashing beacon or a traffic signal at the intersection of Lipoa Street at Drive 'A' are not satisfied. Students crossing Lipoa Street should be directed to the Lipoa Street North-South Collector intersection which should be modified from a two-way stop controlled intersection to a four-way stop controlled intersection.

In conclusion, it is determined that:

1. No mitigation measures are required for the intersection of Piilani Highway at Lipoa Street.

2. Traffic signals are not warranted for the intersection of Lipoa Street at the future North-South Collector under cumulative or cumulative plus project conditions if the intersection is modified to provide a separate northbound through lane when the North-South Collector is constructed.

3. An analysis of the required lengths of left turn storage lanes determined that the minimum length for left turns from Lipoa Street to northbound Piilani Highway is 250 feet and left turns from Lipoa Street to the school is 200 feet. Therefore, it is not possible to relocate left turns to the school to a location opposite the entrance to the project. Traffic to the school will have to use the Lipoa Street/North-South Collector intersection where the proper left turn storage capacity can be provided.

4. An analysis of the intersection of Lipoa Street at Drive 'A' determined that a flashing beacon or traffic signal is not warranted under the warrants for a school crossing. The distance to the traffic signal at Piilani Highway is less than 600 feet, which is the minimum distance required.

3.0

Summary Description of the Affected Environment, Impacts, and Mitigation

3.0 SUMMARY DESCRIPTION OF THE AFFECTED ENVIRONMENT, IMPACTS, AND MITIGATION

3.1 CLIMATE

The Kihei coast is generally sunny, warm and dry during the entire year. In Kihei Town, the annual high temperature averages in the high 80s and the low temperature averages in the high 60s (Armstrong, 1983). June through August are historically the warmer months of the year, while the cooler months are January through March.

Average rainfall distribution in the Kihei-Makena region varies from under 10 inches per year to 30 inches per year in the higher elevations. Rainfall in the Kihei-Makena region is highly seasonal, with most of the precipitation occurring in the winter months.

Northeast tradewinds prevail approximately 80 to 85 percent of the time. Winds average 10 to 15 miles per hour during afternoons with slightly lighter winds during mornings and nights. Between October and April, the southerly winds of Kona storms may be felt.

In the absence of tradewinds and of nearby storms, winds may become light and variable. The diurnal heating and cooling of the land mass gives rise to on-shore sea breezes during the day and off-shore land breezes at night.

Potential Impacts and Mitigative Measures

Design of the proposed project will be typical for a tropical climate. The proposed project will have no effect on climatic conditions and no mitigative measures are necessary. Project landscaping will help mitigate any localized temperature increases from parking areas, roadways, and buildings.

3.2 TOPOGRAPHY

The project site is generally flat with average maximum slopes of two percent. On-site elevations range from five feet to 72 feet above sea level. The contours of the project area are shown on Figure 1.

Anticipated Impacts

The implementation of the project will require vegetation removal, earthwork, and grading. Development of building sites will require grading to establish level building surfaces with new drainage improvements to direct surface flows into the project's drainage system. The natural topography of the land will not require any major cut and fill of building areas.

Mitigative Measures

All grading operations will be conducted in full compliance with dust and erosion control and other requirements of the County of Maui Grading Ordinance, and all construction activities must comply with the provisions of Chapter 11-60.1, Hawaii Administrative Rules, Section 11-60.1-33 on Fugitive Dust.

3.3 SOILS AND GEOLOGY

There have been three soil suitability studies prepared for Hawai'i whose principal focus have been to describe the physical attributes of land and the relative productivity of different land types for agricultural production. These are: 1) Land Study Bureau Detailed Land Classification; 2) the Agricultural Lands of Importance to the State of Hawai'i (ALISH); and 3) the U.S. Department of Agriculture Soil Conservation Service (SCS) Soil Survey.

In addition, a Geotechnical Study has been prepared for the project (Appendix C).

Land Study Bureau - In terms of overall productivity ratings based on the Land Study Bureau Soil classification, the project site is rated as "E" which indicates little or no suitability for soils based agriculture (see Figure 9). Therefore, the loss is insignificant and will not impact the agricultural resources of Maui.

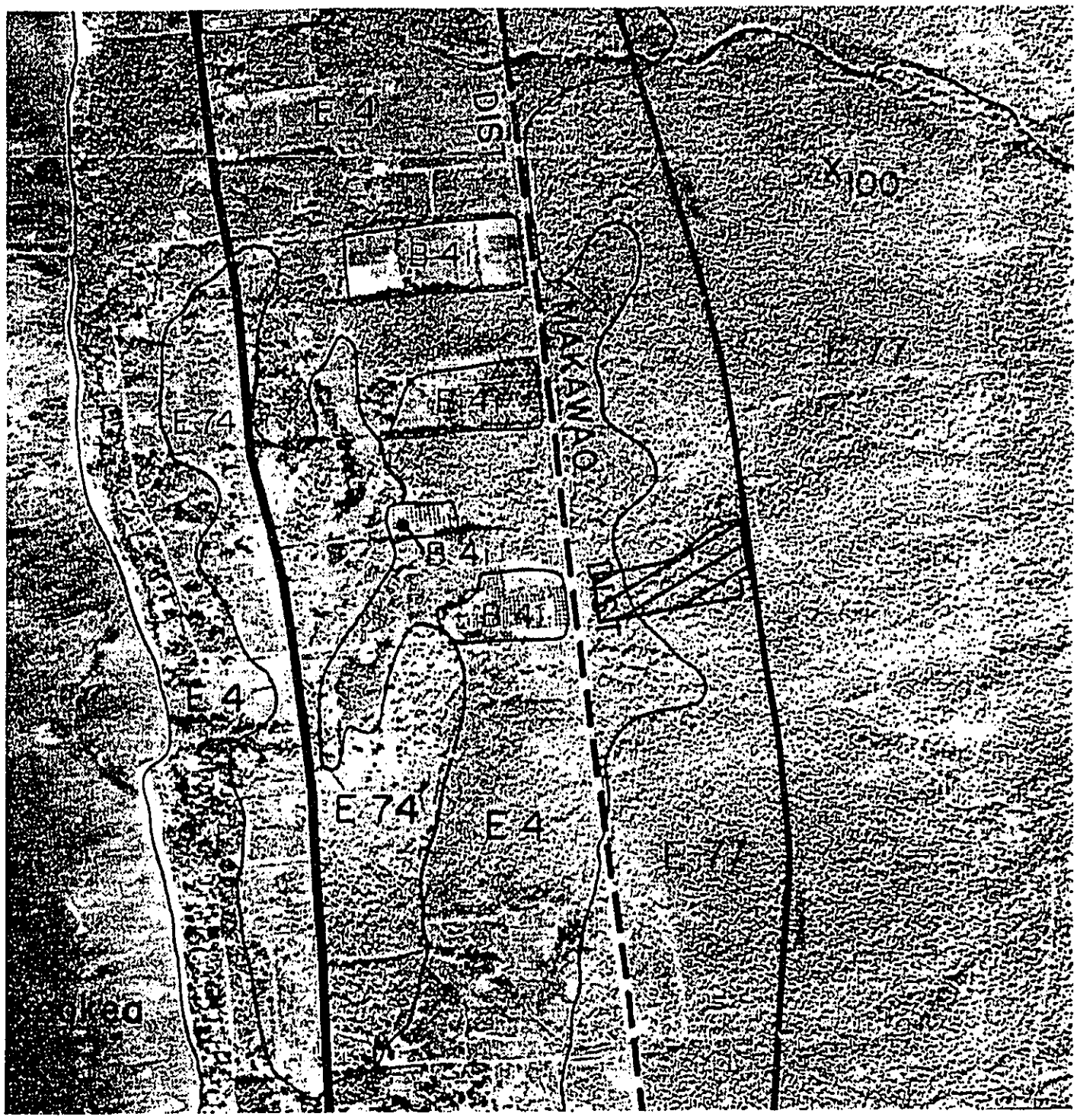
ALISH - The Agricultural Lands of Importance to the State of Hawaii (ALISH) classification system identifies a portion of the subject property as "Prime". Prime agricultural lands are defined as lands that are best suited for agriculture due to soil quality, growing season and moisture supply. However, the size, location, and future surrounding uses of the subject parcel make agriculture use of the land not economically viable at the present time (see Figure 10).

Soil Conservation Service - The soils on the project site reflect those of the Pulehu-Ewa-Jaucas soil association and are located in the central Maui and Kihei shoreline areas. According to the united States Department of Agriculture soil Conservation Service Islands of Kauai, Oahu, Maui, Molokai, and Lanai, state of Hawaii 1972, Soil Survey, the land is classified in four categories, of which Waiakoa extremely stony silty clay loam (WID2) and Pulehu clay loam (PsA) comprise the majority of the site. The soils and respective characteristics are described below (Figure 11).

•Waiakoa extremely stony silty clay loam (WID2). 3 to 25 percent slopes, eroded. Runoff is medium and erosion hazard is severe. Capability classification VIIs, Nonirrigated.

•Pulehu clay loam, 0 to 3 percent slopes (PsA). Runoff is slow, and erosion hazard is slight. Capability classification IVS if irrigated and VIs if nonirrigated.

Geotechnical Study - In general, the project site consists of approximately 3 to 10 feet of very stiff clayey silt material overlying cliinker materials, which consisted of medium dense



LEGEND

Project Site

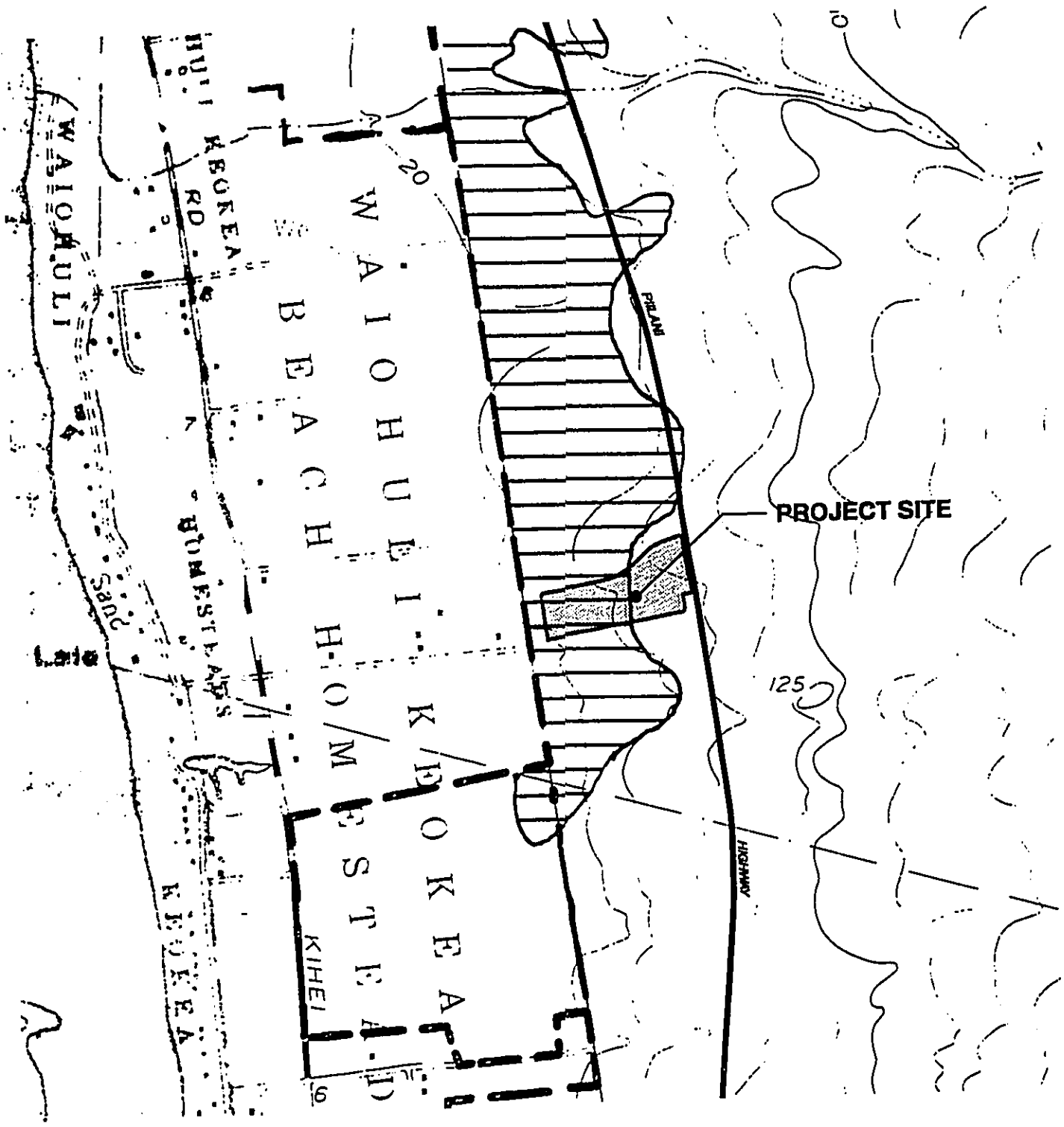
Source: Land Study Bureau, University of Hawaii

FIGURE 9
DETAILED LAND CLASSIFICATION
Kihei Community Center and Swimming Pool Complex

0 500 1000
FEET

May 1997

PBR HAWAII



LEGEND

- Prime
- Other Important Agricultural Land
- Existing Urban Development

Source: Department of Agriculture - State of Hawaii, 1954

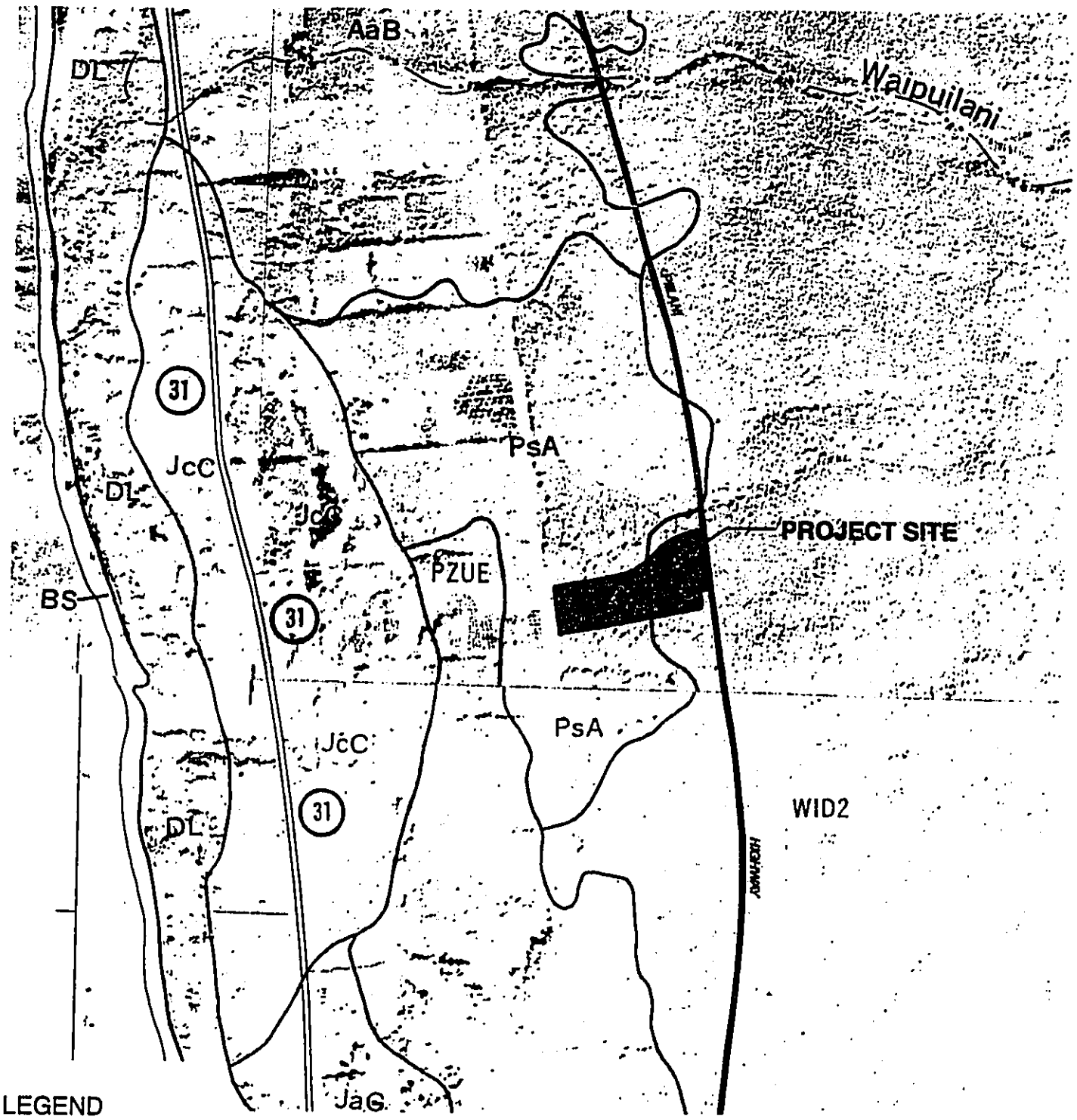
FIGURE 10
AGRICULTURAL LANDS OF IMPORTANCE TO THE STATE OF HAWAII (ALISH)

Kihei Community Center and Swimming Pool Complex

0 500 1000 FEET

May 1997

PBR HAWAII



LEGEND

AaB	Alae sandy loam
WID2	Waikaloa extremely stony silty clay loam
DL	Dune Land
BS	Beaches
JaC	Jaucas sand
JcC	Jaucas sand, saline
PsA	Pulehu clay loam
PZUE	Puuone sand

Source: US Department of Agriculture Soil Conservation Service

FIGURE 11
SCS SOIL SURVEY
Kihei Community Center and Swimming Pool Complex

0 500 1000
FEET

May 1997

PBR HAWAII

basalt gravels and cobbles intermixed with sands, silts, and clays. The clinker materials are generally underlian by hard basalt rock formation extending to the maximum depth drilled of approximately 15 feet below the existing ground surface. Detailed findings are presented in Appendix C.

Groundwater was not encountered in sampled borings during the latest field exploration. However, groundwater levels can fluctuate depending on factors such as seasonal rainfall, groundwater withdrawal and/or injection, and other factors.

Based on the existing topography and the proposed finish floor elevations, it is anticipated that the proposed community center building will be constructed in cut areas of up to approximately 5 feet thick and the proposed pool complex buildings may straddle cuts and fills of approximately 2 feet thick.

Potential Impacts and Mitigative Measures

The soils of the project site have low productivity for agricultural purposes and therefore, the project will not have a significant impact on this characteristic. The soil is generally suited for construction, and short term impacts due to construction, such as erosion, ponding, and dust, should be avoided with construction control measures such as wind screens, on-site drainage retention basins, and frequent watering.

3.4 HYDROLOGY AND DRAINAGE

The project site generally slopes from east to west. There is a mounded area with top elevation 80' mean sea level at the north east corner of the site. With the exception of this mounding, slopes range from 2 to 7 percent. There are no perennial streams and/or intermittent gulches of appreciable size on the property.

The peak 50 year, one year storm runoff for the project site is 5.3 cubic feet per second (CFS).

There is an existing natural drainage way that passes through the proposed project site. Two 66-inch corrugated metal pipes cross under Piilani Highway and outlet onto the site at the southwest corner, near the Lipoa Street and Piilani Highway intersection. The offsite runoff surface flows through a drainage way and leaves the site at the southwest corner of the project site, at the future intersection of the North-South Collector and Lipoa Street. The flows then follow Lipoa Street west and enters an existing drainage system that is inadequate to handle these flows. The excess runoff that the existing system cannot handle flows down Lipoa Street and floods at South Kihei Road.

The drainage basin for the offsite runoff passing through the project site is 340 acres with a 50 year, 6 hour duration peak discharge of 404 CFS. The 100 year peak flows are 551 CFS. Existing offsite flows from properties north of the project site generally flows west or north and do not enter the site (see Appendix A).

Additional runoff generated from the developed site will be retained on site. Onsite retention will consist of retention basins and onsite retention in an underground percolation/piping system. Developed peak runoff volumes for a 50 year one hour storm duration is 35 CFS. The total increase due to development is 29.7 CFS.

Off-site

The County of Maui's Drainage Master Plan for the project area shows flows from the existing two (2) 66-inch diameter culverts passing under Piilani Highway to enter a concrete box culvert system and cross Lipoa Street at the future North-South Collector Road intersection and flow south approximately 600 feet to an existing 71-inch x 47-inch corrugated arched pipe culvert. From here flows follow proposed concrete channels and outlet at the existing regulation reservoir makai of Kihei Road. This system is proposed to be phased and presently is inadequate to handle the flows that pass through the project site.

Potential Impacts and Mitigative Measures

Flows from the two (2) 66-inch diameter culverts at Piilani Highway are proposed to enter an underground 72-inch diameter drain line for a distance of approximately 700 linear feet. Runoff will then outlet within the project site and follow existing drainage patterns prior to leaving the project site.

The velocity and volume of the offsite flows is not expected to increase and there will be no additional adverse effects resulting from the new development to adjacent and downstream properties.

The proposed 72-inch diameter drain line are interim improvements and can be incorporated into the County of Maui's Kihei Drainage Master Plan.

By retaining any additional runoff generated by the development of the Kihei Community Center and Swimming Pool Complex and by allowing the existing offsite flows to pass through the site and leave with no increase in velocity or volume, this project will not create any significant adverse effects resulting from the development to adjacent and downstream properties.

3.5 NATURAL HAZARDS

The project site is not unusually susceptible to potential natural hazards (tsunamis, floods, volcanic events and earthquakes). For example, the site is located outside the tsunami zone; there are no perennial streams and/or intermittent gulches of appreciable size on the property, and no flood prone areas within the property boundaries.

The State of Hawaii has been affected twice since 1982 by devastating hurricanes, 'Iwa in 1982 and 'Iniki in 1992. While it is difficult to predict these natural disasters it is reasonable to assume that future occurrences are possible given the record of the last fifteen years. The

project area, is no more or less vulnerable to the destructive winds and torrential rains associated with hurricanes and cyclones than other areas of the island. All structures will be constructed for protection from earthquakes in accordance with the Uniform Building Codes adopted by the County.

The project site is also located outside of significant lava-flow and other volcanic event hazard areas. The only known historic volcanic activity on Maui was a small eruption in 1790 on the south flank of Haleakala.

Impacts and Mitigation Measures

The project will not exacerbate any hazard conditions. Planning and design for the project will implement standard building standards to mitigate any potential damages. The potential impact of destructive winds and torrential rainfall of tropical hurricane and cyclones on structures within the project will be mitigated by compliance with the Uniform Building Code adopted by the County. All structures will be designed in accordance with the requirements of the County for earthquake and wind.

3.6 FLORA AND FAUNA

According to the County's *Draft Environmental Assessment: Road "C" and North-South Collector Road Segment* (Feb 1997), vegetation on the project site consists primarily of buffelgrass with scattered kiawe and koa haole. Avifauna and mammals common to the project site are typical of species found in the urbanized Kihei area. Feral mammals found in the area include cats, rats, mice, and mongoose. Exotic species of birds common to the area include the Northern Cardinal, Common Mynah, Golden Plover, Spotted Dove, House Finch, Gray and Black Francolin, and the Blue Heron. There are no known endangered or threatened species of wildlife or vascular plants on the project site (see Appendix D).

Potential Impacts

No unique or special habitat features essential to native wildlife is characteristic of the property. The removal of existing flora from the site is not considered a significant adverse impact.

Mitigative Measures

The project will be landscaped with plantings as appropriate to replace the exotic species which currently dominate the site.

3.7 ARCHAEOLOGICAL AND HISTORIC RESOURCES

An archaeological inventory survey for the project site was conducted and the survey resulted in the discovery of a low rock shelter located in an area of dense buffelgrass cover. The rock shelter is located outside of the project area and will not be affected by the proposed project.

An additional survey conducted found the North-South Collector area to be already disturbed by grading and an existing dirt road.

The State Historic Preservation Division inspected the area and no evidence of historic sites were found (see Appendix D).

Potential Impacts and Mitigative Measures

Based on the findings of the surveys, no archaeological surface features exist on the subject property and that little or no negative impacts are anticipated.

The State Historic Sites Division will be immediately notified if artifacts or human remains are uncovered during site preparation stages of development. If the need for further archaeological study is indicated, all applicable requirements of the Department of Land and Natural Resources will be executed.

3.8 NOISE

Existing traffic and background ambient noise levels were measured at five locations in and around the project area[1]. These include the classroom buildings of Kihei Elementary School, the Haggai Institute building, and scattered dwelling units. Existing background ambient noise levels at these noise sensitive properties range between 58 Leq (hourly equivalent sound level) to 66 Leq, or between 59 to 67 Ldn (day-night sound level).

The existing background ambient noise levels from the natural sounds of wind, foliage and birds, as well as intermittent aircraft and traffic are generally less than the average noise levels associated with the proposed land uses.

Noise levels outside the existing classroom and library buildings of Kihei Elementary School currently range form approximately 62 to 64 Leq. Inside the naturally ventilated school buildings, existing interior noise levels may exceed the 52 Leq interior noise criteria set by the U.S. Federal Highway Administration if those buildings are within 700 feet (213) of the centerline of Piilani Highway.

In the future, potential noise impacts will be generated from short-term construction activity and long-term operations of the project. Additional ambient future noise levels will likely be generated from traffic on the surrounding roadways.

Potential Impacts and Mitigative Measures

Construction noise may impact nearby existing residential areas, but will be confined to daytime only and should be relatively short-term. Noise associated with the operation of the

---

[1]Y. Ebisu & Associates. *Acoustic Study for the Kihei Collector Road "C" Project*, June 1995

project will be mitigated through landscaping, grading, site design and building orientation in accordance with the County of Maui and Department of Health requirements. In addition, the Main Hall will be acoustically designed to minimize noise.

As indicated on the project Site Plan, the Main Community Center Complex is sited approximately 200 feet from buildings at Kihei School. The main building has been oriented with the major entry and parking areas directed away from adjoining properties to reduce noise and visual impacts. Major buildings will also be air conditioned to reduce the levels of noise exiting the buildings during special events. A noise specialist will provide input on the physical aspects of the site design and building architecture.

3.9 AIR QUALITY

Both Federal and State standards have been established to control ambient air quality. At present, six parameters are regulated including: 1) particulate matter; 2) sulphur dioxide; 3) nitrogen dioxide; 4) carbon monoxide; 5) ozone; and 6) lead. Hawaii's standards are more stringent than comparable national limits except for sulphur dioxide. Regional and local climate, together with the type and amount of human activity, generally dictate the air quality at a given location. Present air quality is estimated to be good; this is primarily due to the predominant northeast trade winds.

Present air quality in the area of the subject property is mostly affected by air pollutants from vehicular, natural, and/or agricultural sources. Adjacent to the subject property, is Piilani Highway that presently carries moderate levels of vehicular traffic during peak traffic hours. Emissions from motor vehicles using this roadway, primarily nitrogen oxides and carbon monoxide, will tend to be carried over portions of the subject property by the prevailing winds. Another source of airborne emissions may include smoke from sugarcane burning which occurs in the Central Maui Isthmus. This source is intermittent, however, and prevailing tradewinds quickly disperse particulates which are generated.

Air quality impacts attributed to the project will include dust generated by short-term construction-related activities. Site work such as clearing, grubbing and grading, and utilities and parking construction for example, will generate air-borne particulates. Dust control measures, such as regular watering and sprinkling, will be implemented to minimize wind-blown emissions.

Potential Impacts

Future construction within the subject property may produce short- and long-term air quality impacts. Short-term impacts will include fugitive dust and exhaust emissions produced by construction equipment and vehicles. Long-term impacts will result from gradual urbanization of the area and future population growth. These impacts include increased vehicular exhaust, as well as indirect sources such as increasing electrical power uses. However, because of the relatively small scale of the project, these impacts are not expected to adversely impact local and regional ambient air quality conditions.

Mitigative Measures

Air quality impacts will result during construction phases and over the long-term from increased localized automobile emissions. However, fugitive dust generated during construction can be mitigated through frequent watering during construction and rapid establishment of plant materials once grading is completed.

Cumulative increases in auto emissions on an island-wide basis will not be significant. Vehicular emissions will increase from construction equipment during the short-term construction period and over the long-term from highway passenger vehicles. However, State and Federal air quality standards will not be exceeded and no significant adverse impacts are anticipated. Over the long term, increased vehicular traffic will not violate state or federal air quality standards based on the moderate level of existing traffic volumes in the project region.

All future construction activity on the subject property will maintain strict compliance with State of Hawaii Air Pollution Control regulations. A combination of measures such as watering exposed soils, minimizing the amount of disturbed area, and installation of wind screens would be implemented as appropriate. Impacts from exhaust emissions of construction vehicles will usually be mitigated by the effect of the winds, especially as most construction will be removed from existing residential area or other sensitive land uses. Particular care in implementing dust control should be taken when construction activities take place near existing homes or the highway.

3.10 VISUAL RESOURCES

Views of the project site will be altered from the present vacant scrub/kiawe vegetation to a landscaped environment. See Figure 12 for a photo visual analysis of the site and Figure 7-A and 7-B for site plan and elevations. A majority of the project will be utilized as open space (play fields), swimming complex, and landscape buffered parking area.

Potential Impacts and Mitigative Measures

All applicable County of Maui height and setback requirements will be complied with to facilitate maintenance of view corridors and appropriate densities. The proposed structures will not significantly impact the makai view corridors from the Piilani Highway, as the proposed structures will be shorter and have less mass than the existing Haggai Institute building (see Figure 12-D). Views of the West Maui mountains and Haleakala also will not be significantly impacted because of the property's location in relation to existing and future residential parcels and major roads. The project will blend visually with the proposed adjoining land uses. Landscaping and architectural design incorporated into the project can enhance the visual qualities of the site compared to the current vacant condition.

Ⓐ View of the western portion of the site from the future North-South Collector Road with Haleakala in the background. The grassy area is the area proposed for a soccer field.

Ⓑ Looking south along the proposed North-South Collector Road. To the left is the existing elementary/ intermediate school grounds.

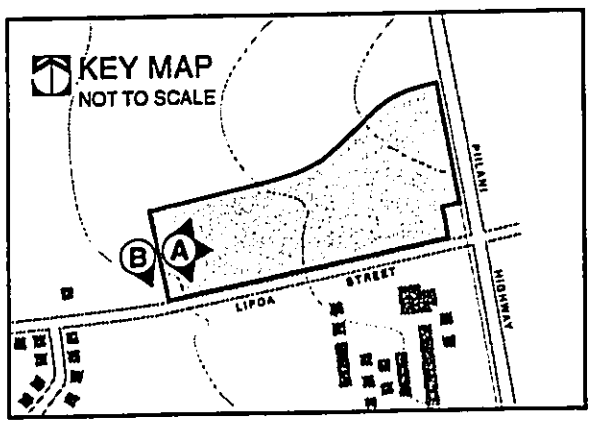
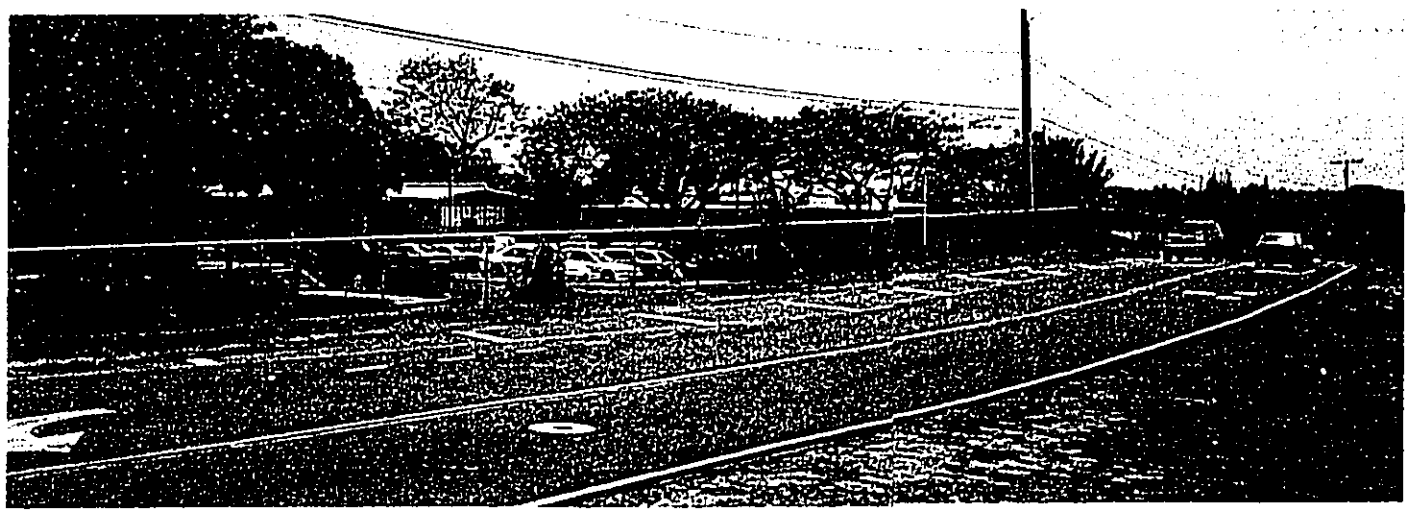


FIGURE 12-A
VISUAL ANALYSIS
Kihei Community Center and Swimming Pool Complex

May 1997

PBR HAWAII

Ⓒ Looking east along Lipoa Street. To the left is the project site. The immediate area will be a landscaped buffer for the proposed pool area.



Ⓓ View from the proposed parking area, looking across Lipoa Street to the existing school parking.

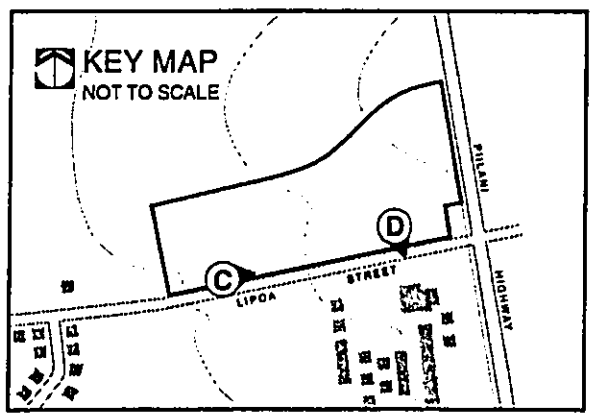


FIGURE 12-B
VISUAL ANALYSIS
Kihei Community Center and Swimming Pool Complex

May 1997

Ⓔ View from the southeastern boundary of the project site (along Lipoa Street), looking east across Piilani Highway.

Ⓕ View from the southeastern portion of the project site, looking north east. Piilani Highway runs along the eastern edge.

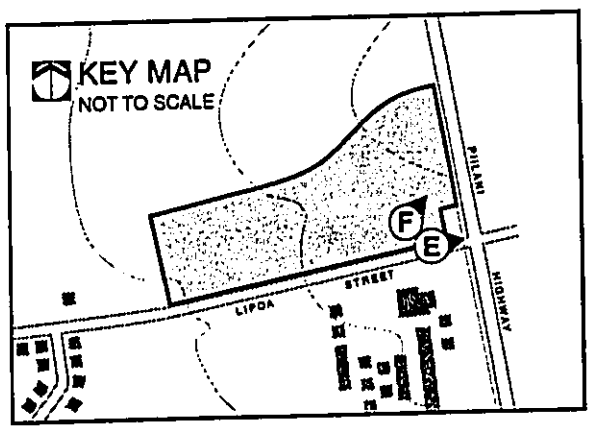
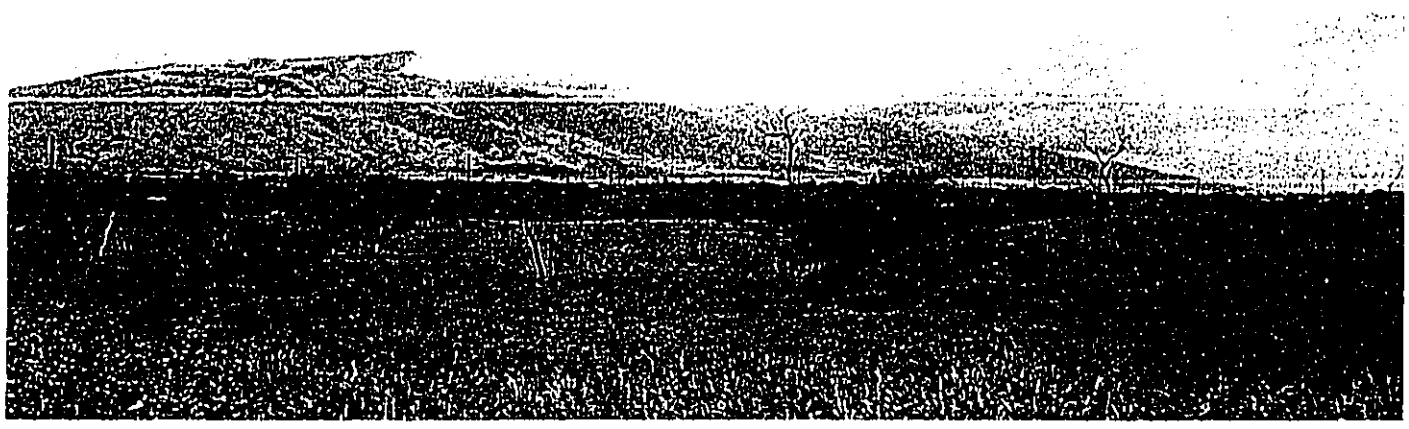


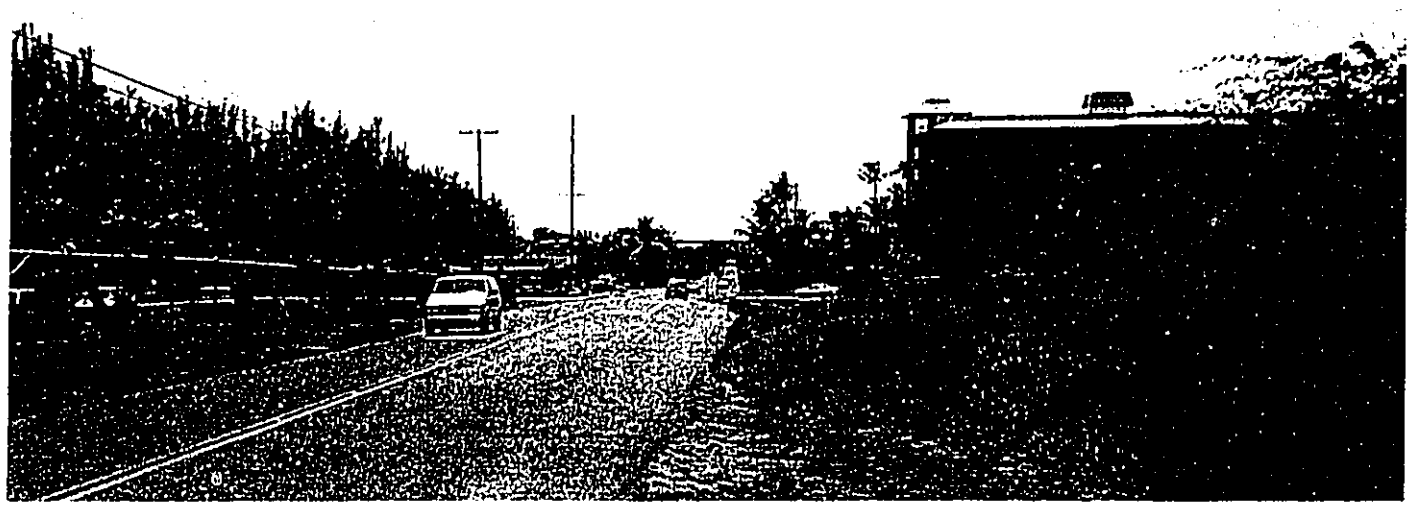
FIGURE 12-C
VISUAL ANALYSIS
Kihei Community Center and Swimming Pool Complex

May 1997

PBR HAWAII



Ⓖ Looking north over the project site toward the West Maui mountains. A parking area and community halls are proposed for this area.



Ⓗ Looking west at the proposed soccer field area. The building in the back is the Haggai Institute. The elementary/intermediate school and residences are to the left.

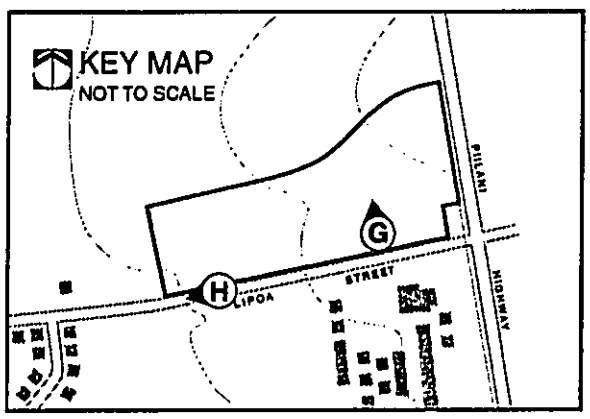


FIGURE 12-D
VISUAL ANALYSIS
Kihei Community Center and Swimming Pool Complex

May 1997

3.11 SOCIAL AND EMPLOYMENT CHARACTERISTICS

Employment

During the construction stages of project development, there will be a temporary increase in the number of construction jobs on Maui. A few long-term jobs would be generated by the project.

Impacts and Mitigative Measures

The socio-economic impacts associated with the project are positive and will not require mitigation.

3.12 CHARACTER OF THE COMMUNITY

The proposed land use has been planned to complement the existing and future surrounding land uses. The project will provide additional recreational and community facilities to improve the overall quality of life for Kihei residents. In response to the proposed project, adjoining landowners will design a site master plan at an appropriate time in the land use and development approval process.

3.13 INFRASTRUCTURE

3.13.1 Roadways and Traffic

The project site is bordered by Piilani Highway on the east and Lipoa Street on the south. Piilani Highway is a two-lane, two-way State highway running north-south. Major intersections along Piilani Highway are signalized with separate left turn phases for north-south traffic. Lipoa Street is a two lane County road that is signalized at its intersection with Piilani Highway. The traffic characteristics of these two roadways is summarized in Section 2, Table 1.

Both intersections operate at LOS C or better during the peak hours. It should be noted that there are long queues for left turning vehicles into and out of Kihei School during the peak hours. Queues of 9 to 10 vehicles were observed several times. This is reflected in the LOS calculations in Appendix B. However, the total intersection delay is minimal because the through traffic movements have little or no delay. Therefore, the overall intersection operates at an acceptable level of service.

The intersection of Piilani Highway at Lipoa Street was analyzed using the methodology for signalized intersections. This intersection is expected to operate at LOS 'A' during both peak hours with the widening to four lanes as indicated in the *Draft Traffic Assessment for Kihei Road 'C'* whether the project is built or not. An LOS analysis for the intersection with Piilani Highway as a two-lane roadway was also performed to determine conditions if Piilani

Highway is not widened. The analysis determined that the LOS will be 'E' and the change in the V/C ratio is less than the 0.020 that defines the impact as significant.

Potential Impacts and Mitigative Measures

The intersection of the North-South Collector at Lipoa Street and the driveways into the project were analyzed using the methodology for unsignalized intersections. The analysis was performed assuming the North-South Collector was constructed as a three-lane roadway and that Lipoa Street as three lanes. All intersections are expected to operate at LOS 'B' or better.

The results of the signal warrant analysis are:

1. A traffic signal is not warranted for the intersection of Lipoa Street at the North-South Collector if the intersection is modified to provide an additional northbound through lane. The intersection should be modified to provide an additional lane to accommodate northbound through traffic. Conversion from a two-way stop controlled intersection to a four-way stop controlled intersection would improve the LOS for all approaches to 'C' or better. Otherwise, the northbound approach will operate at LOS 'D.'

2. The warrants for a flashing beacon or a traffic signal at the intersection of Lipoa Street at Drive 'A' are not satisfied. Students crossing Lipoa Street should be directed to the Lipoa Street North-South Collector intersection which should be modified from a two-way stop controlled intersection to a four-way stop controlled intersection.

According to the Traffic Impact Report prepared for the project, the following mitigation measures are recommended:

- No mitigation measures are required for the intersection of Piilani Highway at Lipoa Street.

- Traffic signals are not warranted for the intersection of Lipoa Street at the future North-South Collector under cumulative or cumulative plus project conditions if the intersection is modified to provide a separate northbound through lane when the North-South Collector is constructed.

- An analysis of the required lengths of left turn storage lanes determined that the minimum length for left turns from Lipoa Street to northbound Piilani Highway is 250 feet and left turns from Lipoa Street to the school is 200 feet. Therefore, it is not possible to relocate left turns to the school to a location opposite the entrance to the project. Traffic to the school will have to use the Lipoa Street/North-South Collector intersection where the proper left turn storage capacity can be provided.

- An analysis of the intersection of Lipoa Street at Drive 'A' determined that a flashing beacon or traffic signal is not warranted under the warrants for a school crossing. The distance to the traffic signal at Piilani Highway is less than 600 feet, which is the minimum distance required.

3.13.2 Water Supply

Potable water for all central Maui is taken from Iao Aquifer located in the west Maui Mountains with a defined sustainable yield of 20.0 million gallons per day (MGD). The present withdrawal from the system as of April 1, 1997 was 20.18 MGD.

At the project site, the transmission line from the Iao Aquifer is a 36" concrete line and located at the future north-south collector roadway. Parallel to the 36" transmission line is a 18" cast iron water line. A 16" line that reduces to 12" and back to a 16" line is connected to the 18" line and is an inflow line to the tank at Lipoa mauka of the Kihei Research and Tech Park from the tank a 12" ductile iron line goes down Lipoa reducing to an 8" cast iron line below Piilani Highway across from Kihei Elementary School. This 8" connects into the 18" line. A 16" line proposed by others is planned to connect where the 12" line now reduces to an 8" line (see Appendix A).

The project water will connect to the proposed 16" line. If not installed by others, the County will install a portion to allow service to the project.

Impacts and Mitigation Measures

The average daily demand for potable water for the proposed Kihei Community Center and Swimming Pool Complex at full development is estimated by Sato and Associates to be approximately 8,600 gallons.

The Department of Water Supply (DWS) is in the process of implementing other sources to reduce the demand on the Iao Aquifer. The Iao ditch is being developed as a source to provide a proposed 1 MGD (million gallons per day). Also, Waihee Well is being developed to produce from an additional 1 to 2 MGD. These sources are planned for operation within the next two years. Sources are also being developed in east Maui, although the DWS does not guarantee this water will be available at the time a water meter is requested for the project.

An estimated 35,000 GPD (gallons per day) of non-potable water would be required for landscape irrigation. The irrigation system is anticipated to utilize reclaimed water provided by the Department of Public Works and Waste Management from the Kihei Wastewater Reclamation Facility which should be available in November of 1998.

Given the relatively low quantities of water required for the proposed project and the planned availability of new water sources within the next two years, the proposed project will not

significantly impact the ground water resource. Protection of groundwater resources will also be maintained by the installation of central sewage collection, treatment, and disposal facilities.

3.13.3 Wastewater Treatment and Disposal

The service area for the County's Kihei wastewater collection system extends from North Kihei to Wailea. The system consists of a number of pump stations, force mains and gravity lines which convey flows to the Kihei Wastewater Reclamation Facility, located mauka of Piilani Highway and south of the project site. The Kihei facility has a total available capacity of 420,000 gallons per day with 234,000 gallons per day of the total available for public/quasi-public and other commercial developments. Based on discussions with the County of Maui Wastewater Reclamation Division, expansion of the Kihei Treatment Facility will be complete by the end of the calendar year 1997 with 2 million gallons per day additional capacity available.

Existing sewer lines in the vicinity of the project include an 8-inch line extending along Lipoa Street and an 8-inch line along South Kihei Road. The project wastewater would connect to existing 8" sewer lines at the intersection of the future north-south collector and Lipoa Street and travel by gravity west to Kihei Road. It then gravity flows north to Pump Station 4 located at Nohokai Street and Kihei Road. It then goes to the south by force main and gravity line to Pump Stations 5 and 6. Pump Station 6 pumps the wastewater east to the Kihei Wastewater Treatment Facility.

The Kihei Wastewater Reclamation Facility treats the effluent wastewater to R-1 quality, the highest rating for effluent in the State of Hawaii. They are in the process of installing a 1 million gallon tank and infrastructure to increase the capacity of the effluent for dust control and irrigation uses.

A 12" reuse line is planned for installation by November 1998, to be available for use in irrigation for the project and other existing and developments in Kihei.

Potential Impacts and Mitigative Measures

An estimated 4,600 GPD of wastewater will be generated from the project. The proposed project is not anticipated to adversely impact capacity and service requirements of water and wastewater systems. In addition, the project will utilize approximately 35,000 GPD of reclaimed water in the future for project irrigation. Considering the quantity of wastewater generated and quantity accepted by the project for disposal as irrigation water, the overall wastewater net impact should be positive.

3.13.4 Drainage Facilities

The peak 50 year, one year storm runoff for the project site is 5.3 cubic feet per second (CFS). There is an existing natural drainage way that passes through the proposed project

site. Two 66-inch corrugated metal pipes cross under Piilani Highway and outlet onto the site at the southwest corner, near the Lipoa Street and Piilani Highway intersection. The offsite runoff surface flows through a drainage way and leaves the site at the southwest corner of the project site, at the future intersection of the North-South Collector and Lipoa Street. The flows then follow Lipoa Street west and enters an existing drainage system that is inadequate to handle these flows. The excess runoff that the existing system cannot handle flows down Lipoa Street and floods at South Kihei Road.

The drainage basin for the offsite runoff passing through the project site is 340 acres with a 50 year, 6 hour duration peak discharge of 404 CFS. The 100 year peak flows are 551 CFS. Existing offsite flows from properties north of the project site generally flows west or north and do not enter the site (see Appendix A).

Additional runoff generated from the developed site will be retained on site. Onsite retention will consist of retention basins and onsite retention in an underground percolation/piping system. Developed peak runoff volumes for a 50 year one hour storm duration is 35 CFS. The total increase due to development is 29.7 CFS.

Off-site

The County of Maui's Drainage Master Plan for the project area shows flows from the existing two (2) 66-inch diameter culverts passing under Piilani Highway to enter a concrete box culvert system and cross Lipoa Street at the future North-South Collector Road intersection and flow south approximately 600 feet to an existing 71-inch x 47-inch corrugated arched pipe culvert. From here flows follow proposed concrete channels and outlet at the existing regulation reservoir makai of Kihei Road. This system is proposed to be phased and presently is inadequate to handle the flows that pass through the project site.

Potential Impacts and Mitigative Measures

Flows from the two (2) 66-inch diameter culverts at Piilani Highway are proposed to enter an underground 72-inch diameter drain line for a distance of approximately 700 linear feet. Runoff will then outlet within the project site and follow existing drainage patterns prior to leaving the project site.

The velocity and volume of the offsite flows is not expected to increase and there will be no additional adverse effects resulting from the new development to adjacent and downstream properties.

The proposed 72-inch diameter drain line are interim improvements and can be incorporated into the County of Maui's Kihei Drainage Master Plan.

By retaining any additional runoff generated by the development of the Kihei Community Center and Swimming Pool Complex and by allowing the existing offsite flows to pass through the site and leave with no increase in velocity or volume, this project will not create

any significant adverse effects resulting from the development to adjacent and downstream properties.

3.13.5 Solid Waste Disposal

Solid waste collection service is provided by the County of Maui on a once-a-week basis. Solid waste collected by County crews is disposed at the County-owned and operated land fill. A solid waste management plan will be prepared and coordinated with the Solid Waste Division of the County Department of Public Works and Waste Management, as applicable.

Solid waste generated by the proposed development during the construction phase, will consist primarily of organic matter as a result of grubbing activities. To the extent possible, this material will be disposed of on-site or recycled.

Potential Impacts and Mitigative Measures

To minimize impacts to the county landfill, vegetation during construction can be disposed on in open space areas to allow for natural decomposition, and chip and compost material for use as mulch and/or soil conditioner in accordance with applicable county regulations or requirements.

Due to the lack of expected adverse impacts resulting from solid waste disposal, mitigation measures to minimize potential adverse impacts do not appear warranted at this time.

3.13.6 Electrical/Communication

Electrical service is provided by Maui Electric Company, Ltd. and telephone service is provided by GTE Hawaiian Tel.

Potential Impacts and Mitigative Measures

No negative impacts on utility systems will result from the development of this project. Cumulative impacts generated by this and other projects on an island-wide basis will impact future needs. The project architects will continue to work with Maui Electric Company in determining the specific transmission, distribution, and substation requirements of the project. All necessary easements will be provided to accommodate transmission lines and associated improvements. Similarly, the Applicant will work with GTE Hawaiian Tel to determine project needs and solutions.

3.14 PUBLIC SERVICES

3.14.1 Police and Fire

The Maui Police Department (MPD) consists of five (5) patrol divisions and includes 410 employees. These divisions provide police services through its Hana, Lahaina, Lanai,

Molokai, and Wailuku districts. On Maui, the MPD includes 373 administrative, patrol, and support personnel.

Police services for the Kihei-Makena subdistrict are currently provided by patrol officers on assignment from the Wailuku Patrol Division. Each eight (8) hour watch is staffed by a minimum of four (4) patrol officers.

Fire prevention, protection, and suppression services are provided by the Maui Fire Department's (MFD) Kihei Station. Situated approximately one (1) mile south of the project site, the Kihei Fire Station is equipped with a 1,500 gallon pumper, and is staffed by one (1) captain and five (5) firefighters per twenty-four (24) hour shift.

Potential Impacts and Mitigative Measures

To maximize potential public safety, the project site plan has been designed in consultation with the Maui Police Department and principles from Tomasi-Dubois & Associates on Crime Prevention Through Environmental Design (CPTED) at the earliest stages of project development. However, with any facility of this type, manpower needs may be impacted due to the need for additional night patrols and general security.

Fire protection capability may increase as a result of water system improvements and the replacement of dry grasses and brush that currently exist on the site.

There may be an occasional and unavoidable demand for both fire and police protection services associated with the overall development. Existing levels of fire protection services and facilities are considered adequate to service the proposed project.

3.14.2 Schools

The State Department of Education (DOE) operates three (3) schools in the Kihei area. Kihei Elementary School covers grades K to 5, with an enrollment of approximately 911 students. Kamali'i Elementary School, a second elementary school with an enrollment of approximately 580 students, opened in August 1996. Lokelani Intermediate School includes grades 6 to 8, with an enrollment of approximately 660 students. Kihei Elementary and Lokelani Intermediate are located across the street from the project site. Public school students in grades 9 through 12 attend Maui High School in Kahului.

Potential Impacts and Mitigation Measures

Development of the project will not create additional need for educational facilities and therefore, mitigation measures are not required. The proposed facilities can potentially increase the availability of recreational opportunities for area students.

3.14.3 Recreational Facilities

The Kihei region has abundant beaches and dry climate. Six county beach parks, one state park, four private golf courses, and public boat launch are available proximate to the project area. Access to shoreline and coastal resources will not be affected.

Diverse recreational opportunities are available in the Kihei-Makena region. Over 90 percent of the Kihei-Makena region's parks are either directly on the beach, or across the street from a beach. Additional recreational opportunities are available in the Wailea-Makena area, including several championship golf courses and tennis courts. Shoreline recreation for both areas include swimming, fishing, picnicking, snorkeling, and windsurfing. The proposed project will increase the type of available recreation by increasing indoor recreation space and providing competition and training pool facilities.

Potential Impacts and Mitigation Measures

The proposed project will not result in any loss of existing recreation space nor increase demand upon existing recreation facilities. On the contrary, the project will increase Kihei's recreation space and perhaps lessen the demand upon existing facilities.

3.14.4 Medical Facilities

Maui Memorial Hospital, the only major medical facility on the island, services the Kihei-Makena region. Acute, general and emergency care services are provided by the 185-bed facility which is located in Wailuku. Several Kihei clinics, and dental and medical offices provide local health care services for Kihei-Makena residents and visitors.

Potential Impacts and Mitigation Measures

The proposed project is not anticipated to result in an increase in demand for medical facilities.

3.15 OVERALL SHORT-TERM AND LONG-TERM MITIGATION MEASURES

As indicated above, few potential adverse impacts to the area are expected to result from implementation of the proposed plan. Short-term impacts will result in the initial construction phase which will require on-site grading, trenching, and movement of vehicles within the project site. These activities will generate localized noise and dust during construction periods. Mitigation measures to minimize adverse air quality would include frequent watering of unpaved roads and construction areas, dust screens, and mulching and planting of ground cover and other vegetation as soon as possible after construction. Construction activities would comply with all applicable regulations of the City and State Department of Health.

Long-term impacts from the development are expected to produce minimal impacts to the adjacent schools, residences, and Haggai Institute. The proposed project is not expected to have any impact on the micro climate of the project area or region. Planned structures would not be tall enough to significantly effect existing wind patterns; and new structures will not significantly effect temperature since some localized cooling can be expected to result from the establishment of landscaping. No specific or predominate natural feature is visually associated with the project site.

Recommended mitigation measures include the following:

Short term:

- Frequent watering during construction and demolition activities to maintain dust control.
- Initiate a construction plan which considers wind patterns and existing and future residential land uses to minimize downwind dust impacts within residential areas.
- Grassing of swales and sodding as soon as practicable once grading has been completed.
- Wind screening as appropriate to limit fugitive dust.
- Restrict use of construction equipment to daylight hours.
- Establishment of on-site drainage retention basins during construction to mitigate soil erosion and off-site runoff.

Long term:

- Establish extensive landscaping to maintain long-term air quality and aesthetically integrate the project into the surrounding neighborhood.
- Use of appropriate engineering, design and construction measures to ensure adequate drainage and irrigation of the site.
- Construct transportation improvements to mitigate traffic generated by the plan.

3.16 SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed development will result in unavoidable construction related impacts as described earlier in this section. Potential effects include noise-generated impacts occurring from site preparation and construction activities. In addition, there may be temporary air

quality impacts associated with dust generated from construction activities, and exhaust emissions discharged by construction equipment. The proposed project is not anticipated to create any significant, long-term adverse environmental effects.

3.17 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed project will result in the loss of 9 acres of land for the development of the Community Center and Swimming Pool Complex. While the loss of this land is considered irretrievable, the projected need for such a facility outweighs the use of vacant land for the uses proposed. Financial resources of the County of Maui will also be required, however, the proposed project serves a public benefit with the use of public funds. Major resource commitments include the land on which the proposed project is located and the financial commitment for construction materials, manpower and energy required for the project's completion.

In addition to physical resources, labor and materials, which are mostly unrenewable and irretrievable will also be necessary. The operation of the project will require the consumption of potable water and petroleum-generated electricity which also represents irretrievable commitments of resources.

The impacts reflected by the commitment of these resources, should be weighed against the positive socio-economic benefits that could be derived from the project versus the consequences of either taking no action or pursuing another less beneficial use of the property. Consumption of these resources will be replaced by the creation of new employment, recreation, and community facilities. As such, significant enhancement to existing and future life-styles will result from the project compared to limited benefits derived from the "no-build" alternative.

No other significant irreversible and irretrievable commitments of resources have been identified in connection with the proposed action.

4.0

Alternatives to the Proposed Action

4.0 ALTERNATIVES TO THE PROPOSED ACTION

In compliance with the provisions of Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Section 11-200-17(f), the "known feasible" alternatives to the proposed project are limited to those that would allow the objectives of the project to be met, while minimizing potential adverse environmental impacts. The feasible alternatives must also realistically address the project's economic limitations while also responding to the surrounding residential land uses that will be impacted by the project. In conformance with applicable regulations, other possible alternatives to the proposed Master Plan have been investigated to identify the appropriate uses for the property and how they would best be accomplished.

4.1 *ALTERNATIVES CONSIDERED*

4.1.1 The Selected Alternative

The Selected Alternative's design program and location, have been determined by the County of Maui and indirectly by the current landowner, Baldwin*Malama. In accordance with the previously approved Project District 5 (Ordinance No. 2386) approved in December 1994, and the Special Management Area Permit for the planned Piilani Community, approximately 17 acres of land is dedicated for recreational purposes within the Project District. A significant portion of the subject property was planned by the Piilani Community master plan as a community park. At the appropriate time in the planning and approval process, Baldwin*Malama will transfer ownership of the subject property to the County of Maui.

Therefore, the availability of the subject property and its central location within Kihei, make the subject property ideally suited for the proposed use.

A letter of authorization from Baldwin*Malama permitting the County of Maui to prepare and process the required land use entitlements for the proposed facility on their property is provided in Appendix E.

The program elements of the proposed Kihei Community Center and Swimming Pool Complex, have been developed by the County of Maui Department of Parks and Recreation after consultation with community groups and individuals. Although the final layout and configuration of the proposed parcel will be refined through the engineering and architectural design process, its development will ensure that the long range use of the property will be consistent with surrounding land uses. Generally, the orientation, dimensions, and size of the buildings have been determined by the program requirements of the proposed facilities and community needs.

Those environmental impacts that do occur can be mitigated by the installation of appropriate infrastructure improvements and implementation of best management practices during project construction.

4.1.2 The No-Action Alternative

The "no-action" alternative would leave the subject property as essentially vacant, unused land. Consequently, the no-action alternative would not be consistent with community desires for new recreational opportunities in Kihei or the previously approved master plan for Project District 5 which conceptually provides for the use of the property as park land.

Although the Piilani Community master plan for Project District 5 has not been implemented, the "no-action" alternative for the property is not consistent with the Kihei-Makena Community Plan's vision of a master planned community for the Project District.

In any alternative plan prepared for the subject property and surrounding land uses, maintaining the parcel as vacant land is not consistent with plans prepared by the landowner or County of Maui for the area as set forth in the Kihei-Makena Community Plan. From a land use perspective, the land uses proposed for the property appears compatible with the existing and planned land uses for the area surrounding this parcel.

5.0

Significance Criteria

5.0 SIGNIFICANCE CRITERIA

5.1 SIGNIFICANCE CRITERIA

According to the Department of Health Rules (11-200-12), an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long-term effects. In making the determination, the Rules establish "Significance Criteria" to be used as a basis for identifying whether significant environmental impact will result from the development. According to the Rules, an action shall be determined to have a significant impact on the environment if it meets any one of the following criteria:

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resources;

The proposed project will not impact scenic views of the ocean or any ridge lines from heavily traveled roadways in the area. The visual character of the area of application will change from the current vacant land to a landscaped recreational complex compatible with the existing and planned surrounding land uses and programs set forth by the Kihei-Makena Community Plan. Presently, the subject property is not landscaped or otherwise improved. The property is not subject to coastal-related flooding and does not contain any wetlands or other unique habitats. Development of drainage systems will follow design standards of the County to ensure the safe conveyance and discharge of storm runoff.

As described by Appendix D, there are no known cultural resources associated with the property, nor and endangered flora or fauna species. Should any archaeologically significant artifacts, bones, or other indicators of previous on-site activity be uncovered during the construction phases of development, their treatment will be conducted in strict compliance with the requirements of the Department of Land and Natural Resources.

(2) Curtails the range of beneficial uses of the environment;

The subject property is not suitable for agricultural uses and the surrounding area is planned by the County of Maui and State Land Use Commission for urban land uses. Because the area is undergoing urbanization, the beneficial use of the property for agricultural production has already been significantly curtailed by both land use policy and the lack of physical attributes that would make the property suitable for agricultural purposes.

Given the physical limitations of the property for alternative uses, the proposed use of the property for public recreational purposes institutes a beneficial use of the land resource for residents of Maui. As such, the proposed project represents a beneficial use of the environment.

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

The proposed development is consistent with the Environmental Policies established in Chapter 344, HRS.

(4) Substantially affects the economic or social welfare of the community or state;

The proposed project will provide a contribution to residents' social welfare by providing additional recreational amenities and affording residents with the opportunity to "live and work in harmony" in a high quality living environment. The proposed development is consistent with the County's Kihei-Makena Community Plan for the area. Consequently, surrounding land use patterns will not be negatively or significantly altered, nor will unplanned population growth or its distribution be stimulated. The project's development is responding to projected population growth and the public's demand for recreation, rather than contributing to new population growth by stimulating in-migration.

Consequently, development of the subject property will provide future residents with a quality living environment close to their neighborhoods. This harmonious relationship between home and the land uses proposed by the proposed project will significantly improve the quality of life for many residents.

(5) Substantially affects public health

Although the public health may be affected by increased traffic, air quality impacts, and noise, these will be insignificant or not detectable, especially when weighed against the positive economic, social, and quality of life improvements associated with the community center and pool complex. Proposed lighting will be directed into the property and shielded as necessary.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities

Existing and planned large-scale housing development projects within the Kihei-Wailea-Makena region will contribute to a future population growth rate that will require expansion of public and private facilities and services. These improvements will become necessary as the overall population of grows and settlement patterns shift toward this area. However, the proposed project will not in itself generate new population growth, but provide meeting and recreation opportunities for a significant portion of the area's present and future population.

Infrastructure improvements will include access and parking, potable and non-potable water systems, wastewater collection, and drainage improvements to more efficiently control storm runoff from the project site. Potable water will be available in sufficient quantities for the

project and new opportunities for the reuse of treated waste water (in excess of the quantities generated by the project) will be provided through landscape irrigation.

The proposed project will provide both temporary and long-term employment opportunities during the construction period and permanent employment for operational support. Indirect employment in a wide range of service related industries will also be created from construction during project development and operation.

(7) Involves a substantial degradation of environmental quality;

The proposed development will utilize existing vacant land, but will not result in degradation of environmental quality. The Community Center and Swimming Pool Complex project will complement surrounding planned land uses associated with the future development of Project District 5. Makai views from the subject property are available, however, they are not significant nor generally available to the public in the property's present condition. No significant increases in air, noise, or water impacts are anticipated. No endangered plant or animal species or important habitat is associated with the property.

(8) Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions;

By planning now to meet the existing and future recreational needs of the community, development of the property is consistent with the existing and planned urban character if the area. None of the proposed uses will obstruct existing views or be visually incompatible with the surrounding low-rise character of existing development. No commitment for larger actions or significant cumulative impacts is associated with the project. Traffic levels, potable water consumption, and generation of waste water will increase, but the cumulative impact should be insignificant since the project will not stimulate in-migration into the area.

(9) Substantially affects a rare, threatened or endangered species or its habitat;

On-site studies indicate that there are no endangered plant or animal species located on the subject property.

(10) Detrimentally affects air or water quality or ambient noise levels;

Any possible impact to near-shore ecosystems resulting from surface runoff, will be mitigated by the establishment of retention basins during the construction phases of development and permanent retention facilities within the play field. This extensive system of planned drainage improvements will dramatically improve drainage of the entire property. After development, retention areas will enhance the recharge of the groundwater. Protection of groundwater resources will be facilitated by a centralized sewage collection, treatment, and disposal system.

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

Development of the property is compatible with the above criteria by establishing urban land uses within an existing urban area. The subject property does not contain any flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters and will not be impacted by the development.

(12) Substantially affects scenic vistas and view planes identified in county or state plans or studies;

Due to topographical characteristics of the property and the elevation of proposed structures, the view corridor primarily from the Piilani Highway will not be impacted. Views of the area to be developed are generally not significant. Although some rooftops will be seen looking makai from Piilani Highway, the proposed project will not establish negative visual impacts especially when compared to the existing vacant condition of the property. No County or State studies have identified scenic vistas and/or view planes associated with the property.

(13) Requires substantial energy consumption.

Construction of the proposed project will not require substantial energy consumption relative to other similar development on sites with similar attributes. The proposed project will incorporate the latest technology in heating/cooling systems for both the pool and main building. In addition, the building architecture has taken maximum advantage of the following design features to increase energy efficiency:

- windows are well shaded by roof overhangs
- outdoor ventilation will be utilized when appropriate
- timers may be used for room air conditioning controls
- a skylight with high efficiency glazing will minimize heat gain and allow the use of natural lighting
- CMU block walls will limit heat transfer and provide insulation
- extensive landscaping will shade building and hard surfaces to provide additional natural cooling

6.0

Relationship of the Proposed Action to Existing Public Plans, Policies, and Controls

6.0 RELATIONSHIP OF THE PROPOSED ACTION TO EXISTING PUBLIC PLANS, POLICIES, AND CONTROLS

6.1 STATE OF HAWAII

Chapter 343, Hawai'i Revised Statutes

Within the County of Maui Special Management Area, the Planning Director has the authority to require compliance with Chapter 343, Hawai'i Revised Statutes and Hawai'i Administrative Rules, Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules. According to the Rules, a Draft Environmental Assessment is required to determine whether a specific project will result in significant environmental effects (as previously described in Section 5.0). According to the Department of Health Rules which govern Chapter 343, HRS implementation, if "significant environmental effects" are not identified by an Environmental Assessment, preparation of a full Environmental Impact Statement is exempted, and a Finding of No Significant Impact is issued. Otherwise, a Notice of Preparation is issued and processing of a full Environmental Impact Statement is required.

Given that the proposed project will require the use of County funds, the Planning Director has determined that this document (Draft Environmental Assessment) be prepared and processed in accordance with Chapter 343, HRS.

Chapter 205, Hawaii Revised Statutes (HRS)

Chapter 205, Hawaii Revised Statutes (HRS), establishes the State Land Use Commission (LUC) and gives this body the authority to designate all lands in the State as Urban, Rural, Agricultural, or Conservation District lands. Land use decisions within Urban District lands are generally left to the counties to control in accordance with local General Plans and zoning ordinances. As such, the entire subject property is located within the State Urban District and land uses on the property are controlled by the County of Maui. Consequently, no action from the State Land Use Commission is required to implement the proposed project.

6.2 COUNTY OF MAUI

Kihei-Makena Community Plan

According to the Kihei-Makena Community Plan, the subject property is located within Project District 5. According to the County Planning Department, the land uses permitted within this project district were amended in 1994 by Ordinance No. 2386. Land uses specifically permitted within Project District 5 by the Kihei-Makena Community Plan are:

- Single Family (109.01 acres)
- Multifamily (36 acres)
- Commercial (15 acres)
- Community Park (17 acres)
- Open Space Landscape Buffer (10.7 acres)

The types of land uses allowed within these land use categories are reflected by the Project District permissible land uses, appropriate standards of development, and specific allocations of land as defined by Chapter 19.74 of the Maui County Code.

Kihei-Makena Project District 5

According to Chapter 19.74.050 of Maui County Code regarding permitted park uses within Project District 5, *"noncommercial parks and playgrounds, certain commercial amusement and refreshment sale activities may be permitted when under supervision of the government agency in charge of the park or playground."* Special uses in the park district that are similar in character to the permitted use cited, require approval by the commission.

As such, the proposed Kihei Community Center and Pool Complex is a permitted use within Project District 5.

6.2.1 Special Management Area

The project is consistent with applicable Special Management Area Significance criteria set forth in Part II, Section 2-9:4 of the Rules and Regulations of the Maui County Planning Commission.

a. In considering the significance of potential environmental and ecological effects, the Director and the Applicant shall consider the sum of those effects that adversely affect the quality of the environment and the ecology, and shall evaluate the overall and cumulative adverse effects of the proposed action.

b. A "significant adverse effect" may vary with the individual setting and circumstances of the particular proposed action. Generally, any proposed action which may have a major adverse effect on the quality of the environment, the ecology, or on the economic or social welfare of an area, or be contrary to the objectives, policies, and guidelines of these rules and regulations, the County's General Plan, Development Plans, zoning and subdivision ordinances, the State's environmental policies and guidelines as expressed in Chapters 342 and 344, Hawaii Revised Statutes, or the State Plan, would be a "significant adverse effect."

Response: The project is not contrary to the SMA Rules and Regulations, or the other plans, ordinances and regulations formulated by the State or County. No significant adverse environmental or social impacts are anticipated. Positive economic and social impacts will

result from the establishment of permanent new jobs and temporary direct and indirect jobs during the construction phase. The cumulative adverse effects of the project will be confined to those of the project itself which will be negligible.

The project site is located within the Maui County SMA, and is subject to the provisions of Act 176. The project is generally consistent with the Objectives, Policies and Guidelines set forth in Part II, Section 2-8 of the Special Management Area Rules and Regulations of the County of Maui as follows:

Objectives

The following objectives shall be used by the Authority for the review of developments within the Special Management Area:

a. Provide coastal recreational opportunities accessible to the public;

b. Protect, preserve, and where desirable, restore those natural and man-made historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture;

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

d. Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems;

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

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

Response: The project is consistent with the above objectives a, b, c, d, e, and f because public access to the shoreline opportunities, coastal ecosystems and scenic resources will not be negatively affected, historic resources will not be affected, the local economy will derive short and long term benefits through increased construction activity and operational functions, and potential hazards to life and property by means of controlling on-site and off-site drainage will be improved.

Policies

The project is consistent with applicable policies as follows:

Section 2-8:2a. (2) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

a. Protecting coastal resources uniquely suited for recreation 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 waters."

Response: Public shoreline access and use will be maintained and is unaffected. Coastal resources and water quality will be protected through the implementation of Best Management Practices during construction and by the development of improved drainage system facilities. These improvements will potentially improve water quality, reduce the quantity of off-site surface flows, and allow for better control of discharged water to reduce the quantities of off-site drainage. Overall recreational opportunities will be enhanced by the project.

Historic Resources:

1. Identify and analyze significant archaeological resources;

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

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

Response: A previously prepared archaeological reconnaissance survey was conducted of the entire property (Appendix D). The archaeologist found no significant site features, and a review of archaeological records at the Department of Land and Natural Resources revealed no recorded sites on the subject property. The report concludes that there is little or no chance of negative impacts to historic or cultural resources as a result of the proposed project.

Scenic and Open Space Resources:

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 land forms and existing public views to and along the shoreline;

3. Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources."

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

Response: The use and appearance of the shoreline will be unaffected, as development will be located inland near Kihei Elementary/Lokelani Intermediate Schools, as permitted by the Kihei-Makena Community Plan and Project District 5 regulations.

Coastal Ecosystems:

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 and water uses, recognizing competing water needs;

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."

Response: Coastal ecosystems will not be negatively impacted by project construction or land use related pollution. On-site runoff will be directed into retention basins to permit the controlled discharge of contained flows. During project construction, erosion will be

controlled by limiting the exposed areas through the establishment of landscaping, watering, and other forms of ground cover in accordance with County standards. Following project completion, soil erosion will likely be reduced since additional hard surfaces and project related landscaping of open space areas will work with drainage system improvements to mitigate potential water quality impacts.

Economic Uses:

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

2. Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments 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."

Response: Given the mitigation measures proposed, the proposed project has been designed to minimize potential impacts on the environment.

Guidelines

The proposed improvements are consistent with applicable guidelines as follows:

Section 2-8:3a Guidelines.

1. Adequate access, by dedication or other means to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles.

2. Adequate and properly located public recreation areas and wildlife preserves are reserved.

3. Provisions are made for solid and liquid waste treatment, disposition, and management which will minimize adverse effects upon Special Management Area resources; and,

4. Alterations to existing land forms and vegetation except crops, and construction of structures shall cause minimum adverse effect to water

resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of earthquake."

Response: Shoreline access will not be impacted by the proposed development and recreation areas will be provided. Sanitary sewer systems, storm drain sewer systems and refuse removal services will be utilized to avoid negative environmental impacts. Existing land forms will be altered by minimal site grading and through development of drainage system improvements. These proposed alterations will result in reduced erosion, sedimentation, and flooding of the site and surrounding properties.

No development shall be approved unless the Authority has first found that:

1. The development will not have any substantial adverse environmental or ecological substantial adverse environmental or ecological effect except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health, safety, or compelling public interest. Such adverse effect shall include, but not be limited to, the potential cumulative impact or individual developments, each one of which taken in itself might not have a substantial adverse effect and the elimination of planning options;

2. The development is consistent with the objectives and policies, as enumerated in Chapter 205A, Hawaii Revised Statutes, and as recited herein under Sections 2-8.1. and 2-8.2., above; and Special Management Area guidelines set forth in this Article.

3. The development is consistent with the County General Plan, Zoning, Subdivision, and other applicable ordinances.

Response: The project will not have any substantial adverse environmental or ecological effects, is consistent with the County's SMA Rules and Regulations, Chapter 205A Hawaii Revised Statutes, and complies with the Maui County General Plan, Kihei-Makena Community Plan, County of Maui Zoning Districts, and other applicable ordinances as discussed in this section.

The Authority shall seek to minimize, where reasonable:

1. Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough, or lagoon.

2. Any development which would reduce the size of any beach or other area usable for public recreation.

3. Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams

within the Special Management Area and the mean high tide line where there is no beach.

4. Any development which would substantially interfere with or detract from the line of sight toward the sea from the State Highway nearest the coast, or from existing public views to and along the shoreline.

5. Any development which would adversely affect water quality, existing areas of open water free of visible structure, existing and potential fisheries and fishing grounds, wildlife habitats, estuary sanctuaries, potential or existing agricultural use of land.

Response: Shoreline and beach areas will not be affected, nor will views from inland areas to the shoreline. Similarly, water quality will not be negatively affected by the proposed development. In addition, the project will not impact or obstruct access to shoreline areas and coastal resources.

7.0

List of All Approvals and Permits Required

7.0 LIST OF ALL APPROVALS AND PERMITS REQUIRED

During the implementation stages of the project, the applicant will be working with the State and County review agencies for examination and approval of project plans and specifications.

Permit	**Responsible Agency**
Environmental Assessment	Planning Commission
Project District Phase II	Planning Commission
Special Management Area Permit	Planning Commission
Project District Phase III	Planning Commission
Subdivision Approval	Department of Public Works
Grading/Building Permits	Department of Public Works
National Pollutant Discharge Elimination System	State Department of Health

8.0

Findings and Determination

8.0 FINDINGS AND DETERMINATION

Based on the findings of this Environmental Assessment, the applying agency has determined that no significant environmental affects will result from development of the proposed project and an Environmental Impact Statement (EIS) will not be required. A Finding of No Significant Impact (FONSI) is therefore recommended.

This determination is consistent with previous County of Maui findings of no significant environmental impacts related to the development of the subject property for land use entitlements proposed by Baldwin*Malama associated with the Piilani Village project.

9.0

References

9.0 REFERENCES

Armstrong, R. W. ed. *Atlas of Hawai'i*. 2nd edition. Honolulu: University of Hawai'i Press, 1983.

Austin, Tsutsumi & Associates. *Draft Traffic Assessment Report for Kihei Road 'C'*, March 1997.

County of Maui. *Draft Environmental Assessment: Road "C" and North-South Collector Road Segment*, February 1997.

Hawai'i State Department of Agriculture. *Agricultural Lands of Importance to the State of Hawai'i*. Honolulu, Hawai'i, 1977.

Hawaii, State of. Department of Business and Economic Development and Tourism. *The Data Book*. Honolulu, Hawaii.

Hawai'i State Office of State Planning. *The Hawai'i State Plan*. Honolulu, Hawai'i, 1989.

Hawaii, State of. Department of Transportation. *Traffic Survey Data, Islands of Maui, Molokai & Lanai*, 1993.

Kaku Associates. *South Kihei Master Traffic Plan*, 1996.

Sahara, Tamotsu et al. *Detailed Land Classification, Island of Maui*. L.S.B Bulletin No. 7, Land Study Bureau, University of Hawai'i, 1967.

United States Department of Agriculture Soil Conservation Service. *Islands of Kaua'i, O'ahu, Maui, Moloka'i, and Lāna'i, State of Hawai'i*, 1972.

Appendices

A

Engineering Report

PRELIMINARY ENGINEERING REPORT

FOR

KIHEI COMMUNITY CENTER & SWIMMING POOL COMPLEX

AT

KIHEI, MAUI, HAWAII

PREPARED FOR:

COUNTY OF MAUI
DEPARTMENT OF PARKS AND RECREATION
1580 KAAHUMANU AVENUE
WAILUKU, HAWAII 96793

PREPARED BY:

SATO & ASSOCIATES, INC.
2115 WELLS STREET
WAILUKU, MAUI, HAWAII 96793

JUNE 1997

TABLE OF CONTENTS

I. PROJECT LOCATION

The proposed project is located in Kihei and described as TMK 2-2-2:67 (por.). The nine (9) acre parcel is bounded to the east by Piilani Highway, to the south by Lipoa Street, and to the west by the future North-South Collector Roadway. To the north is property owned by Baldwin - Malama for proposed multi-family housing. The entire project is located in Flood Zone C, areas of minimal flooding.

II. PROJECT DESCRIPTION

The proposed project will consist of a community center, swimming pool complex, and future soccer fields. Parking, landscaping, drainage, and utilities will be included in the improvements. The proposed project is a County of Maui project under the direction of the Parks Department.

III. EXISTING CONDITIONS

A. ONSITE

The existing site is undeveloped. Vegetation on the project site includes kiawe, koa haole and common grasses.

The United States Department of Agriculture, Soils Conservation Service, Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, 1972, identifies the soils in the project site as Puuone Sand (PZUE) and Pulehu Series (PsA). Puuone Sand 7 to 30 percent slope consists of excessively drained soils on low uplands. Pulehu Series 0-3 percent consists of well drained soils on alluvial fans and stream terraces. Areas include gravelly, stony and gently sloping soils.

The project site generally slopes from east to west. There is a mounded area with top elevation 80'MSL at the north east corner of the site. With the exception of this mounding, slopes range from 2 to 7 percent.

The peak 50 year, one year storm storm runoff for the project site is 5.3 cfs.

B. OFF SITE

There is an existing natural drainage way that passes through the proposed project site. Two 66-inch corrugated metal pipes cross under Piilani Highway and outlet onto the site at the southwest corner, near the Lipoa Street and Piilani Highway intersection. The offsite runoff surface flows through a drainage way and leaves the site at the southwest corner of the project site, at the future intersection of the North-South Collector and Lipoa Street. The flows then follow Lipoa Street west and enters an existing drainage system that is inadequate to handle these flows. The excess runoff that the existing system cannot handle flows down Lipoa Street and floods at South Kihei Road.

The drainage basin for the offsite runoff passing through the project site is 340 acres with a 50 year, 6 hour duration peak discharge of 404 cfs. The 100 year peak flows are 551 cfs. Existing offsite flows from properties north of the project site generally flows west or north and do not enter the site.

IV. DEVELOPED CONDITIONS

A. ONSITE

Additional runoff generated from the developed site will be retained on site. Onsite retention will consist of retention basins and onsite retention in an underground percolation/piping system. Developed peak runoff volumes for a 50 year one hour storm duration is 35 cfs. The total increase due to development is 29.7 cfs.

B. OFFSITE

1. County Master Plan

The County of Maui's Drainage Master Plan by Norman Saito Engineering for the project area shows flows from the existing two (2) 66-inch diameter culverts passing under Piilani Highway to enter a concrete box culvert system and cross Lipoa Street at the future North-South Collector Road intersection and flow south approximately 600 feet to an existing 71-inch x 47-inch corrugated arched pipe culvert. From here flows follow proposed concrete channels and outlet at the existing regulation reservoir makai of Kihei Road.

This system is proposed to be phased and presently is inadequate to handle the flows that pass through the project site.

2. Developed Improvements

Flows from the two (2) 66-inch diameter culverts at Piilani Highway are proposed to enter an underground 72-inch diameter drainline for a distance of approximately 700 linear feet. Runoff will then outlet within the project site and follow existing drainage patterns prior to leaving the project site.

The velocity and volume of the offsite flows will not increase and there will be no additional adverse effects resulting from the new development to adjacent and downstream properties.

The proposed 72-inch diameter drainline are interim improvements and can be incorporated into the County of Maui's Kihei Drainage Master Plan.

V. CONCLUSION

By retaining any additional runoff generated by the development of the Kihei Community Center and Swimming Pool Complex and by allowing the existing offsite flows to pass through the site and leave with no increase in velocity or volume, this project will not create any additional adverse effects resulting from the development to adjacent and downstream properties.

KIHEI COMMUNITY CENTER & SWIMMING POOL COMPLEX

VI. WATER TRANSMISSION SYSTEM AND CAPACITY

Portable water for all central Maui is taken from Iao Aquifer located in the west Maui Mountains with a defined sustainable yield of 20.0 million gallons per day (MGD). The present withdrawal from the system as of April 1, 1997 was 20.18 MGD.

The Department of Water Supply (DWS) is in the process of implementing other sources to reduce the demand on the Iao Aquifer. The Iao ditch is being developed as a source to provide a proposed 1 MGD. Also Waihee Well is being developed to produce from an additional 1 to 2 MGD. These sources are planned for operation within the next two years.

Sources are also being developed in east Maui. The DWS does not guarantee water will be available at the time a water meter is requested for the project.

At the project site the transmission line from the Iao Aquifer is a 36" concrete line and located at the future north-south collector roadway. Parallel to the 36" transmission line is a 18" cast iron water line.

A 16" line that reduces to 12" and back to a 16" line is connected to the 18" line and is an inflow line to the tank at Lipoa mauka of the Kihei Research and Tech Park from the tank a 12" ductile iron line goes down Lipoa reducing to an 8" castiron line below Piilani Highway across from Kihei Elementary School. This 8" connects into the 18" line. A proposed 16" line by others is to connect where the 12" line now reduces to an 8" line (see sketch).

The project water will connect to the proposed 16" line. If not installed by others we will install a portion to allow to service the project.

VII. WASTEWATER SYSTEM - DESCRIPTION & CAPACITY

The Kihei area is sewered by a series of gravity lines and pump stations that ultimately pump wastewater to the Kihei Wastewater Reclamation Plant mauka of Piilani Highway and south of the project site.

The project wastewater would connect to existing 8" sewerlines at the intersection of the future north-south collector and Lipoa Street and travel by gravity west to Kihei Road. It then gravity flows north to Pump Station 4 located at Nohokai Street and Kiehi Road. It then goes to the south by force main and gravity line to Pump Stations 5 and 6. Pump Station 6 pumps the wastewater east to the Kihei Wastewater Treatment Facility.

The Kihei Wastewater Facility has a total available capacity of 420,000 gallons per day with 234,000 gallons per day of the total available for public/quasi-public and other commercial developments. Based on discussions with the County of Maui Wastewater Reclamation Division, expansion of the Kihei Treatment Facility will be complete by the end of the calendar year 1997 with 2 million gallons per day additional capacity available.

The Kihei Wastewater Reclamation Facility treats the effluent wastewater to R-1 quality, the highest rating for effluent in the State of Hawaii. They are in the process of installing a 1 million gallon tank and infrastructure to increase the capacity of the effluent for uses of dust control and irrigation.

A 12" reuse line is planned for installation by November 1998, to be implemented for use in irrigation for the project.

VIII. REFERENCES

1. Storm Drain Standards - Department of Public Works City and County of Honolulu.

2. Title MC-15 Department of Public Works and Waste Management County of Maui Chapter 4; Rules for the Design of Storm Drainage Facilities in the County of Maui.

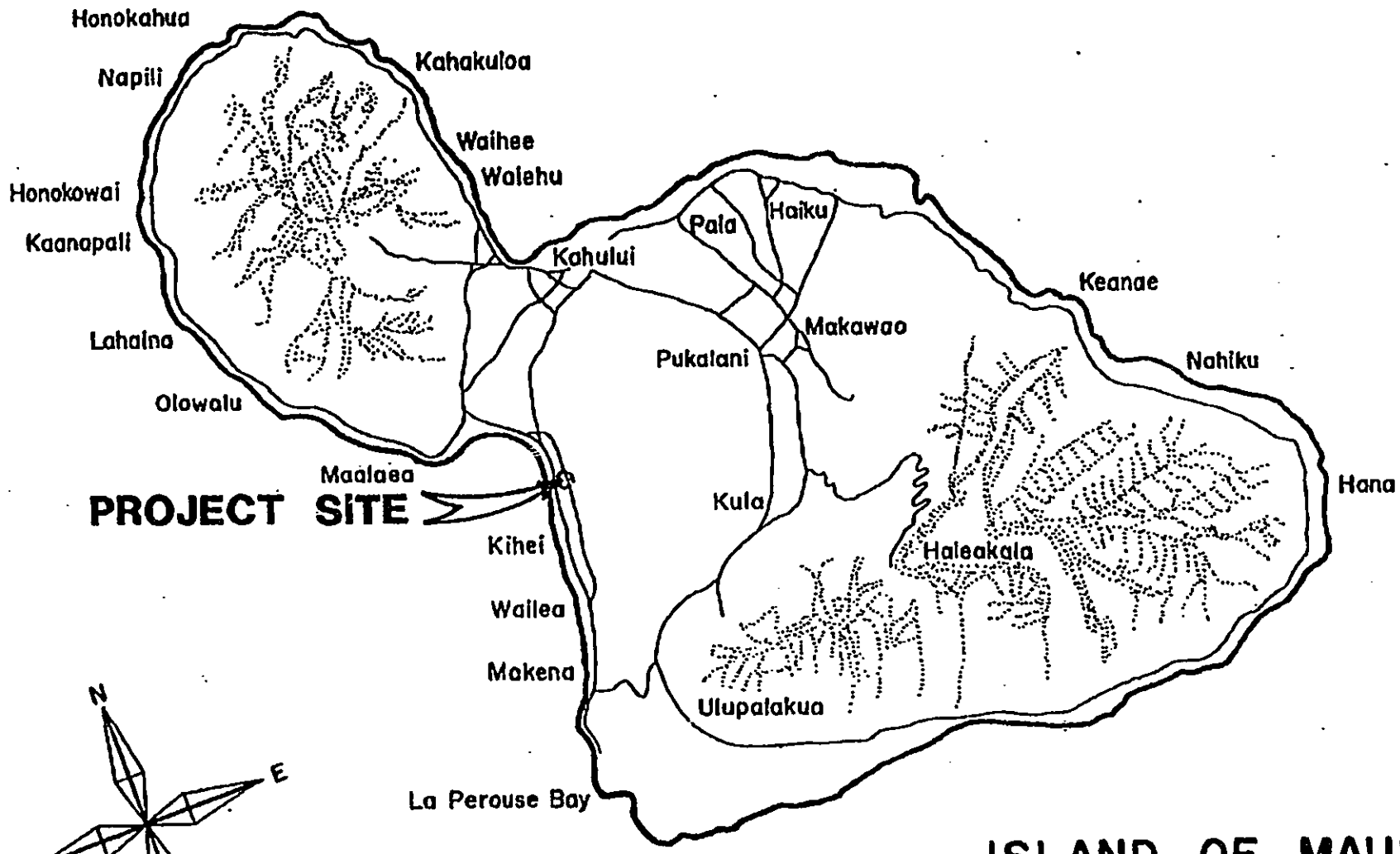
3. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. United States Department of Agriculture Soil Conservation Service 1972.

4. Hydrology Report for Piilani Highway for Highways Division, Department of Transportation 1978.

5. Preliminary Kihei Drainage Master Plan & Preliminary Kihei School Offsite Engineering Report by Norman Saito Engineering, 1993.

IX. EXHIBITS

EXHIBIT A - PROJECT MAP
EXHIBIT B - LOCATION MAP
EXHIBIT C - SITE MAP

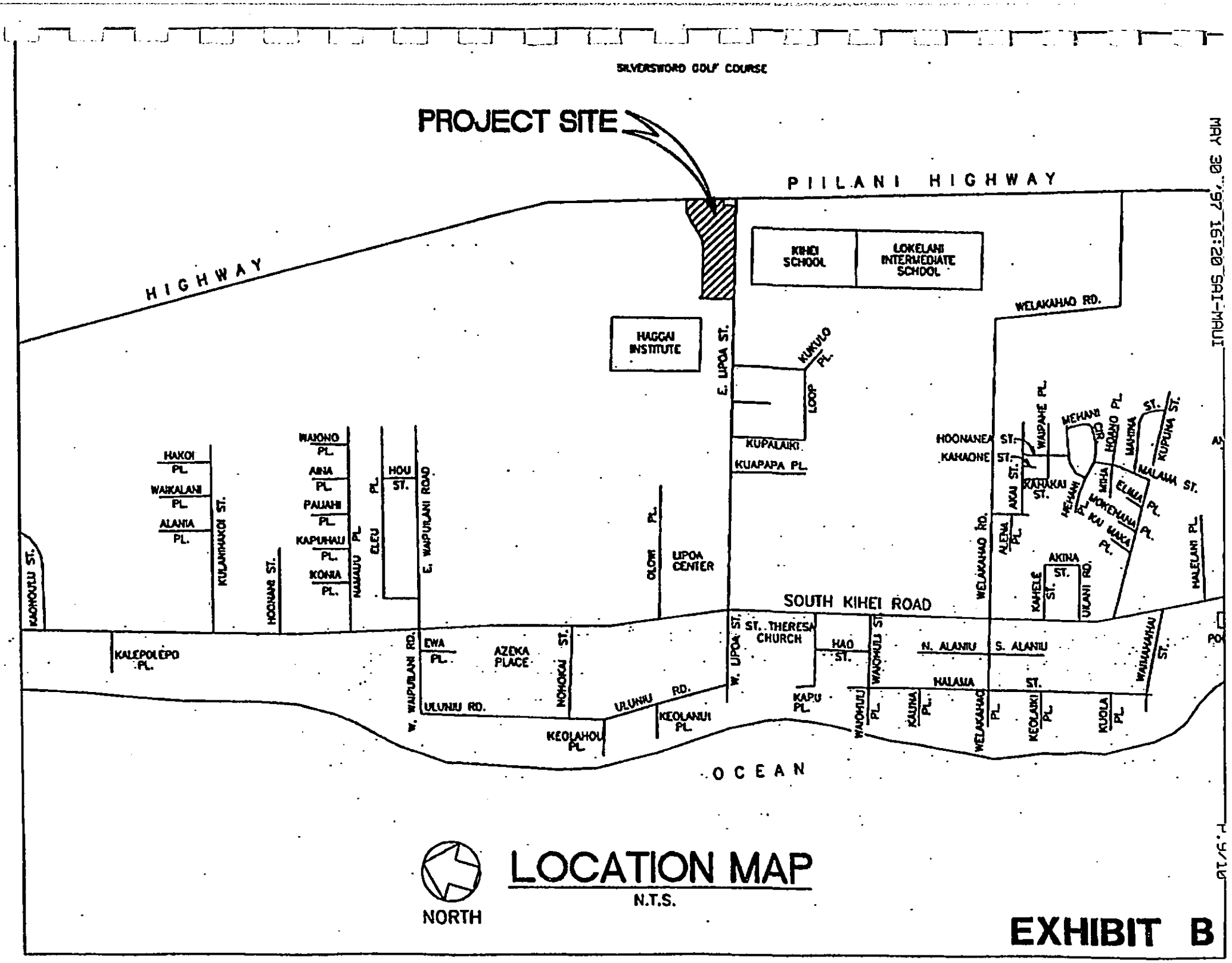


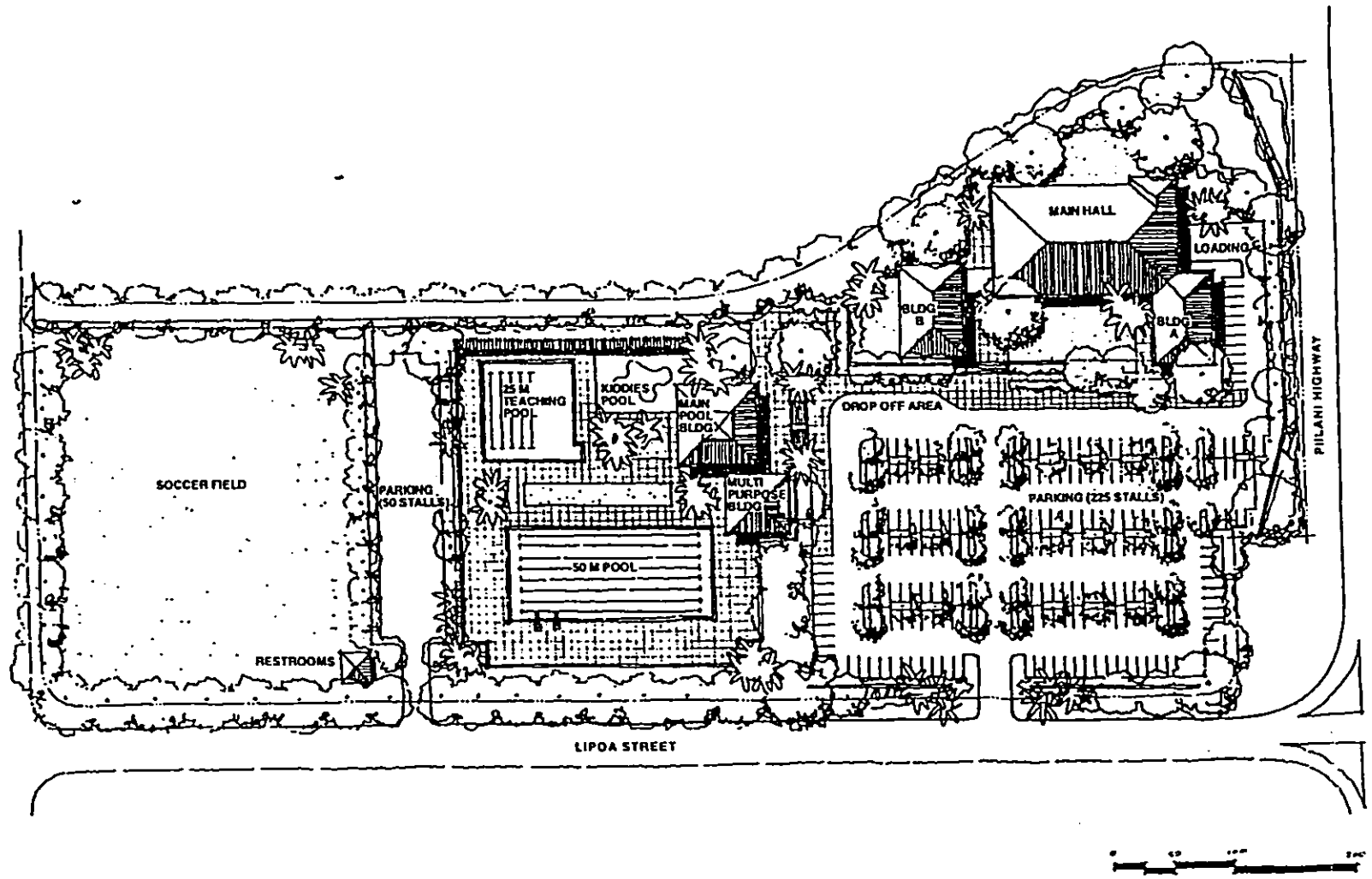
ISLAND OF MAUI

N.T.S.

P.8/10

EXHIBIT A


SILVERSWORD GOLF COURSE
PROJECT SITE
PIILANI HIGHWAY
HIGHWAY
KIHEI SCHOOL
LOKELANI INTERMEDIATE SCHOOL
HAGGAI INSTITUTE
E. LIPOA ST.
KUKUIO PL.
LOOP
KUPALAIKI
KUAPAPA PL.
WELAKAHAO RD.
HOONANEA ST.
KAHAONE ST.
WAIPAHE PL.
MEHANI CIR.
HOONIU PL.
MAHINA ST.
KUPUNA ST.
MALAMA ST.
KAHAKAI ST.
MEHANI PL.
MOKUHANA PL.
KU WAKA PL.
ELIMA PL.
AKAI ST.
ALENA PL.
AKINA ST.
KAHELE ST.
ULANI RD.
HALELANI PL.
HAKOI PL.
WAIKALANI PL.
ALANIA PL.
KULANIHAKOI ST.
KAONOULU ST.
HOONANI ST.
WAIONO PL.
ANIA PL.
PALIAHI PL.
KAPUHAU PL.
KOHIA PL.
NAHALU PL.
ELELU
HOU ST.
E. WAIPULANI ROAD
OLOWI PL.
UPOA CENTER
SOUTH KIHEI ROAD
KALEPOLEPO PL.
W. WAIPULANI RD.
EWA PL.
AZEKA PLACE
NOHOKAI ST.
ULUNIU RD.
KEOLAHOU PL.
KEOLANUI PL.
W. UPOA ST.
ST. THERESA CHURCH
HAO ST.
WAOHULI ST.
KAPU PL.
N. ALANIU
S. ALANIU
HALAMA ST.
WAIHAHAU ST.
WAOHULI PL.
KAUNA PL.
WELAKAHAO PL.
KEOLANUI PL.
KUOLA PL.
OCEAN
NORTH
LOCATION MAP
N.T.S.
EXHIBIT B
MAY 30 '97 16:20 SAI-MAUI



SITE MAP **EXHIBIT C**

B

Traffic Study

FINAL REPORT
TRAFFIC IMPACT ANALYSIS REPORT

KIHEI COMMUNITY CENTER AND SWIMMING COMPLEX

IN KIHEI, MAUI, HAWAI'I

Prepared For

SATO & ASSOCIATES, INC.
Honolulu, Hawai'i

Phillip Rowell and Associates
47-273 'D' Hui Iwa Street
Kaneohe, Hawai'i 96744
Tel: 808-239-8206 Fax: 808-239-4175
Email: prowell@aloha.net

July 25, 1997

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

Executive Summary

Phillip Rowell and Associates has been retained by Sato & Associates, Inc. to prepare a Traffic Impact Analysis Report (TIAR) for a proposed community center and swimming pool complex in the South Kihei area of Maui.

The proposed project is located on the north side of Lipoa Street between Piilani Highway and the proposed North-South Collector that is to be constructed between Piilani Highway and South Kihei Road. The proposed project is to consist of a community center building, swimming pool complex and soccer fields. The project will encompass 9.0 acres. The project will provide a total of 230 parking spaces.

The results of the Level-of-Service analysis for existing conditions determined that the intersections of Lipoa Street at Piilani Highway and Lipoa Street at the Kihei School Entrance operate at LOS 'C' or better during the peak hours. It should be noted that there are long queues for left turning vehicles into and out of Kihei School during the peak hours. Queues of 9 to 10 vehicles were observed several times. However, the total intersection delay is minimal because the through traffic movements have little or no delay. Therefore, the overall intersection operates at an acceptable level of service.

Future background projections for the study intersections were estimated from traffic projections provided in the *South Kihei Master Traffic Plan* prepared by Kaku Associates in 1996 and *Draft Traffic Assessment Report for Kihei Road 'C'* prepared by Austin, Tsutsumi & Associates dated March 1997.

The Kaku study provided an estimate of future trips produced by anticipated development in South Kihei. The design year for the study was 2005.

The second study addresses the impacts of Road 'C' and makes recommendations relative to the alignment and connection with Piilani Highway. The study also considered the following:

1. Traffic projections from the Kaku report were adjusted to reflect construction of the North-South Collector from Waipuilani Road to Halekuai Street. The North-South Collector is not extended beyond these streets for this study.

2. Traffic generated by development of Piilani North was included in the traffic projections.

3. The graphics indicated that Piilani Highway was widened to four lanes (two lanes in each direction) with separate left turn lanes.

4. The intersection of Lipoa Street at North-South Collector was unsignalized.

5. The report graphics also indicated that the intersection of Lipoa Street at the North-South Collector was modified to accommodate the existing driveway to the schools.

Future traffic volumes generated by the project were determined using trip generation rates contained in *Trip Generation*, Fifth Edition, prepared by the Institute of Transportation Engineers. The proposed project is expected to generated 70 trips during the morning peak hour and 77 trips during the afternoon peak hour.

The conclusions and recommendations of the study are:

1. No mitigation measures are required for the intersection of Piilani Highway at Lipoa Street.

2. Traffic signals are not warranted for the intersection of Lipoa Street at the future North-South Collector under cumulative or cumulative plus project conditions if the intersection is modified to provide a separate northbound through lane when the North-South Collector is constructed.

3. An analysis of the required lengths of left turn storage lanes determined that the minimum length for left turns from Lipoa Street to northbound Piilani Highway is 250 feet and left turns from Lipoa Street to the school is 200 feet. Therefore, it is not possible to relocate left turns to the school to a location opposite the entrance to the project. Traffic to the school will have to use the Lipoa Street/North-South Collector intersection where the proper left turn storage capacity can be provided.

4. An analysis of the intersection of Lipoa Street at Drive 'A' determined that a flashing beacon or traffic signal is not warranted under the warrants for a school crossing. The distance to the traffic signal at Piilani Highway is less than 600 feet, which is the minimum distance required.

1. INTRODUCTION

Phillip Rowell and Associates has been retained by Sato & Associates, Inc. to prepare a Traffic Impact Analysis Report (TIAR) for a proposed community center and swimming pool complex in the South Kihei area of Maui.

The following report has been prepared to describe the traffic characteristics of the project and likely impacts to the adjacent roadway network. This introductory chapter discusses the location of the project, the proposed development, and the study methodology.

Project Location and Description

The location of the proposed project shown on Figure 1.

The proposed project is located on the north side of Lipoa Street between Piilani Highway and the proposed North-South Collector that is to be constructed between Piilani Highway and South Kihei Road. The proposed project is to consist of a community center building, swimming pool complex and soccer fields. The project will encompass 9.0 acres. The project will provide a total of 230 parking spaces.

Access to the park will via two driveways Lipoa Street. The locations of the driveways are shown schematically on Figure 2.

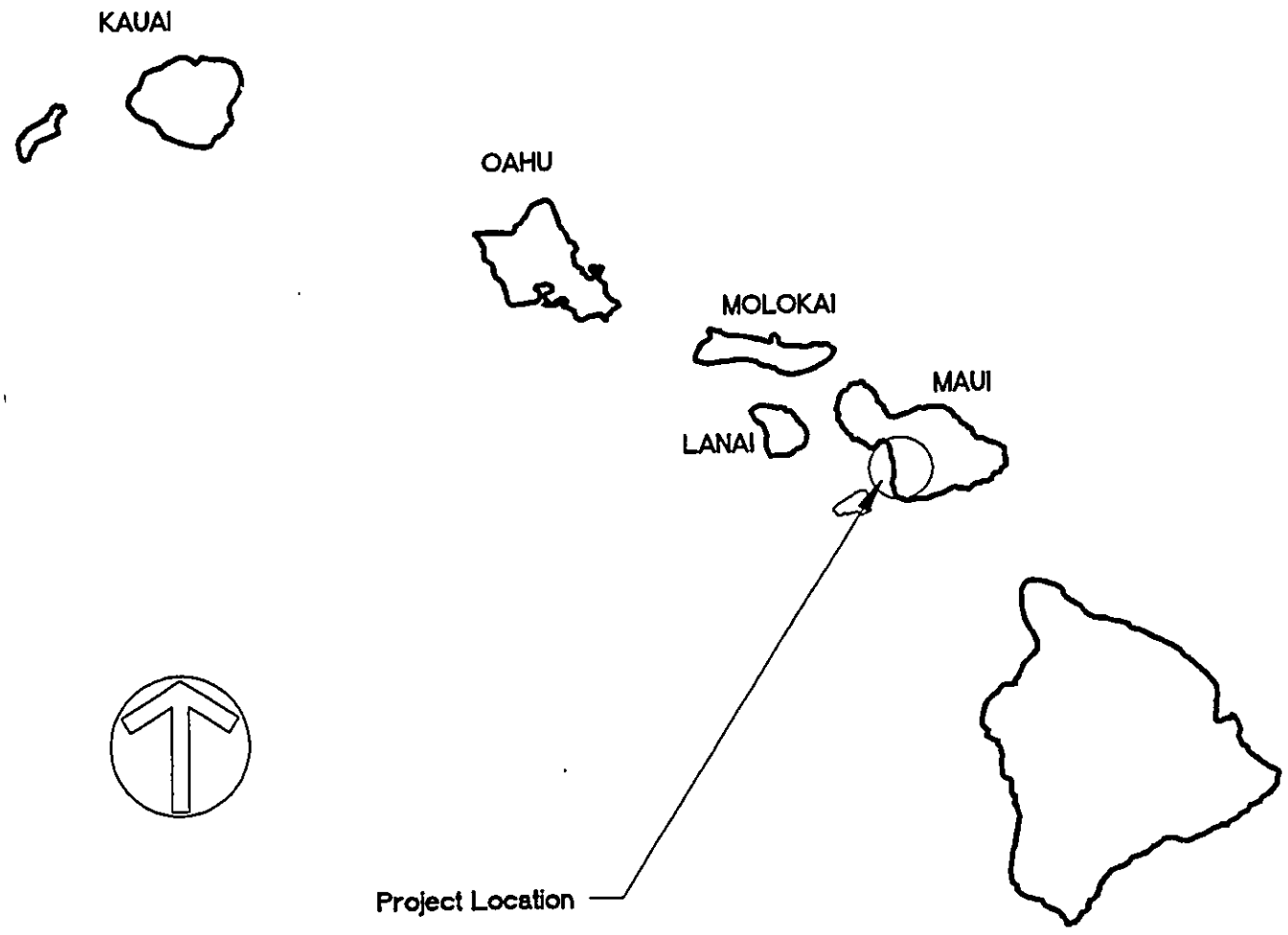


Figure 1

LOCATION MAP

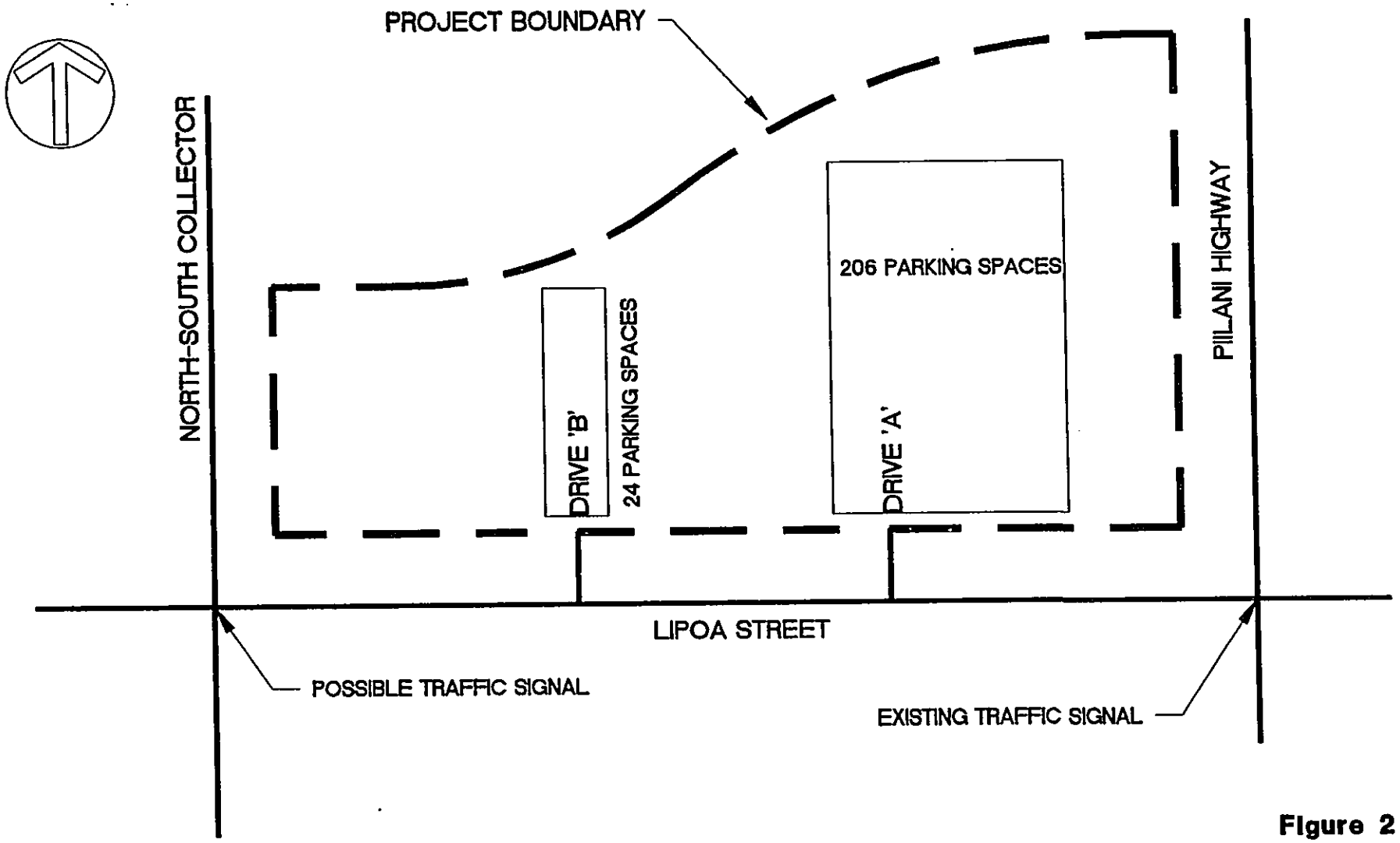


Figure 2

SCHEMATIC SITE PLAN

Study Methodology and Order of Presentation

In order to conduct this traffic study, a number of tasks were performed. These tasks are discussed in the following paragraphs.

1. Analysis of Existing Traffic Conditions

Existing traffic volumes at the study intersections were determined from traffic counts performed in May 1997. Intersection configurations and traffic control information were also collected in the field at the time of the traffic counts.

Using the data collected, existing traffic operating conditions in the vicinity of the project were determined. The methodology described in the 1994 *Highway Capacity Manual* (HCM) was used to determine the level-of-service (LOS) at the study intersections.

Existing traffic conditions, the LOS concept and the results of the LOS analysis for existing conditions is presented in Chapter 2.

2. Determination of Cumulative Traffic Projections

The year 2005 was used as the design year. This does not necessarily represent the project completion date. It represents occupancy for purposes of conducting the impact analysis. Cumulative traffic conditions are defined as future traffic conditions without the proposed project. A description of the process used to estimate 2005 cumulative traffic volumes and the resulting cumulative traffic projections is presented in Chapter 3.

3. Analysis of Project-Related Traffic Impacts

The next step in the traffic analysis was to estimate the peak-hour traffic that would be generated by the proposed development. This was done using standard trip generation rates published by the Institute of Transportation Engineers.

These trips were distributed based on the available approach and departure routes. The project-related traffic was then superimposed on 2005 cumulative traffic volumes at the subject intersections. The HCM methodology was used again to conduct a LOS analysis for cumulative plus project conditions. The results of this analysis were compared to 2005 cumulative conditions to determine the impacts of this project.

The 2005 cumulative plus project traffic projections are presented in Chapter 4. The analysis of the project-related impacts and the conclusions of the analyses are presented in Chapter 5.

2. ANALYSIS OF EXISTING CONDITIONS

This chapter presents the existing traffic conditions and volumes on the roadways adjacent to the proposed project. The level-of-service concept and the results of the level-of-service analysis for existing conditions is also presented. The purpose of this analysis is to establish the base conditions for the determination of the impacts of the project which are described in a subsequent chapter.

Description of Existing Streets and Intersection Controls

The intersections analyzed and existing lane configurations are shown on Figure 3. Photographs of the roadways in the area are presented as Appendix A.

Piilani Highway. Piilani Highway is a two-lane, two-way State highway running north-south along the eastern boundary of the proposed project. Major intersections are signalized with separate left turn phases for north-south traffic.

Lipoa Street. Lipoa Street is a two lane County road traversing the southern boundary of the project. The intersection of Lipoa Street at Piilani Highway is signalized.

Traffic characteristics of these roadways is summarized in Table 1.

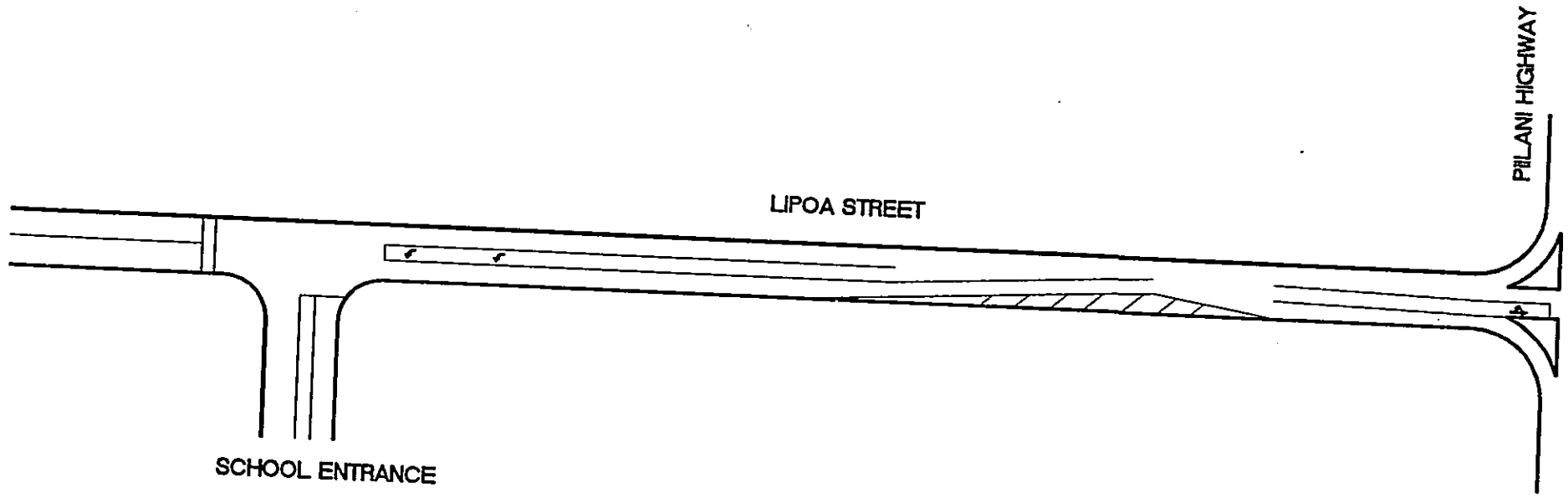


Figure 3

EXISTING ROADWAY NEYWORK

Table 1 Traffic Characteristics of Piilani Highway and Lipoa Street

Roadway	Piilani Highway		Lipoa Street	
Direction	Northbound	Southbound	Eastbound	Westbound
Location	North of Lipoa Street		West of Piilani Highway	
Posted Speed Limit	45 mph		25 mph	
Average Daily Traffic	10,397	11,677	3,158	4,267
AM Peak Hour	7:00 to 8:00	7:15 to 8:15	7:30 to 8:30	8:00 to 9:00
AM k-Factor	7.60%		6.29%	
AM Peak Hour Traffic	830	866	194	281
PM Peak Hour	3:30 to 4:30	4:15 to 5:15	4:30 to 5:30	3:45 to 4:45
PM Peak Hour Traffic	809	1,005	246	383
PM k-Factor	8.15%		8.24%	

Source: Traffic Survey Data, Islands of Maui, Molokai & Lanai, 1993, Hawaii Department of Transportation

Existing Peak Hour Traffic Volumes

Morning and afternoon peak hour traffic volumes were obtained from traffic counts conducted in May 1997. The peak hour traffic volumes at the study intersections serving the project are shown in Figure 4.

Level-of-Service Concept

Signalized Intersections

The planning method described in the *1994 Highway Capacity Manual* (HCM) was used to analyze the operating efficiency of the signalized intersections adjacent to the study site. This method involves the calculation of a volume-to-capacity (V/C) ratio which is related to a level-of-service. A maximum intersection capacity based on the number of phases was used for the V/C calculations.

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in Table 2. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

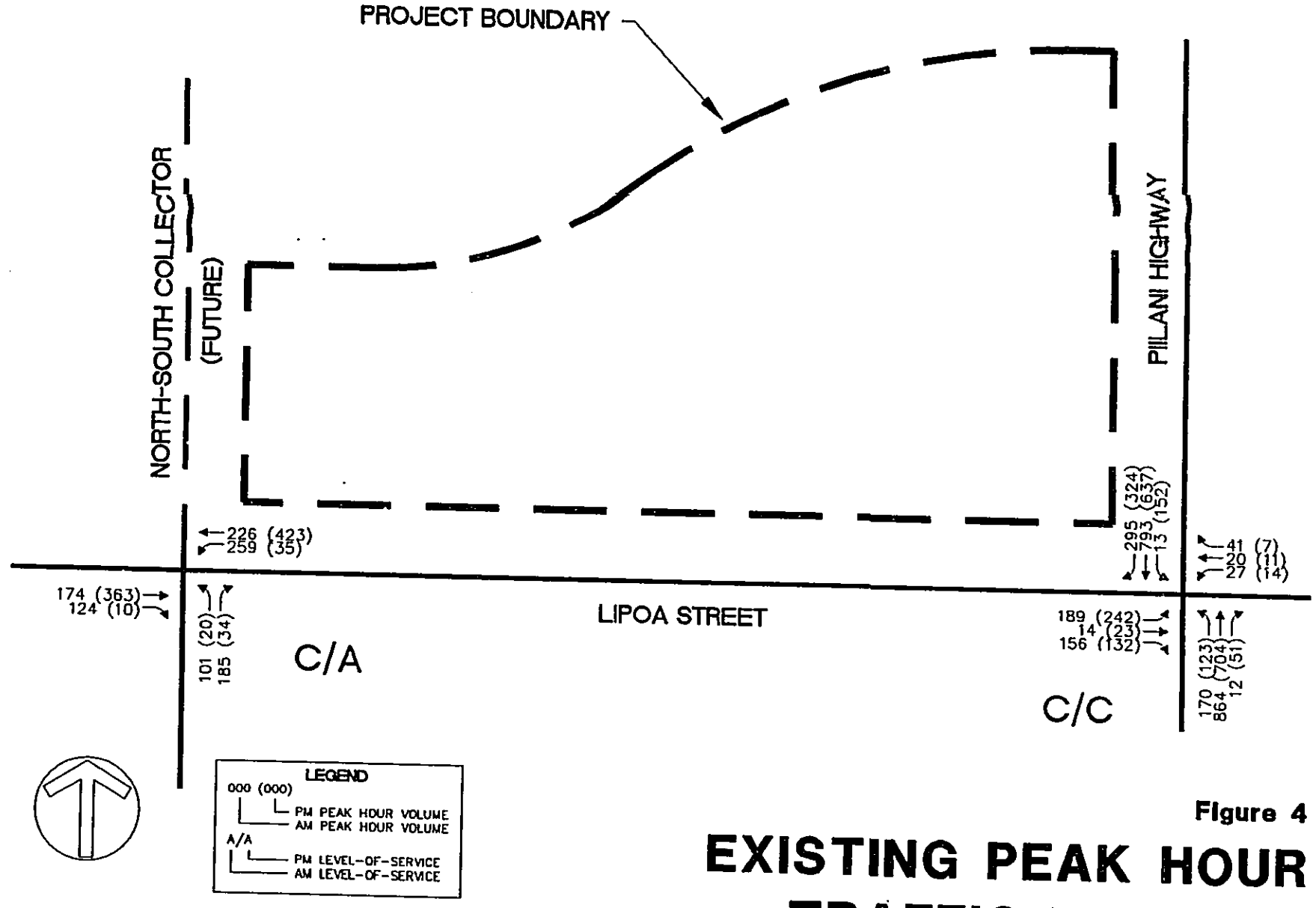


Figure 4

EXISTING PEAK HOUR TRAFFIC VOLUMES

Table 2 Level-of-Service Definitions for Signalized Intersections[1]

Level of Service	Interpretation	Volume-to-Capacity Ratio[2]	Stopped Delay (Seconds)
A, B	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<15.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	15.1-25.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801-0.900	25.1-40.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901-1.000	40.1-60.0
F	Total breakdown with stop-and-go operation	>1.001	>60.0

Notes:
(1) Source: *Highway Capacity Manual*, 1994.
(2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

Unsignalized Intersections

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. Table 3 summarizes the definitions for level-of-service and the corresponding delay. A subsequent calculation to determine an overall LOS was made, and these results are presented in tables to summarize traffic conditions using parameters similar to those used for signalized intersections.

Table 3 Level-of-Service Definitions for Unsignalized Intersections[1]

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little of no delay	>5
B	Short traffic delays	5.1 to 10.0
C	Average traffic delays	10.1 to 20.0
D	Long traffic delays	20.1 to 30.0
E	Very long traffic delays	30.1 to 45.0
F	See note (2) below	>45.1

Notes:
(1) Source: *Highway Capacity Manual*, 1994.
(2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

Existing Level-of-Service Analysis

The results of the Level-of-Service analysis for the signalized intersections are shown in Table 4 and for unsignalized intersections are summarized in Table 5. Both intersections operate at LOS 'C' or better during the peak hours. It should be noted that there are long queues for left turning vehicles into and out of Kihei School during the peak hours. Queues of 9 to 10 vehicles were observed several times. This is reflected in the LOS calculations presented in Appendix B. However, the total intersection delay is minimal because the through traffic movements have little or no delay. Therefore, the overall intersection operates at an acceptable level of service.

Table 4 Existing Level-of-Service Analysis for Signalized Intersections[1]

	AM Peak Hour		PM Peak Hour	
Intersection	V/C[2]	LOS[3]	V/C[2]	LOS[3]
Piilani Highway at Lipoa Street	0.777	C	0.747	C

NOTE:
(1) For calculations, see Appendix B.
(2) V/C denotes Volume-to-Capacity ratio.
(3) LOS = Level-of-Service

Table 5 Existing Level-of-Service Analysis for Unsignalized Intersections[1]

	AM Peak Hour		PM Peak Hour	
Intersection	Delay[2]	LOS[3]	Delay[2]	LOS[3]
Lipoa Street at Future North-South Collector	13.8	C	0.6	A
Lipoa Street at Drive A	Future Drive		Future Drive	
Lipoa Street at Drive B	Future Drive		Future Drive	

NOTE:
(1) For calculations, see Appendix B.
(2) Delay shown is average seconds of delay per vehicle.
(3) LOS = Level-of-Service

3. PROJECTED CUMULATIVE TRAFFIC CONDITIONS

The purpose of this chapter is to discuss the assumptions and data used to estimate 2005 cumulative traffic conditions. Cumulative traffic conditions are defined as the traffic conditions resulting from background growth and related projects.

Future traffic growth consist of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. The second component is estimated traffic that will be generated by other development projects in the vicinity of the proposed project.

Background Traffic Projections

Future background projections for the study intersections were estimated from traffic projections provided in the *South Kihei Master Traffic Plan* prepared by Kaku Associates in 1996 and *Draft Traffic Assessment Report for Kihei Road 'C'* prepared by Austin, Tsutsumi & Associates dated March 1997.

The Kaku study provided an estimate of future trips produced by anticipated development in South Kihei. The design year for the study was 2005. The Hawaii Department of Transportation was contacted about traffic projections with the North-South Collector completed. We were not able to obtain traffic projections used in the Kaku study for 2005 conditions for the proposed North-South Collector in place.

The second study addresses the impacts of Road 'C' and makes recommendations relative to the alignment and connection with Piilani Highway. The study also considered the following:

1. Traffic projections from the Kaku report were adjusted to reflect construction of the North-South Collector from Waipuilani Road to Halekuai Street. The North-South Collector is not extended beyond these streets for this study.

2. Traffic generated by development of Piilani North was included in the traffic projections.

3. The graphics indicated that Piilani Highway was widened to four lanes (two lanes in each direction) with separate left turn lanes.

4. The intersection of Lipoa Street at North-South Collector was unsignalized.

5. The report graphics also indicated that the intersection of Lipoa Street at the North-South Collector was modified to accommodate the existing driveway to the schools.

The resulting 2005 cumulative peak hour traffic projections are shown in Figure 5.

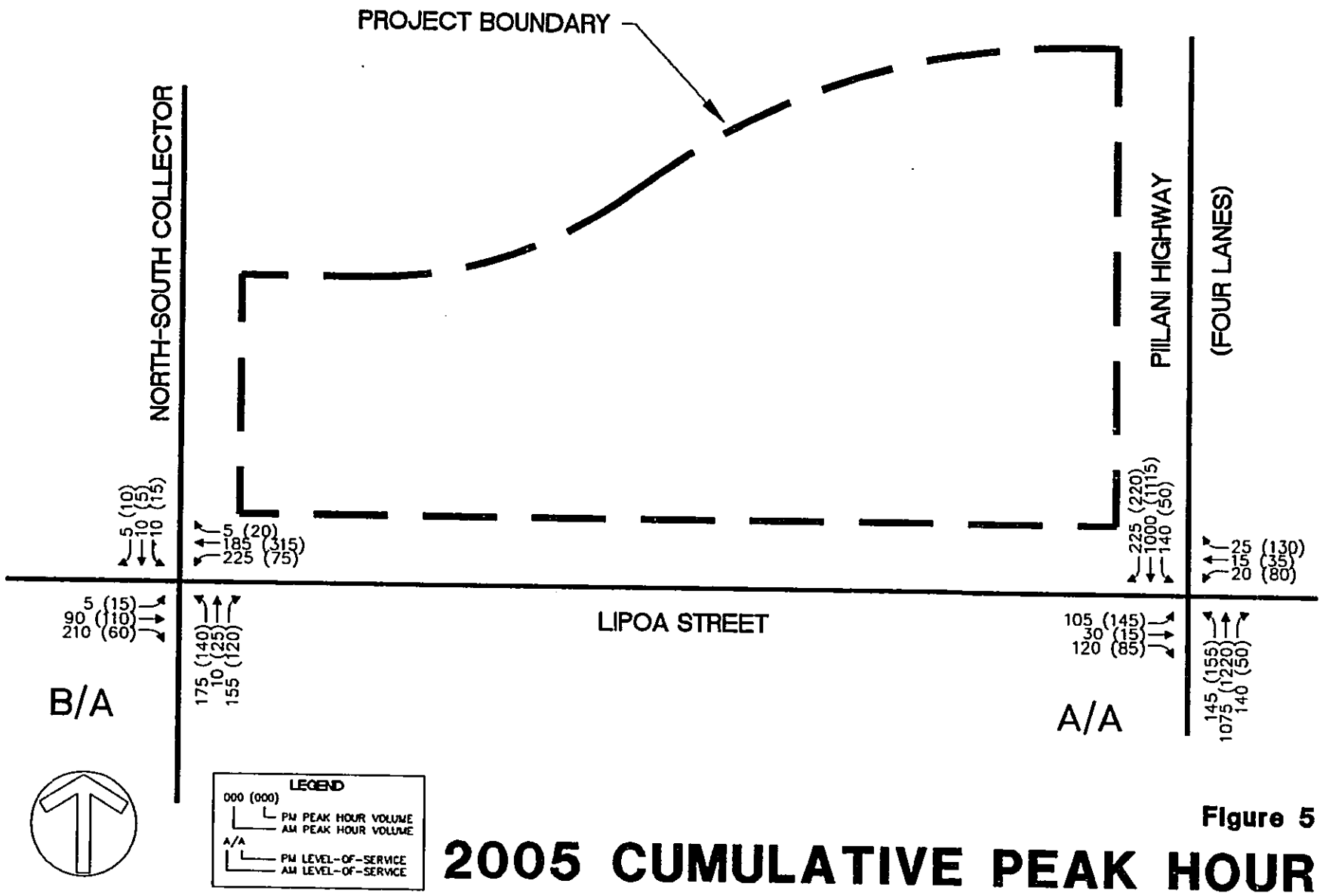


Figure 5

2005 CUMULATIVE PEAK HOUR TRAFFIC VOLUMES

4. PROJECT-RELATED TRAFFIC CONDITIONS

This chapter discusses the methodology used to identify the traffic-related impacts of the proposed project. Generally, the process involves the determination of weekday and peak-hour trips that would be generated by the proposed project, distribution and assignment of these trips on the approach and departure routes, and finally, determination of the levels-of-service at affected intersections subsequent to implementation of the project.

Trip Generation

Future traffic volumes generated by the project were determined using trip generation rates contained in *Trip Generation*, Fifth Edition, prepared by the Institute of Transportation Engineers. The trip generation analysis and the resulting daily and peak hour volumes are summarized in Table 6.

Trip generation rates for County Parks (Land Use Code 412) were used for estimating trips generated by the project.

Table 6 Trip Generation Calculations

Area (Acres)	9.0	
Period	Trips Per Acre	Trips
Average Weekday Total	2.99[1]	27
AM Peak Hour Total	2.87[2]	26
% Inbound	72	19
% Outbound	28	7
PM Peak Hour Total	3.14[3]	28
% Inbound	35	10
% Outbound	65	18

Notes:
(1) Institute of Transportation Engineers, *Trip Generation*, Fifth Edition, 1991, p 590
(2) Ibid, p 591.
(3) Ibid, p. 592.

Trip Distribution

The project-related trips were distributed along the anticipated approach routes to the project site. This information was obtained from previously conducted traffic studies in the area, which have been generally accepted by the reviewing agencies.

The approach and departure distributions are shown as percentages in Figure 6.

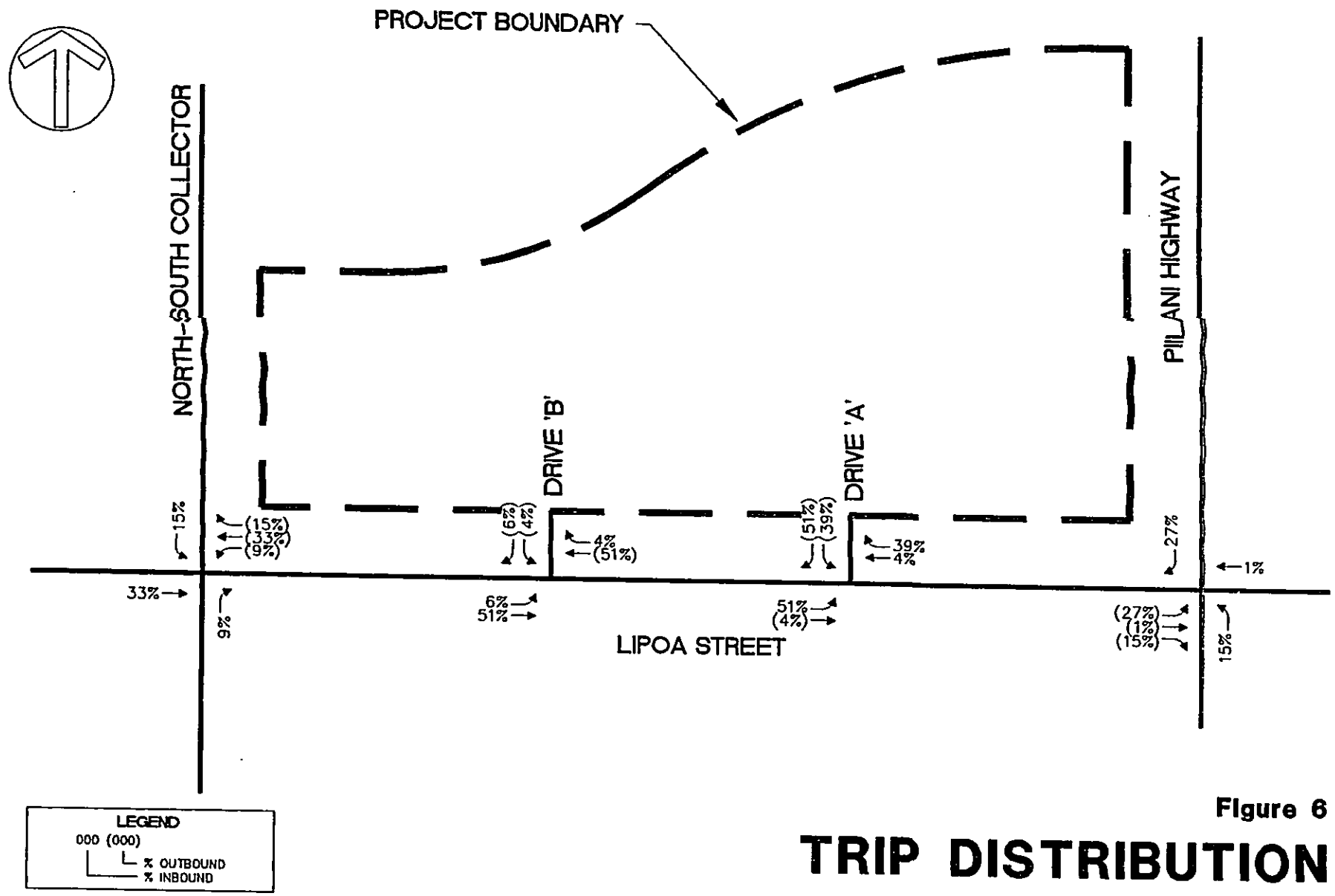


Figure 6

TRIP DISTRIBUTION

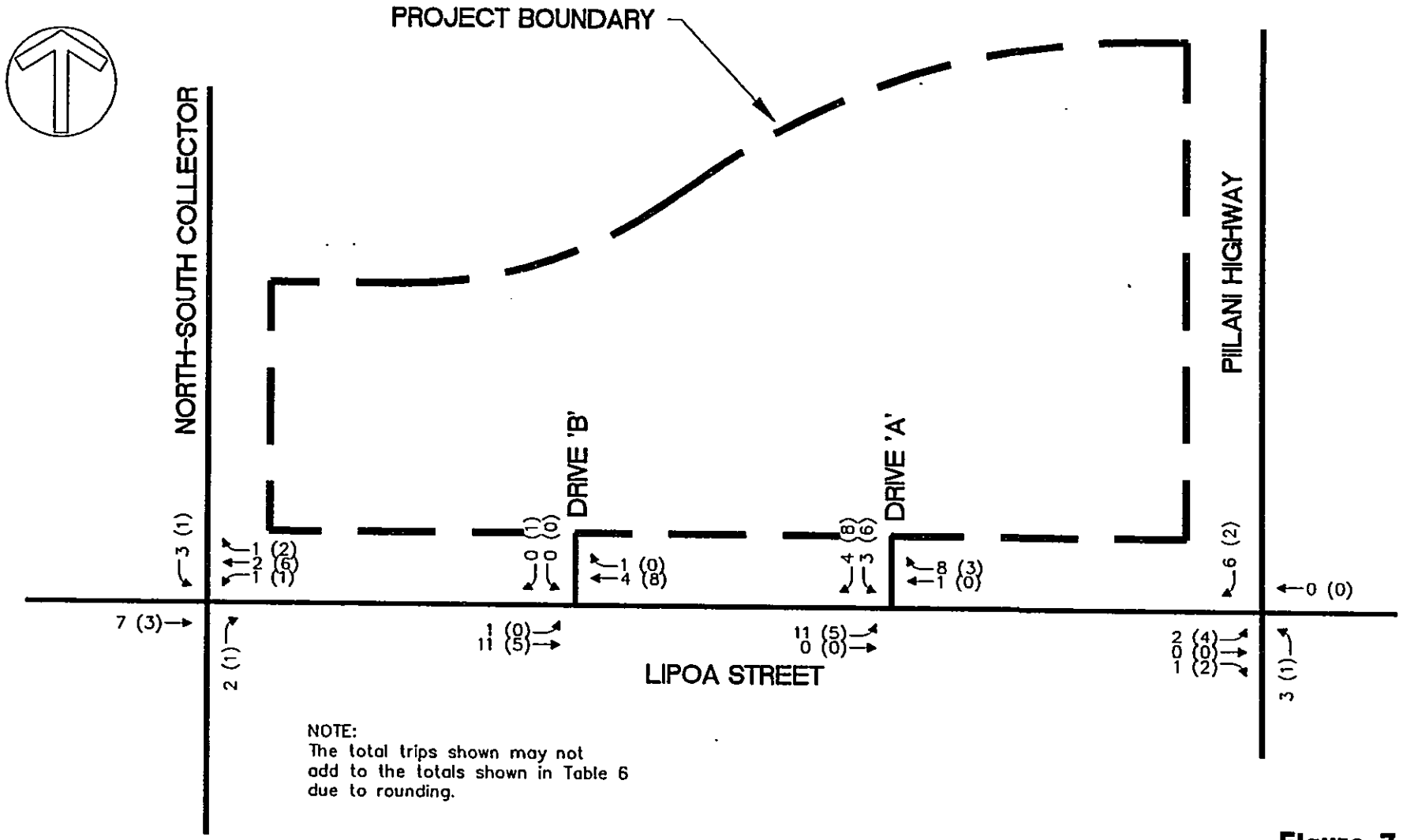
Trip Assignment

Using the trip generation and trip distribution previously discussed, project-related traffic was assigned to the various traffic movements at the intersections studied. Figure 7 presents the project related traffic volumes for the project.

2005 Cumulative Plus Project Peak Hour Traffic Volumes

Future traffic volumes with the project were determined by superimposing the project-generated traffic on the 2005 cumulative traffic volumes presented in Chapter 3. The resulting peak hour traffic volumes for 2005 cumulative plus project are shown on Figure 8.

The traffic projection worksheets are presented as Appendix C.

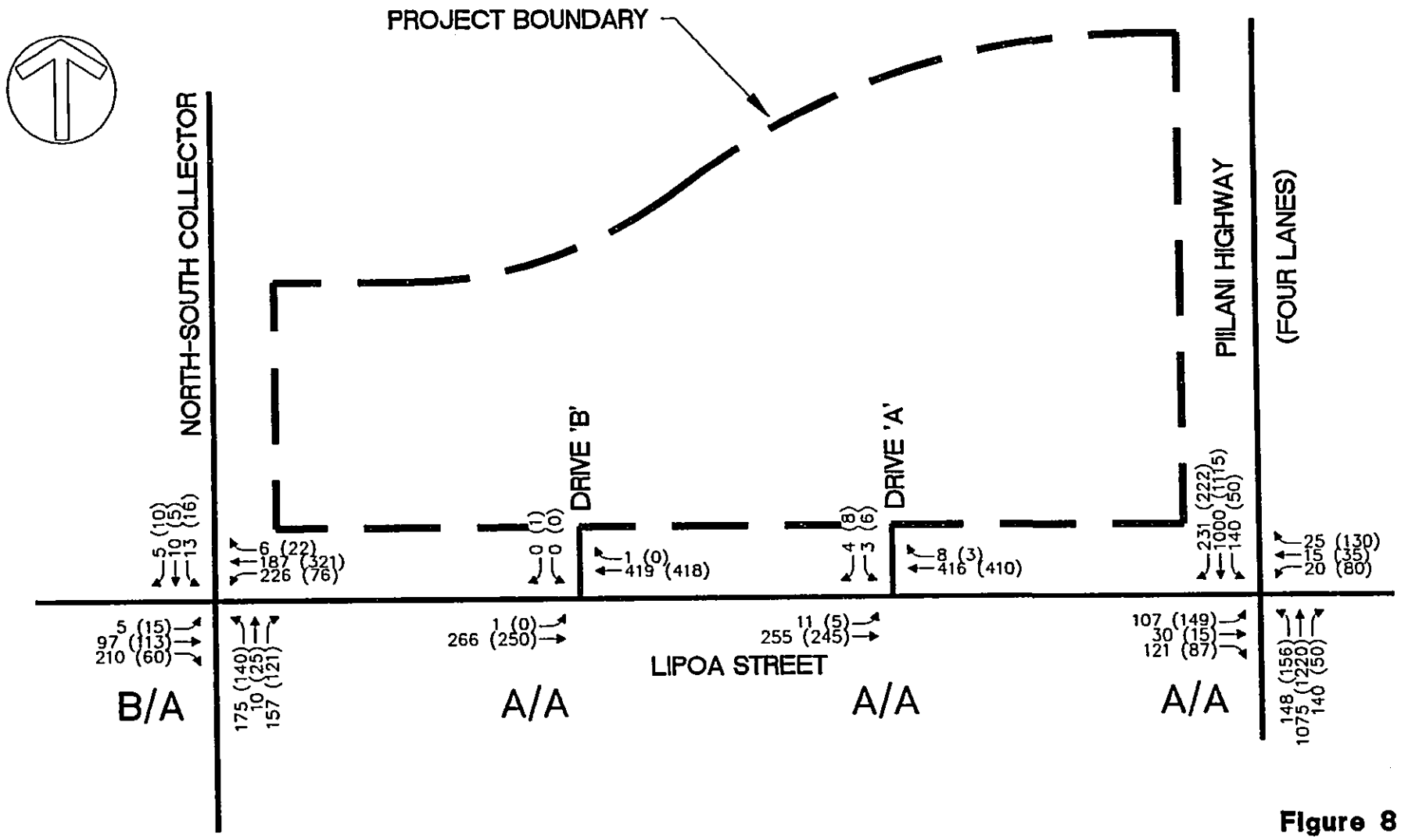


NOTE:
The total trips shown may not add to the totals shown in Table 6 due to rounding.

LEGEND
000 (000)
PM PEAK HOUR VOLUME
AM PEAK HOUR VOLUME

Figure 7

TRAFFIC ASSIGNMENTS



LEGEND

000 (000)
- PM PEAK HOUR VOLUME
- AM PEAK HOUR VOLUME

A/A
- PM LEVEL-OF-SERVICE
- AM LEVEL-OF-SERVICE

Figure 8

2005 CUMULATIVE PLUS PROJECT PEAK HOUR TRAFFIC VOLUMES

5. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this chapter is to present the results of the level-of-service analysis, which identifies the project-related impacts. In addition, any mitigation measures necessary and feasible are identified and other access, egress and circulation issues are discussed.

Definition of Significant Impacts

Criteria for determining if a project has a significant traffic impact for which mitigation measures must be investigated have been established based on traffic impact study guidelines used in other traffic studies. Generally, the criteria are as follows: if the level-of-service (LOS) without the project is E or F and the volume/capacity (V/C) ratio changes less than 0.020, the project's traffic impacts are considered insignificant. However, if the V/C ratio change is greater than 0.020, then mitigation measures which will reduce the V/C ratio change to less than 0.020 must be identified. If the LOS with the project is D or better, then no mitigation measures need to be identified.

Project Related Traffic Impacts and Mitigation Measures

The level-of-service analysis for 2005 cumulative and cumulative plus project conditions are summarized in Tables 7 and 8.

The intersection of Piilani Highway at Lipoa Street was analyzed using the methodology for signalized intersections. This intersection is expected to operate at LOS 'A' during both peak hours with the widening to four lanes as indicated in the *Draft Traffic Assessment for Kihei Road 'C'* whether the project is built or not. An LOS analysis for the intersection with Piilani Highway as a two-lane roadway was also performed to determine conditions if Piilani Highway is not widened. The analysis determined that the LOS will be 'E' and the change in the V/C ratio is less than the 0.020 that defines the impact as significant.

The calculations are provided in Appendices D and E.

Table 7 Level-of-Service Analysis for Signalized Intersections

	Weekday AM Peak Hour				Weekday PM Peak Hour			
	Without Project		With Project		Without Project		With Project	
Approach & Movement	V/C[1]	LOS[2]	V/C	LOS	V/C	LOS	V/C	LOS
Lipoa Street at Piilani Highway[3]	0.541	A	0.542	A	0.582	A	0.585	A

NOTES:
(1) V/C denotes ratio of volume to capacity. See Appendices D and E for calculations.
(2) LOS denotes Level-of-Service calculated using the planning method described in *Highway Capacity Manual.*
(3) LOS calculations assume that the North-South Collector has been completed and that Piilani Highway has been widened to four-lanes as shown in the *Draft Traffic Assessment Report for Kihei Road 'C'* dated March 1997 prepared by Austin, Tsutsumi & Associates. Calculations for Piilani Highway as a four-lane and as a two-lane facility is provided in Appendices D and E.

The intersection of the North-South Collector at Lipoa Street and the driveways into the project were analyzed using the methodology for unsignalized intersections. The analysis was performed assuming the North-South Collector was constructed as a three-lane roadway and that Lipoa Street was constructed as a three-lanes roadway. As shown all intersections are expected to operate at LOS 'B' or better. The lane configurations for the intersections are shown in Figure 9.

Table 8 Level-of-Service Analysis for Unsignalized Intersections

	Weekday AM Peak Hour				Weekday PM Peak Hour			
	Without Project		With Project		Without Project		With Project	
Approach & Movement	Delay[1]	LOS[2]	Delay	LOS	Delay	LOS	Delay	LOS
Lipoa Street at North-South Collector	5.6	B	5.7	B	3.5	A	3.5	A
Lipoa Street at Drive 'A'	Future		0.1	A	Future		0.2	A
Lipoa Street at Drive 'B'	Future		0.0	A	Future		0.0	A

NOTES:
(1) Delay shown is the average vehicle delay in seconds for the total intersection. The delay for each movement is calculated and shown in the calculations presented in Appendices D and E.
(2) LOS denotes Level-of-Service calculated using unsignalized method described in *Highway Capacity Manual.*

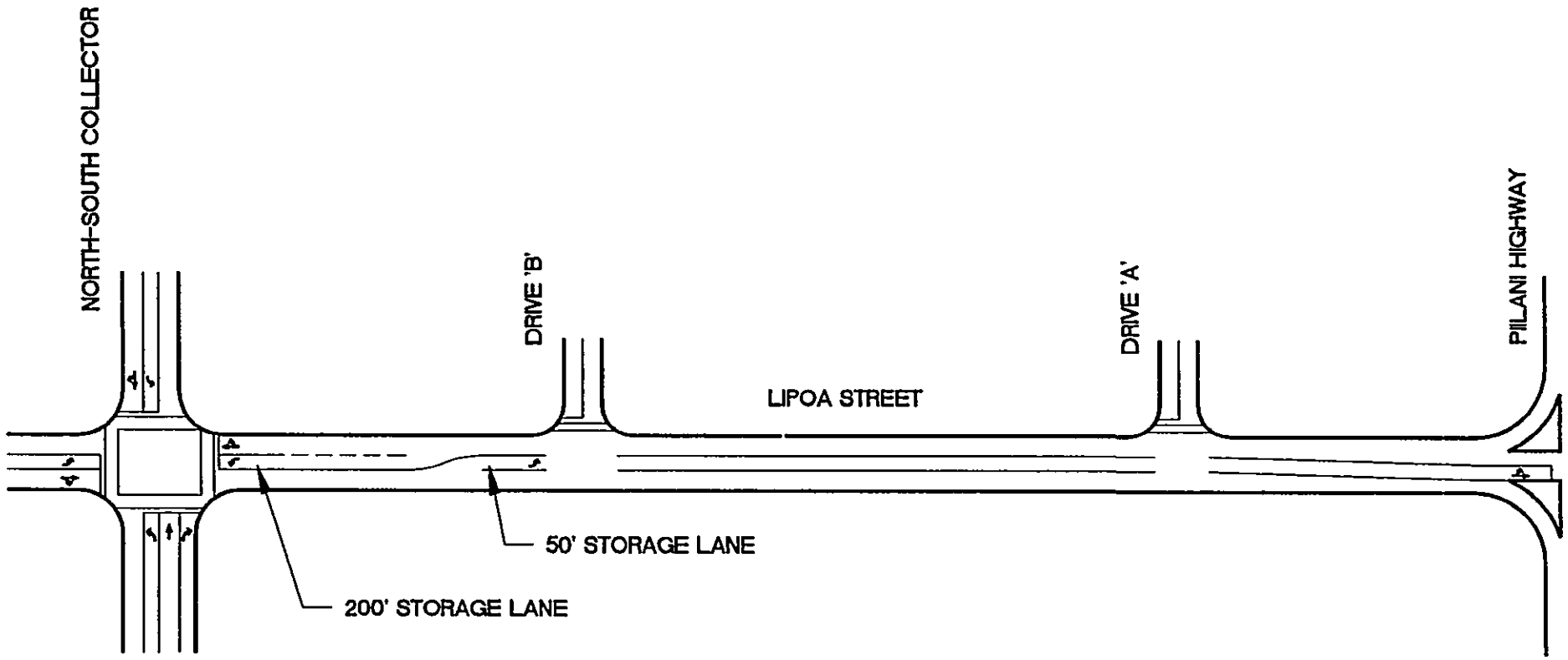


Figure 9

RECOMMENDED TRAFFIC PLAN

Traffic Signal Warrant Analysis

Lipoa Street at North-South Collector

A traffic signal warrant analysis was performed for the intersection of Lipoa Street at the North-South Collector as part of the evaluation of potential mitigation measures. The traffic signal warrant analysis was performed using the warrants and procedures described in the *Manual of Uniform Traffic Control Devices* (MUTCD) published by the U.S. Department of Transportation, Federal Highway Administration.

There are eleven warrants described in the MUTCD. If the traffic conditions satisfy any of the warrants, then a traffic signal should be considered. The MUTCD and traffic manual clearly states that satisfaction of a warrant is not necessarily justification for a traffic signal. Delay, congestion, confusion or other evidence of the need of right-of-way assignment must be shown.

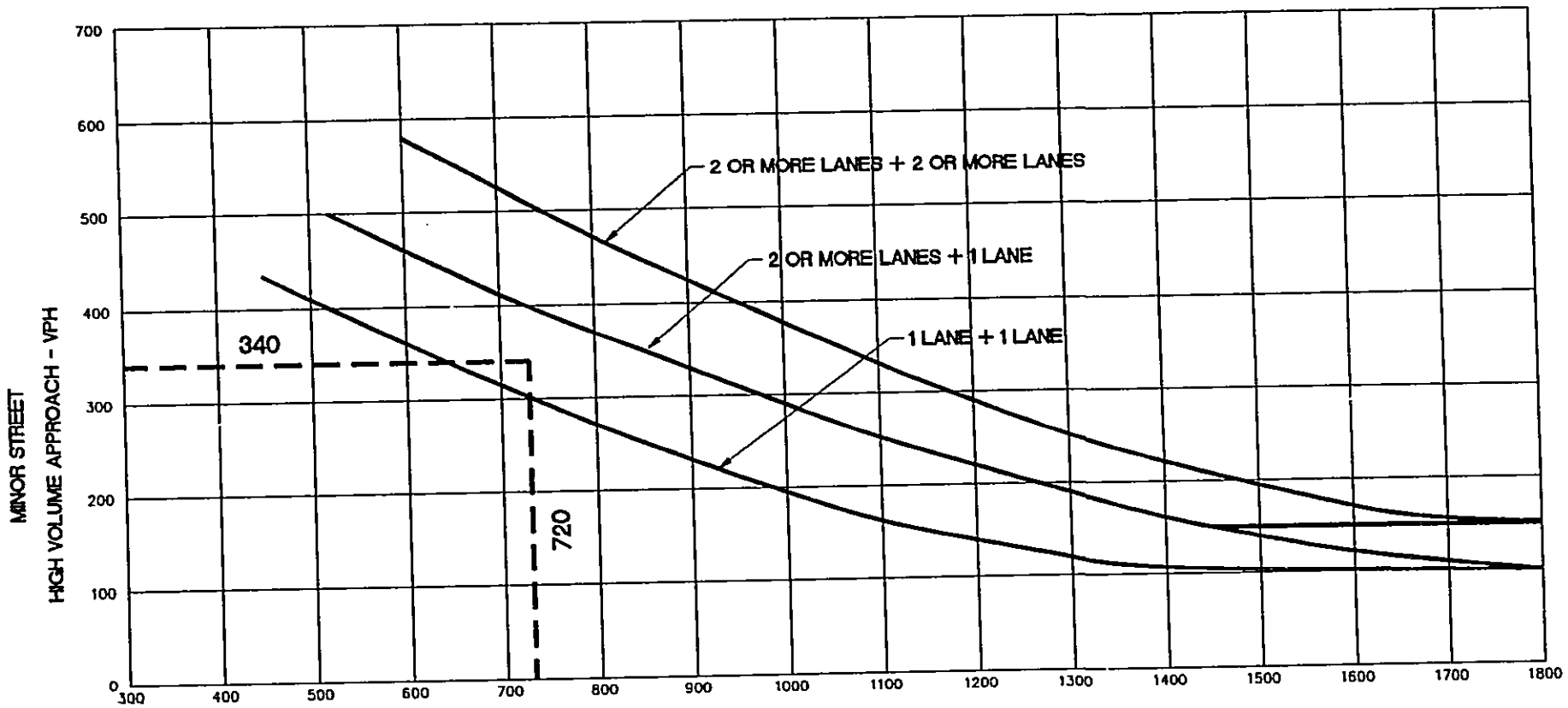
Traffic volumes for a full 12-hour period were not available so the warrants that require 8 to 12 hours volumes were not performed. As the intersection is currently configured, a traffic signal is warranted under the peak hour volume warrant (Warrant 11) for cumulative (without project conditions) because of the volume of traffic associated with the adjacent schools. The peak hour volume warrant is shown as Figure 10.

The warrant analysis is based on the northbound approach as currently configured. If this approach is modified to provide separate left, through and right-turn lanes (three lanes total), the traffic signal warrant is not satisfied. Conversion from a two-way to a four-way STOP controlled intersection will further improve the operation of the intersection. As a four-way STOP controlled intersection, this intersection will operate at LOS B. The calculations for this intersection as a four-way STOP controlled intersection is presented in the Appendices.

Lipoa Street at Drive 'A'

A signal warrant analysis for Lipoa Street at Drive 'A' was also performed since it is anticipated the pool at the park will be used by students of Kihei School and that they would cross at this driveway. This warrant analysis was performed using the criteria for school crossings and evaluated the warrants for a flashing beacon and a traffic signal. For a flashing beacon, three warrants must be satisfied. These warrants relate to minimum pedestrian/vehicular volumes, critical speed along the street, and distance to the nearest signal.

The minimum pedestrian volume is satisfied if more that 40 students use the crossing for two or more hours per day. It is reasonable to assume that this warrant would be satisfied. The critical speed is 35 mph whereas the posted speed along Lipoa Street is 25 mph. Therefore, this warrant is not satisfied. The minimum distance to the nearest traffic signal is 600 feet. The scaled distance between this driveway and the signal at Piilani Highway is approximately 400 feet. This warrant is not satisfied either. In conclusion, two of the three warrants required are not satisfied.



NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET WITH ONE LANE.

Figure 10

PEAK HOUR TRAFFIC SIGNAL WARRANTS
URBAN CONDITIONS

INTERSECTION OF LIPOA STREET AT NORTH-SOUTH COLLECTOR
2005 CUMULATIVE (WITHOUT PROJECT) CONDITIONS

For a traffic signal, the minimum pedestrian warrant for a traffic signal is a minimum of 100 students using the crosswalk for two hours a day or 500 students per day versus 500 vehicles per hour for two hours. It is possible that this warrant will be satisfied. The minimum distance to the nearest signal is the same for a flashing beacon. This warrant is not satisfied.

The results of the signal warrant analysis are:

1. A traffic signal is <u>not</u> warranted for the intersection of Lipoa Street at the North-South Collector if the intersection is modified to provide an additional northbound through lane. The intersection should be modified to provide an additional lane to accommodate Northbound through traffic. Conversion from a two-way STOP controlled intersection to a four-way STOP controlled intersection would improve the LOS for all approaches to "C" or better. Otherwise, the Northbound approach will operate at LOS "D".

2. The warrants for a flashing beacon or a traffic signal at the intersection of Lipoa Street at Drive 'A' are not satisfied. Students crossing Lipoa Street should be directed to the Lipoa-Street-North-South Collector intersection which should be modified from a two-way STOP controlled intersection to a four-way STOP controlled intersection.

Left Turn Storage Lane Analysis

The left turn storage lengths required to accommodate estimated traffic volumes was performed using guidelines in *A Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway and Transportation Officials, 1990 edition. There are separate policies for unsignalized and signalized intersections. Based on this policy, the assumptions used to determine the required lengths of the left turn storage lanes are:

1. For unsignalized intersections, the length of the left turn storage lane should be based on the number of vehicles arriving during an average two-minute period during the peak hour.

2. For signalized intersections, the length of the left turn storage lane should be based on two times the average number of vehicles arriving during a signal cycle during the peak hour.

3. The length of a vehicle is 25 feet.

4. The minimum length of a left turn storage lane should accommodate one automobile and one single-unit truck, or 50 feet.

5. The traffic signal cycle length is 120 seconds.

The calculation of the left turn storage lanes is shown in Table 9.

Table 9 Minimum Length of Left Turn Storage Lanes

Interjection	Approach and Volume	Design Volume	Queue Length	
			Vehicles	Feet
Piilani Highway at Lipoa Street	EB Left	149 (PM)	10	250
North-South Collector at Lipoa Street	WB Left	226 (AM)	8	200
Lipoa Street at Drive 'A'	EB Left	11 (AM)	2	50
Lipoa Street at Drive 'B'	EB Left	1 (AM)	2	50

Reference: *A Policy on Geometric Design of Highways and Streets* published by the American Association pf State Highway and Transportation Officials, 1990 edition

Conclusions and Recommendations

1. No mitigation measures are required for the intersection of Piilani Highway at Lipoa Street.

2. Traffic signals are not warranted for the intersection of Lipoa Street at the future North-South Collector under cumulative or cumulative plus project conditions if the intersection is modified to provide a separate northbound through lane when the North-South Collector is constructed.

3. An analysis of the required lengths of left turn storage lanes determined that the minimum length for left turns from Lipoa Street to northbound Piilani Highway is 250 feet and left turns from Lipoa Street to the school is 200 feet. Therefore, it is not possible to relocate left turns to the school to a location opposite the entrance to the project. Traffic to the school will have to use the Lipoa Street/North-South Collector intersection where the proper left turn storage capacity can be provided.

4. An analysis of the intersection of Lipoa Street at Drive 'A' determined that a flashing beacon or traffic signal is not warranted under the warrants for a school crossing. The distance to the traffic signal at Piilani Highway is less than 600 feet, which is the minimum distance required.

APPENDIX A

PHOTOGRAPHS OF STUDY INTERSECTIONS

Figure A-1. Looking north along Piilani Highway from southeast corner of Piilani Highway/Lipoa Street intersection.

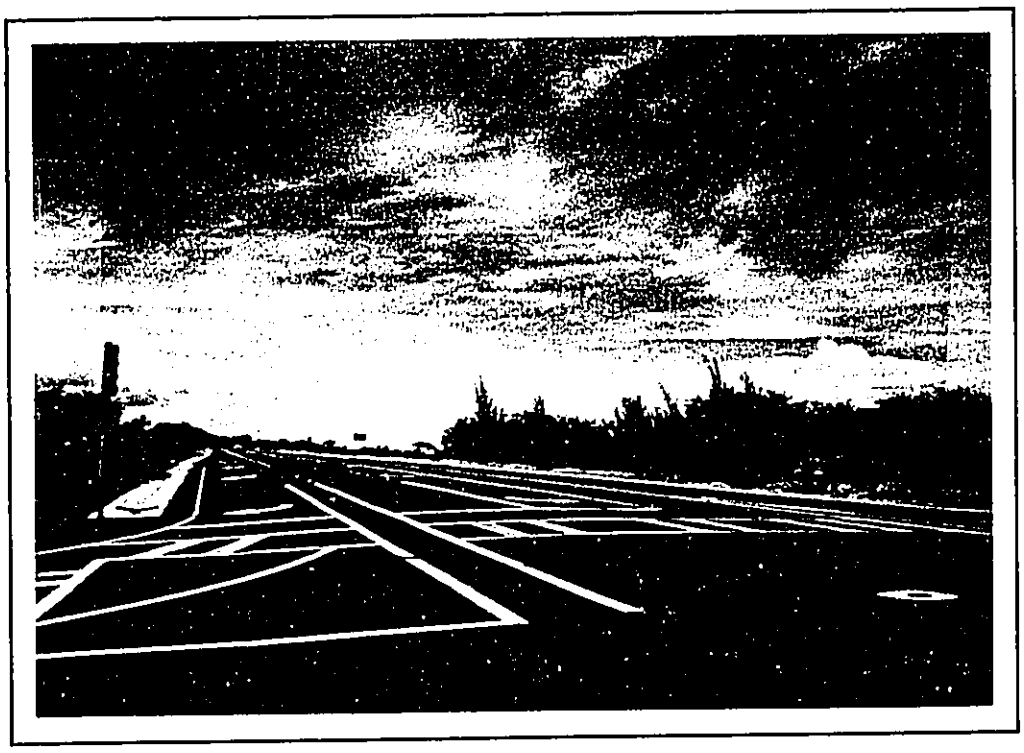


Figure A-2 Looking north along Piilani Highway from southeast corner of Piilani Highway/Lipoa Street intersection.

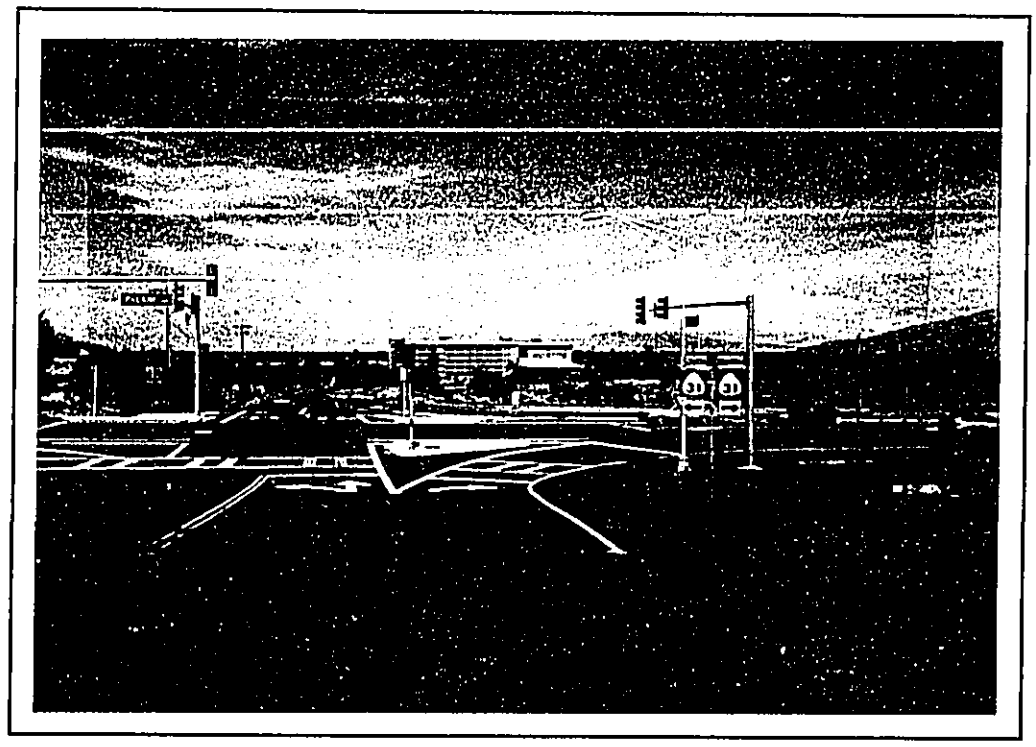


Figure A-3. Looking west along Lipoa Street from east side of Piilani Highway.

Figure A-4. Looking east along Lipoa Street from west side of Piilani Highway.

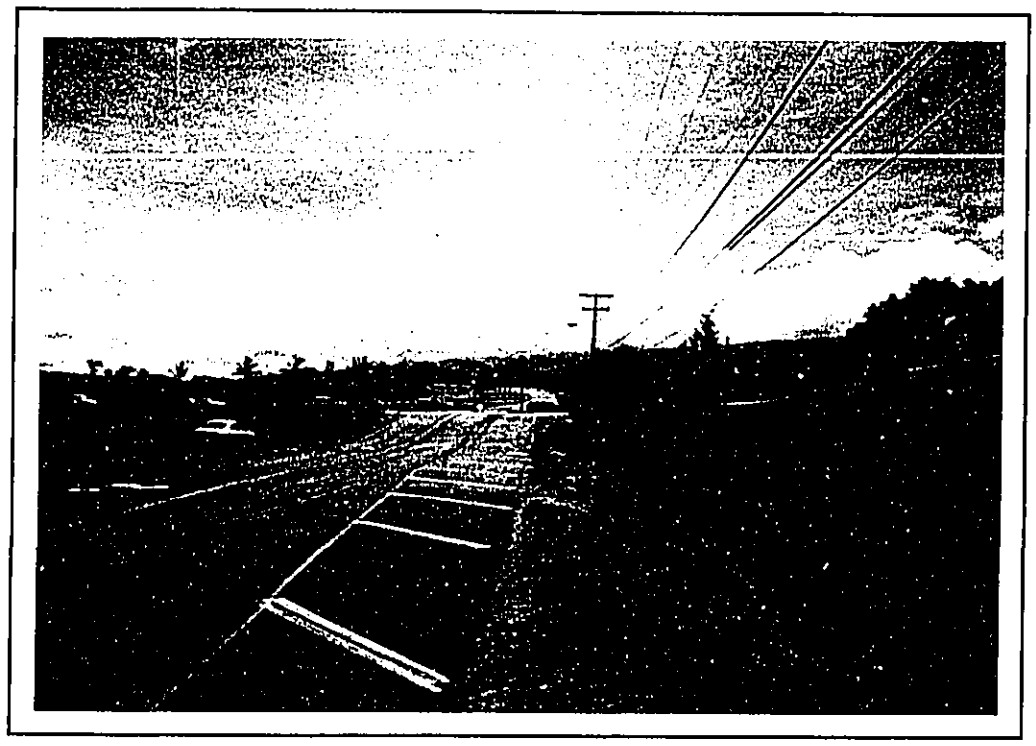


Figure A-5. Looking west along Lipoa Street from midway between Piilani Highway and Future North-South Collector.

Figure A-6. Looking west along Lipoa Street from midway between Piilani Highway and Future North-South Collector.

Figure A-7. Looking east along Lipoa Street toward Piilani Highway from school entrance.

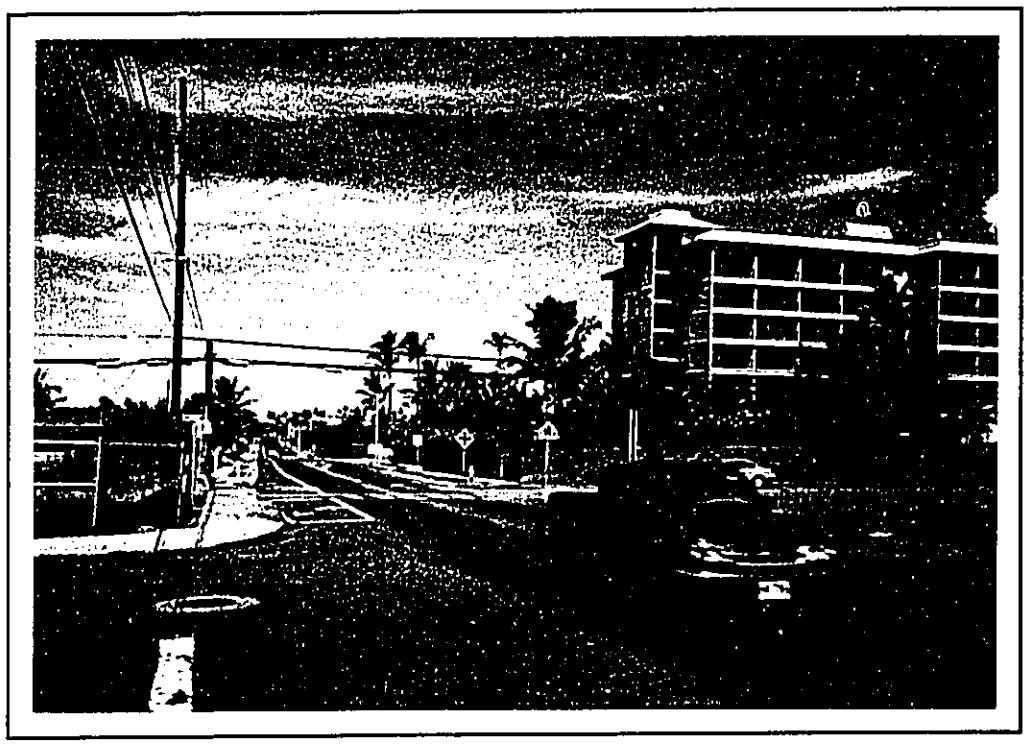


Figure A-8. Looking west along Lipoa Street from school entrance.

APPENDIX B

LEVEL-OF-SERVICE CALCULATIONS FOR EXISTING CONDITIONS

LEVEL-OF-SERVICE CALCULATIONS

Project: Kihei Community Center
Intersection of: Piilani Highway at Lipoa Street
Condition: Existing Conditions
Date: May 19, 1997

CAPACITY INPUTS

THRU Lane Capacity (vph):	1500
LEFT Lane Capacity (vph):	1500
Double Left Penalty (%)	20
Cycle Length (secs):	120
Amber (% of cycle):	0
North RTOR (%):	0
East RTOR (%):	10
South RTOR (%):	10
West RTOR (%):	0

Appr & Mvt	Appr Lanes	Capacity	Volumes AM	Volumes PM	Volumes Sat	V/C Ratios AM	V/C Ratios PM	V/C Ratios Sat
N- Rt	1	1500	295	324	N	0.197	0.216	0.000
Th	1	1500	793	637	O	0.529	0.425	0.000
Lt	1	1500	13	152	T	0.009	0.101	0.000
E- Rt	1	1500	41	7		0.027	0.005	0.000
Th	1	1500	20	11	A	0.031	0.017	0.000
Lt	0	0	27	14	N	0.000	0.000	0.000
S- Rt	1	1500	12	51	A	0.008	0.034	0.000
Th	1	1500	864	704	L	0.576	0.469	0.000
Lt	1	1500	170	123	Y	0.113	0.082	0.000
W- Rt	1	1500	156	132	Z	0.104	0.088	0.000
Th	1	1500	14	23	E	0.135	0.177	0.000
Lt	0	0	189	242	D	0.000	0.000	0.000
N-S(1):			2594	2420	0	0.642	0.507	0.000
N-S(2):						0.585	0.570	0.000
E-W(1):						0.031	0.017	0.000
E-W(2):						0.135	0.177	0.000
V/C:						0.777	0.747	0.000
AMBER:						0.000	0.000	0.000
ICU						0.777	0.747	0.000
LOS						C	C	A

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S Collector (E-W) Lipoa Street
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst.....
Date of Analysis..... 5/21/97
Other Information.....Existing AM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	1	0	1	0	0	0
Stop/Yield			N			N						
Volumes		174	124	259	226		101		185			
PHF		.8	.8	.6	.8		.8		.8			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10			1.10		1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	294	
Potential Capacity: (pcph)	983	
Movement Capacity: (pcph)	983	
Prob. of Queue-Free State:	0.74	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	372	
Potential Capacity: (pcph)	1140	
Movement Capacity: (pcph)	1140	
Prob. of Queue-Free State:	0.58	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	1008	
Potential Capacity: (pcph)	276	
Major LT, Minor TH Impedance Factor:	0.58	
Adjusted Impedance Factor:	0.58	
Capacity Adjustment Factor due to Impeding Movements	0.58	
Movement Capacity: (pcph)	161	

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB L	139	161		122.7	9.3	F	46.5
NB R	254	983		4.9	1.2	A	
WB L	475	1140		5.4	2.4	B	2.9

Intersection Delay = 13.8 sec/veh

C'

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S Collector (E-W) Lipoa Street
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst.....
Date of Analysis..... 5/21/97
Other Information.....Existing PM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	1	0	1	0	0	0
Stop/Yield			N			N						
Volumes		363	10	35	423		20		34			
PHF		.9	.9	.85	.85		.8		.8			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10			1.10		1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	408	
Potential Capacity: (pcph)	860	
Movement Capacity: (pcph)	860	
Prob. of Queue-Free State:	0.95	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	414	
Potential Capacity: (pcph)	1088	
Movement Capacity: (pcph)	1088	
Prob. of Queue-Free State:	0.96	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	948	
Potential Capacity: (pcph)	299	
Major LT, Minor TH Impedance Factor:	0.96	
Adjusted Impedance Factor:	0.96	
Capacity Adjustment Factor due to Impeding Movements	0.96	
Movement Capacity: (pcph)	287	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	28	287		13.9	0.3	C	7.9
NB	R	46	860		4.4	0.0	A	
WB	L	45	1088		3.5	0.0	A	0.3

Intersection Delay = 0.6 sec/veh

'A'

APPENDIX C

TRAFFIC ASSIGNMENT WORKSHEETS

Part 4

TRIP ASSIGNMENT WORKSHEET

Kihei Community Center, Scenario 1
May 1997

INTERSECTION NO 1
INTERSECTION OF Piilani Highwway at Lipoa Road

No	Approach & Mvt	Existing AM	Existing PM	1999 Cumulative AM	1999 Cumulative PM	Project Trips AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	Project Trips PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	1999 Cumulative Plus Project AM	1999 Cumulative Plus Project PM
1	N- RT	295	324	225	220	13		13	8		8	238	228
2	TH	793	637	1000	1115			0			0	1000	1115
3	LT	13	152	140	50			0			0	140	50
4	E- RT	41	7	25	130			0			0	25	130
5	TH	20	11	15	35	0		0	0		0	15	35
6	LT	27	14	20	80			0			0	20	80
7	S- RT	12	51	140	50			0			0	140	50
8	TH	864	704	1075	1220			0			0	1075	1220
9	LT	170	123	145	155	8		8	4		4	153	159
10	W- RT	156	132	120	85		3	3		8	8	123	93
11	TH	14	23	30	15		0	0		0	0	30	15
12	LT	189	242	105	145		6	6		13	13	111	158
TOTAL		2594	2420	3040	3300	21	9	30	12	21	33	3070	3333

Approach Totals

			1365	1385	13	0	13	8	0	8	1378	1393
			60	245	0	0	0	0	0	0	60	245
From North	1101	1113	1360	1425	8	0	8	4	0	4	1368	1429
From East	88	32	255	245	0	9	9	0	21	21	264	266
From South	1046	878										
From West	359	397	3040	3300	21	9	30	12	21	33	3070	3333
Total	2594	2420										
To North	1094	953	1205	1495	0	6	6	0	13	13	1211	1508
To East	39	226	310	115	0	0	0	0	0	0	310	115
To South	976	783	1140	1280	0	3	3	0	8	8	1143	1288
To West	485	458	385	410	21	0	21	12	0	12	406	422
Total	2594	2420	3040	3300	21	9	30	12	21	33	3070	3333
Leg Totals												
North	2195	2066	2570	2880	13	6	19	8	13	21	2589	2901
East	127	258	370	360	0	0	0	0	0	0	370	360
South	2022	1661	2500	2705	8	3	11	4	8	12	2511	2717
West	844	855	640	655	21	9	30	12	21	33	670	688
Total	5188	4840	6080	6600	42	18	60	24	42	66	6140	6666

TRIP ASSIGNMENT WORKSHEET
Kihei Community Center, Scenario 1
May 1997

INTERSECTION NO 2
INTERSECTION OF North-South Collector at Lipoa Road

No	Approach & Mvt	Existing AM	Existing PM	1999 Cumulative AM	1999 Cumulative PM	Project Trips AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	1999 Cumulative Plus Project AM	1999 Cumulative Plus Project PM
1	N- RT	0	0	5	10		0	0		0	0	5	10
2	TH	0	0	10	5		0	0		0	0	10	5
3	LT	0	0	10	15	8	0	8	4	0	4	18	19
4	E- RT	0	0	5	20	0	3	3	0	8	8	8	28
5	TH	226	423	185	315		7	7		17	17	192	332
6	LT	259	35	225	75		2	2		4	4	227	79
7	S- RT	185	34	155	120	4		4	2		2	159	122
8	TH	0	0	10	25	0		0	0		0	10	25
9	LT	101	20	175	140			0			0	175	140
10	W- RT	124	10	210	60			0			0	210	60
11	TH	174	363	90	110	17		17	9		9	107	119
12	LT	0	0	5	15	0		0	0		0	5	15
TOTAL		1069	885	1085	910	29	12	41	15	29	44	1126	954

Approach Totals

From North	0	0	25	30	8	0	8	4	0	4	33	34
From East	485	458	415	410	0	12	12	0	29	29	427	439
From South	286	54	340	285	4	0	4	2	0	2	344	287
From West	298	373	305	185	17	0	17	9	0	9	322	194
Total	1069	885	1085	910	29	12	41	15	29	44	1126	954

Departure Totals

To North	0	0	20	60	0	3	3	0	8	8	23	68
To East	359	397	255	245	29	0	29	15	0	15	284	260
To South	383	45	445	140	0	2	2	0	4	4	447	144
To West	327	443	365	465	0	7	7	0	17	17	372	482
Total	1069	885	1085	910	29	12	41	15	29	44	1126	954

Leg Totals

North	0	0	45	90	8	3	11	4	8	12	56	102
East	844	855	670	655	29	12	41	15	29	44	711	699
South	669	99	785	425	4	2	6	2	4	6	791	431
West	625	816	670	650	17	7	24	9	17	26	694	676
Total	2138	1770	2170	1820	58	24	82	30	58	88	2252	1908

TRIP ASSIGNMENT WORKSHEET

Kihei Community Center, Scenario 1
May 1997

INTERSECTION NO 3
INTERSECTION OF Lipoa Road at Drive 'A'

No	Approach & Mvt	Existing AM	Existing PM	1999 Cumulative AM	1999 Cumulative PM	Project Trips AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	1999 Cumulative Plus Project AM	1999 Cumulative Plus Project PM
1	N- RT	0	0	0	0		11	11		26	26	11	26
2	TH	0	0	0	0			0			0	0	0
3	LT	0	0	0	0		8	8		19	19	8	19
4	E- RT	0	0	0	0	19		19	11		11	19	11
5	TH	0	0	415	410	2		2	0		0	417	410
6	LT	0	0	0	0			0			0	0	0
7	S- RT	0	0	0	0			0			0	0	0
8	TH	0	0	0	0			0			0	0	0
9	LT	0	0	0	0			0			0	0	0
10	W- RT	0	0	0	0			0			0	0	0
11	TH	0	0	255	245		1	1		2	2	256	247
12	LT	0	0	0	0	26		26	14		14	26	14
TOTAL		0	0	670	655	47	20	67	25	47	72	737	727

Approach Totals

From North	0	0	0	0	0	19	19	0	45	45	19	45
From East	0	0	415	410	21	0	21	11	0	11	436	421
From South	0	0	0	0	0	0	0	0	0	0	0	0
From West	0	0	255	245	26	1	27	14	2	16	282	261
Total	0	0	670	655	47	20	67	25	47	72	737	727

Departure Totals

To North	0	0	0	0	45	0	45	25	0	25	45	25
To East	0	0	255	245	0	9	9	0	21	21	264	266
To South	0	0	0	0	0	0	0	0	0	0	0	0
To West	0	0	415	410	2	11	13	0	26	26	428	436
Total	0	0	670	655	47	20	67	25	47	72	737	727

Leg Totals

North	0	0	0	0	45	19	64	25	45	70	64	70
East	0	0	670	655	21	9	30	11	21	32	700	687
South	0	0	0	0	0	0	0	0	0	0	0	0
West	0	0	670	655	28	12	40	14	28	42	710	697
Total	0	0	1340	1310	94	40	134	50	94	144	1474	1454

22-May-97

Phillip Rowell and Associates

TRIP ASSIGNMENT WORKSHEET

Kihei Community Center, Scenario 1
May 1997

INTERSECTION NO 4
INTERSECTION OF Lipoa Road at Drive 'B'

No	Approach & Mvt	Existing AM	Existing PM	1999 Cumulative AM	1999 Cumulative PM	Project Trips AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	Project Trips PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	1999 Cumulative Plus Project AM	1999 Cumulative Plus Project PM
1	N- RT	0	0	0	0		1	1		3	3	1	3
2	TH	0	0	0	0			0			0	0	0
3	LT	0	0	0	0		1	1		2	2	1	2
4	E- RT	0	0	0	0	2		2	1		1	2	1
5	TH	0	0	415	410	0	11	11	0	26	26	426	436
6	LT	0	0	0	0			0			0	0	0
7	S- RT	0	0	0	0			0			0	0	0
8	TH	0	0	0	0			0			0	0	0
9	LT	0	0	0	0			0			0	0	0
10	W- RT	0	0	0	0			0			0	0	0
11	TH	0	0	255	245	26	0	26	14	0	14	281	259
12	LT	0	0	0	0	3		3	1		1	3	1
TOTAL		0	0	670	655	31	13	44	16	31	47	714	702

Approach Totals

From North	0	0	0	0	0	2	2	0	5	5	2	5
From East	0	0	415	410	2	11	13	1	26	27	428	437
From South	0	0	0	0	0	0	0	0	0	0	0	0
From West	0	0	255	245	29	0	29	15	0	15	284	260
Total	0	0	670	655	31	13	44	16	31	47	714	702

Departure Totals

To North	0	0	0	0	5	0	5	2	0	2	5	2
To East	0	0	255	245	26	1	27	14	2	16	282	261
To South	0	0	0	0	0	0	0	0	0	0	0	0
To West	0	0	415	410	0	12	12	0	29	29	427	439
Total	0	0	670	655	31	13	44	16	31	47	714	702

Leg Totals

North	0	0	0	0	5	2	7	2	5	7	7	7
East	0	0	670	655	28	12	40	15	28	43	710	698
South	0	0	0	0	0	0	0	0	0	0	0	0
West	0	0	670	655	29	12	41	15	29	44	711	699
Total	0	0	1340	1310	62	26	88	32	62	94	1428	1404

APPENDIX D

LEVEL-OF-SERVICE CALCULATIONS FOR CUMULATIVE CONDITIONS

LEVEL-OF-SERVICE CALCULATIONS

Project: Kihei Community Center
Intersection of: Piilani Highway at Lipoa Street
Condition: 2005 Cumulative
Date: May 19, 1997

CAPACITY INPUTS

THRU Lane Capacity (vph):	1500
LEFT Lane Capacity (vph):	1500
Double Left Penalty (%)	20
Cycle Length (secs):	120
Amber (% of cycle):	0
North RTOR (%):	0
East RTOR (%):	10
South RTOR (%):	10
West RTOR (%):	0

Appr & Mvt	Appr Lanes	Capacity	Volumes AM	Volumes PM	Volumes Sat	V/C Ratios AM	V/C Ratios PM	V/C Ratios Sat
N- Rt	1	1500	225	220	0	0.150	0.147	0.000
Th	2	3000	1000	1115	0	0.333	0.372	0.000
Lt	1	1500	140	50	0	0.093	0.033	0.000
E- Rt	1	1500	25	130	0	0.017	0.087	0.000
Th	1	1500	15	35	0	0.023	0.077	0.000
Lt	0	0	20	80	0	0.000	0.000	0.000
S- Rt	1	1500	140	50	0	0.093	0.033	0.000
Th	2	3000	1075	1220	0	0.358	0.407	0.000
Lt	1	1500	145	155	0	0.097	0.103	0.000
W- Rt	1	1500	120	85	0	0.080	0.057	0.000
Th	1	1500	30	15	0	0.090	0.107	0.000
Lt	0	0	105	145	0	0.000	0.000	0.000
N-S(1):			3040	3300	0	0.430	0.475	0.000
N-S(2):						0.451	0.440	0.000
E-W(1):						0.023	0.087	0.000
E-W(2):						0.090	0.107	0.000
V/C:						0.541	0.582	0.000
AMBER:						0.000	0.000	0.000
ICU						0.541	0.582	0.000
LOS						A	A	A

LEVEL-OF-SERVICE CALCULATIONS

Project: Kihei Community Center
Intersection of: Piilani Highway at Lipoa Street ℄
Condition: 2005 Cumulative
Date: May 19, 1997

CAPACITY INPUTS

THRU Lane Capacity (vph):	1500
LEFT Lane Capacity (vph):	1500
Double Left Penalty (%)	20
Cycle Length (secs):	120
Amber (% of cycle):	0
North RTOR (%):	0
East RTOR (%):	10
South RTOR (%):	10
West RTOR (%):	0

Appr & Mvt	Appr Lanes	Capacity	Volumes AM	Volumes PM	Volumes Sat	V/C Ratios AM	V/C Ratios PM	V/C Ratios Sat
N- Rt	1	1500	225	220	0	0.150	0.147	0.000
Th	1	1500	1000	1115	0	0.667	0.743	0.000
Lt	1	1500	140	50	0	0.093	0.033	0.000
E- Rt	1	1500	25	130	0	0.017	0.087	0.000
Th	1	1500	15	35	0	0.023	0.077	0.000
Lt	0	0	20	80	0	0.000	0.000	0.000
S- Rt	1	1500	140	50	0	0.093	0.033	0.000
Th	1	1500	1075	1220	0	0.717	0.813	0.000
Lt	1	1500	145	155	0	0.097	0.103	0.000
W- Rt	1	1500	120	85	0	0.080	0.057	0.000
Th	1	1500	30	15	0	0.090	0.107	0.000
Lt	0	0	105	145	0	0.000	0.000	0.000
N-S(1):			3040	3300	0	0.764	0.846	0.000
N-S(2):						0.810	0.846	0.000
E-W(1):						0.023	0.087	0.000
E-W(2):						0.090	0.107	0.000
V/C:						0.900	0.953	0.000
AMBER:						0.000	0.000	0.000
ICU						0.900	0.953	0.000
LOS						D	E	A

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S Collector (E-W) Lipoa Street
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst.....
Date of Analysis..... 5/23/97
Other Information.....Cumulative AM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	1	1	1	< 0	1	1	< 0	1	1	< 0
Stop/Yield			N			N						
Volumes		90	210	225	185	5	175	10	155	10	10	5
PHF	.9	.9	.9	.85	.9	.9	.85	.85	.85	.9	.9	.9
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	100	209
Potential Capacity: (pcph)	1232	1085
Movement Capacity: (pcph)	1232	1085
Prob. of Queue-Free State:	0.84	0.99

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	333	212
Potential Capacity: (pcph)	1190	1359
Movement Capacity: (pcph)	1190	1359
Prob. of Queue-Free State:	0.75	0.99
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:		0.99

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	583	813
Potential Capacity: (pcph)	539	408
Capacity Adjustment Factor due to Impeding Movements	0.75	0.75
Movement Capacity: (pcph)	405	306
Prob. of Queue-Free State:	0.97	0.96

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	588	678
Potential Capacity: (pcph)	483	429
Major LT, Minor TH Impedance Factor:	0.72	0.73
Adjusted Impedance Factor:	0.78	0.79
Capacity Adjustment Factor due to Impeding Movements	0.78	0.66
Movement Capacity: (pcph)	376	283

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)		Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	227	376			23.9	4.5	D	
NB	T	13	405	>					14.3
NB	R	200	1232	>	1095	4.1	0.8	A	
SB	L	12	283			13.3	0.0	C	
SB	T	12	306	>					10.8
SB	R	7	1085	>	416	9.1	0.0	B	
EB	L	7	1359			2.7	0.0	A	0.0
WB	L	292	1190			4.0	1.1	A	2.2

Intersection Delay = 5.6 sec/veh

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S Collector (E-W) Lipoa Street
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst.....
Date of Analysis..... 5/23/97
Other Information.....Cumulative PM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	1	1	1	< 0	1	1	< 0	1	1	< 0
Stop/Yield			N			N						
Volumes	15	110	60	75	315	20	140	25	120	15	5	10
PHF	.9	.9	.9	.85	.9	.9	.85	.85	.85	.9	.9	.9
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	122	361
Potential Capacity: (pcph)	1201	909
Movement Capacity: (pcph)	1201	909
Prob. of Queue-Free State:	0.87	0.99
Step 2: LT from Major Street	**WB**	**EB**
Conflicting Flows: (vph)	189	372
Potential Capacity: (pcph)	1393	1140
Movement Capacity: (pcph)	1393	1140
Prob. of Queue-Free State:	0.93	0.98
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:		0.98
Step 3: TH from Minor Street	**NB**	**SB**
Conflicting Flows: (vph)	599	655
Potential Capacity: (pcph)	529	494
Capacity Adjustment Factor due to Impeding Movements	0.91	0.91
Movement Capacity: (pcph)	483	451
Prob. of Queue-Free State:	0.93	0.98
Step 4: LT from Minor Street	**NB**	**SB**
Conflicting Flows: (vph)	596	672
Potential Capacity: (pcph)	478	432
Major LT, Minor TH Impedance Factor:	0.90	0.85
Adjusted Impedance Factor:	0.92	0.89
Capacity Adjustment Factor due to Impeding Movements	0.91	0.77
Movement Capacity: (pcph)	435	334

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)		Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	182	435			14.2	2.3	C	
NB	T	32	483	>					9.4
NB	R	155	1201	>	957	4.7	0.8	A	
SB	L	19	334			11.4	0.0	C	
SB	T	7	451	>					8.5
SB	R	12	909	>	662	5.6	0.0	B	
EB	L	19	1140			3.2	0.0	A	0.3
WB	L	97	1393			2.8	0.1	A	0.5

Intersection Delay = 3.5 sec/veh

APPENDIX E

LEVEL-OF-SERVICE CALCULATIONS FOR CUMULATIVE PLUS PROJECT CONDITIONS

LEVEL-OF-SERVICE CALCULATIONS

Project: Kihei Community Center
Intersection of: Piilani Highway at Lipoa Street
Condition: 2005 Cumulative Plus Project
Date: May 19, 1997

CAPACITY INPUTS

THRU Lane Capacity (vph):	1500
LEFT Lane Capacity (vph):	1500
Double Left Penalty (%)	20
Cycle Length (secs):	120
Amber (% of cycle):	0
North RTOR (%):	0
East RTOR (%):	10
South RTOR (%):	10
West RTOR (%):	0

Appr & Mvt	Appr Lanes	Capacity	Volumes AM	Volumes PM	Volumes Sat	V/C Ratios AM	V/C Ratios PM	V/C Ratios Sat
N- Rt	1	1500	231	222	0	0.154	0.148	0.000
Th	2	3000	1000	1115	0	0.333	0.372	0.000
Lt	1	1500	140	50	0	0.093	0.033	0.000
E- Rt	1	1500	25	130	0	0.017	0.087	0.000
Th	1	1500	15	35	0	0.023	0.077	0.000
Lt	0	0	20	80	0	0.000	0.000	0.000
S- Rt	1	1500	140	50	0	0.093	0.033	0.000
Th	2	3000	1075	1220	0	0.358	0.407	0.000
Lt	1	1500	148	156	0	0.099	0.104	0.000
W- Rt	1	1500	121	87	0	0.081	0.058	0.000
Th	1	1500	30	15	0	0.091	0.109	0.000
Lt	0	0	107	149	0	0.000	0.000	0.000
N-S(1):			3052	3309	0	0.432	0.476	0.000
N-S(2):						0.451	0.440	0.000
E-W(1):						0.023	0.087	0.000
E-W(2):						0.091	0.109	0.000
V/C:						0.542	0.585	0.000
AMBER:						0.000	0.000	0.000
ICU						0.542	0.585	0.000
LOS						A	A	A

LEVEL-OF-SERVICE CALCULATIONS

Project: Kihei Community Center
Intersection of: Piilani Highway at Lipoa Street
Condition: 2005 Cumulative Plus Project
Date: May 19, 1997

CAPACITY INPUTS

THRU Lane Capacity (vph):	1500
LEFT Lane Capacity (vph):	1500
Double Left Penalty (%)	20
Cycle Length (secs):	120
Amber (% of cycle):	0
North RTOR (%):	0
East RTOR (%):	10
South RTOR (%):	10
West RTOR (%):	0

Appr & Mvt	Appr Lanes	Capacity	Volumes AM	Volumes PM	Volumes Sat	V/C Ratios AM	V/C Ratios PM	V/C Ratios Sat
N- Rt	1	1500	231	222	0	0.154	0.148	0.000
Th	1	1500	1000	1115	0	0.667	0.743	0.000
Lt	1	1500	140	50	0	0.093	0.033	0.000
E- Rt	1	1500	25	130	0	0.017	0.087	0.000
Th	1	1500	15	35	0	0.023	0.077	0.000
Lt	0	0	20	80	0	0.000	0.000	0.000
S- Rt	1	1500	140	50	0	0.093	0.033	0.000
Th	1	1500	1075	1220	0	0.717	0.813	0.000
Lt	1	1500	148	156	0	0.099	0.104	0.000
W- Rt	1	1500	121	87	0	0.081	0.058	0.000
Th	1	1500	30	15	0	0.091	0.109	0.000
Lt	0	0	107	149	0	0.000	0.000	0.000
N-S(1):			3052	3309	0	0.766	0.847	0.000
N-S(2):						0.810	0.846	0.000
E-W(1):						0.023	0.087	0.000
E-W(2):						0.091	0.109	0.000
V/C:						0.901	0.956	0.000
AMBER:						0.000	0.000	0.000
ICU						0.901	0.956	0.000
LOS						E	E	A

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S Collector (E-W) Lipoa Street
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst.....
Date of Analysis..... 5/23/97
Other Information.....Cumulative Plus Project, AM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	1	1	1	< 0	1	1	< 0	1	1	< 0
Stop/Yield			N			N						
Volumes	5	97	210	226	187	6	175	10	157	13	10	5
PHF	.9	.9	.9	.85	.9	.9	.85	.85	.85	.9	.9	.9
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	108	212
Potential Capacity: (pcph)	1221	1081
Movement Capacity: (pcph)	1221	1081
Prob. of Queue-Free State:	0.83	0.99

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	341	215
Potential Capacity: (pcph)	1179	1354
Movement Capacity: (pcph)	1179	1354
Prob. of Queue-Free State:	0.75	0.99
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:		0.99

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	595	824
Potential Capacity: (pcph)	532	403
Capacity Adjustment Factor due to Impeding Movements	0.75	0.75
Movement Capacity: (pcph)	398	301
Prob. of Queue-Free State:	0.97	0.96

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	600	690
Potential Capacity: (pcph)	476	422
Major LT, Minor TH Impedance Factor:	0.72	0.72
Adjusted Impedance Factor:	0.78	0.79
Capacity Adjustment Factor due to Impeding Movements	0.78	0.65
Movement Capacity: (pcph)	370	276

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	227	370		24.8	4.6	D	
NB	T	13	398	>				14.7
NB	R	204	1221	> 1086	4.1	0.9	A	
SB	L	15	276		13.8	0.0	C	
SB	T	12	301	>				11.3
SB	R	7	1081	> 410	9.2	0.0	B	
EB	L	7	1354		2.7	0.0	A	0.0
WB	L	293	1179		4.1	1.1	A	2.2

Intersection Delay = 5.7 sec/veh

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S Collector (E-W) Lipoa Street
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst.....
Date of Analysis..... 5/23/97
Other Information.....Cumulative Plus Project, PM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	1	1	1	< 0	1	1	< 0	1	1	< 0
Stop/Yield			N			N						
Volumes	15	113	60	76	321	22	140	25	121	16	5	10
PHF	.9	.9	.9	.85	.9	.9	.85	.85	.85	.9	.9	.9
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	126	369
Potential Capacity: (pcph)	1195	900
Movement Capacity: (pcph)	1195	900
Prob. of Queue-Free State:	0.87	0.99

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	193	381
Potential Capacity: (pcph)	1387	1129
Movement Capacity: (pcph)	1387	1129
Prob. of Queue-Free State:	0.93	0.98
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:		0.98

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)	613	668
Potential Capacity: (pcph)	520	487
Capacity Adjustment Factor due to Impeding Movements	0.91	0.91
Movement Capacity: (pcph)	474	444
Prob. of Queue-Free State:	0.93	0.98

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	610	686
Potential Capacity: (pcph)	469	424
Major LT, Minor TH Impedance Factor:	0.90	0.85
Adjusted Impedance Factor:	0.92	0.89
Capacity Adjustment Factor due to Impeding Movements	0.91	0.77
Movement Capacity: (pcph)	427	326

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)		Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	182	427			14.7	2.4	C	
NB	T	32	474	>					9.6
NB	R	156	1195	>	949	4.7	0.8	A	
SB	L	20	326			11.8	0.1	C	
SB	T	7	444	>					8.8
SB	R	12	900	>	653	5.7	0.0	B	
EB	L	19	1129			3.2	0.0	A	0.3
WB	L	98	1387			2.8	0.1	A	0.5

Intersection Delay = 3.5 sec/veh

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S Collector (E-W) Lipoa Street
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst..... Drive 'A'
Date of Analysis..... 5/23/97
Other Information.....Cumulative Plus Project AM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1	< 0	0	0	0	0	> 1	< 0
Stop/Yield			N			N						
Volumes	11	255			416	8				3	0	4
PHF	.9	.9			.9	.9				.9	.9	.9
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10									1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		466
Potential Capacity: (pcph)		804
Movement Capacity: (pcph)		804
Prob. of Queue-Free State:		1.00
Step 2: LT from Major Street	**WB**	**EB**
Conflicting Flows: (vph)		471
Potential Capacity: (pcph)		1022
Movement Capacity: (pcph)		1022
Prob. of Queue-Free State:		0.99
Step 3: TH from Minor Street	**NB**	**SB**
Conflicting Flows: (vph)		762
Potential Capacity: (pcph)		434
Capacity Adjustment Factor due to Impeding Movements		0.99
Movement Capacity: (pcph)		428
Prob. of Queue-Free State:		1.00
Step 4: LT from Minor Street	**NB**	**SB**
Conflicting Flows: (vph)		762
Potential Capacity: (pcph)		383
Major LT, Minor TH Impedance Factor:		0.99
Adjusted Impedance Factor:		0.99
Capacity Adjustment Factor due to Impeding Movements		0.99
Movement Capacity: (pcph)		378

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
SB L	3	378 >					
SB T	0	428 >	542	6.7	0.0	B	6.7
SB R	4	804 >					
EB L	13	1022		3.6	0.0	A	0.1

Intersection Delay = 0.1 sec/veh

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		458
Potential Capacity: (pcph)		811
Movement Capacity: (pcph)		811
Prob. of Queue-Free State:		0.99

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		459
Potential Capacity: (pcph)		1036
Movement Capacity: (pcph)		1036
Prob. of Queue-Free State:		0.99

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		736
Potential Capacity: (pcph)		448
Capacity Adjustment Factor due to Impeding Movements		0.99
Movement Capacity: (pcph)		445
Prob. of Queue-Free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		736
Potential Capacity: (pcph)		397
Major LT, Minor TH Impedance Factor:		0.99
Adjusted Impedance Factor:		0.99
Capacity Adjustment Factor due to Impeding Movements		0.99
Movement Capacity: (pcph)		394

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
SB L	8	394 >					
SB T	0	445 >	552	6.7	0.0	B	6.7
SB R	10	811 >					
EB L	7	1036		3.5	0.0	A	0.1

Intersection Delay = 0.2 sec/veh

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S Collector (E-W) Lipoa Street
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst..... Drive 'A'
Date of Analysis..... 5/23/97
Other Information.....Cumulative Plus Project PM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1	< 0	0	0	0	0	> 1	< 0
Stop/Yield			N			N						
Volumes	5	245			410	3				6	0	8
PHF	.9	.9			.9	.9				.9	.9	.9
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10									1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S Collector (E-W) Lipoa Street
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst..... Drive 'B'
Date of Analysis..... 5/23/97
Other Information.....Cumulative Plus Project AM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1	< 0	0	0	0	0	> 1	< 0
Stop/Yield			N			N						
Volumes	1	266			419	1				1	0	1
PHF	.9	.9			.9	.9				.9	.9	.9
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10									1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		466
Potential Capacity: (pcph)		804
Movement Capacity: (pcph)		804
Prob. of Queue-Free State:		1.00

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		467
Potential Capacity: (pcph)		1027
Movement Capacity: (pcph)		1027
Prob. of Queue-Free State:		1.00

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		764
Potential Capacity: (pcph)		433
Capacity Adjustment Factor due to Impeding Movements		1.00
Movement Capacity: (pcph)		433
Prob. of Queue-Free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		764
Potential Capacity: (pcph)		382
Major LT, Minor TH Impedance Factor:		1.00
Adjusted Impedance Factor:		1.00
Capacity Adjustment Factor due to Impeding Movements		1.00
Movement Capacity: (pcph)		382

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
SB L	1	382 >					
SB T	0	433 >	518	7.0	0.0	B	7.0
SB R	1	804 >					
EB L	1	1027		3.5	0.0	A	0.0

Intersection Delay = 0.0 sec/veh

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S Collector (E-W) Lipoa Street
Major Street Direction.... EW
Length of Time Analyzed... 60 (min)
Analyst..... Drive 'B'
Date of Analysis..... 5/23/97
Other Information.....Cumulative Plus Project PM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1	< 0	0	0	0	0	> 1	< 0
Stop/Yield			N			N				0	0	1
Volumes	0	250			418	0				.9	.9	.9
PHF	.9	.9			.9	.9					0	
Grade		0			0							
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10									1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		464
Potential Capacity: (pcph)		806
Movement Capacity: (pcph)		806
Prob. of Queue-Free State:		1.00

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)		464
Potential Capacity: (pcph)		1030
Movement Capacity: (pcph)		1030
Prob. of Queue-Free State:		1.00

Step 3: TH from Minor Street	NB	SB
Conflicting Flows: (vph)		742
Potential Capacity: (pcph)		445
Capacity Adjustment Factor due to Impeding Movements		1.00
Movement Capacity: (pcph)		445
Prob. of Queue-Free State:		1.00

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)		742
Potential Capacity: (pcph)		394
Major LT, Minor TH Impedance Factor:		1.00
Adjusted Impedance Factor:		1.00
Capacity Adjustment Factor due to Impeding Movements		1.00
Movement Capacity: (pcph)		394

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
SB L	0	394 >					
SB T	0	445 >	806	4.5	0.0	A	4.5
SB R	1	806 >					
EB L	0	1030		3.5	0.0	A	0.0

Intersection Delay = 0.0 sec/veh

Phillip Rowell And Associates
47-273 'D' Hui Iwa Street
Kaneohe, HI 96744-
Ph: (808) 239-8206

Streets: (N-S) N-S COLLECTOR (E-W) LIPOA ROAD
Analyst.....
Date of Analysis..... 6/3/97
Other Information.....PM CUMULATIVE PLUS PROJECT, 4-WAY STOP
All-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	1	1	1	1	1	< 0
Volumes	15	113	60	76	321	22	140	25	121	16	5	10
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9

Volume Summary and Capacity Analysis WorkSheet

	EB	WB	NB	SB
LT Flow Rate	17	84	156	18
RT Flow Rate	67	24	134	11
Approach Flow Rate	210	465	318	35
Proportion LT	0.08	0.18	0.49	0.51
Proportion RT	0.32	0.05	0.42	0.31
Opposing Approach Flow Rate	465	210	35	318
Conflicting Approaches Flow Rate	353	353	675	675
Proportion, Subject Approach Flow Rate	0.20	0.45	0.31	0.03
Proportion, Opposing Approach Flow Rate	0.45	0.20	0.03	0.31
Lanes on Subject Approach	2	2	3	2
Lanes on Opposing Approach	2	2	2	3
LT, Opposing Approach	84	17	18	156
RT, Opposing Approach	24	67	11	134
LT, Conflicting Approaches	174	174	101	101
RT, Conflicting Approaches	145	145	91	91
Proportion LT, Opposing Approach	0.18	0.08	0.51	0.49
Proportion RT, Opposing Approach	0.05	0.32	0.31	0.42
Proportion LT, Conflicting Approaches	0.49	0.49	0.15	0.15
Proportion RT, Conflicting Approaches	0.41	0.41	0.13	0.13
Approach Capacity	652	810	637	283

Intersection Performance Summary

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
EB	210	652	0.32	3.4	A
WB	465	810	0.57	8.9	B
NB	318	637	0.50	6.7	B
SB	35	283	0.12	1.6	A

Intersection Delay = 6.8
Level of Service (Intersection) = B

C

Geotechnical Report

C.W. ASSOCIATES, INC. dba
GEOLABS-HAWAII
Geotechnical Engineering, Geology and Environmental Services

May 29, 1997
W.O. 3788-00

Mr. Loren Lau
Sato & Associates
2046 S. King Street
Honolulu, HI 96826

Dear **Mr. Lau:**

Preliminary Geotechnical Recommendations
Proposed Kihei Community Center and Swimming Pool
Kihei, Maui, Hawaii

We have recently completed our field exploration for the proposed Kihei Community Center and Swimming Pool at the corner of Piilani Highway and Lipoa Road in Kihei on the island of Maui. This letter serves to present our preliminary geotechnical engineering recommendations for the foundation design of the proposed project.

Subsurface Conditions

Our field exploration program consisted of drilling and sampling six borings, designated as Boring Nos. 1 through 6, to depths of about 15 feet below the existing ground surface. In general, our field exploration encountered approximately 3 to 10 feet of very stiff clayey silt material overlying clinker materials, which consisted of medium dense basalt gravels and cobbles intermixed with sands, silts, and clays. The clinker materials were generally underlain by hard basalt rock formation extending to the maximum depth drilled of approximately 15 feet below the existing ground surface. Detailed findings are presented on the Logs of Borings, Plates A-1 through A-6. Approximate locations of the borings are presented on the Site Plan, Plate 2.

Groundwater was not encountered in the drilled borings at the time of our field exploration. However, groundwater levels can fluctuate depending on factors such as seasonal rainfall, groundwater withdrawal and/or injection, and other factors.

2006 Kalihi St. • Honolulu, Hawaii 96819
Facsimile: (808) 847-1749 • Phone: (808) 841-5064

Building Foundations

Based on the existing topography and the proposed finish floor elevations, we anticipate that the proposed community center building will be constructed in cut areas of up to approximately 5 feet thick and the proposed pool complex buildings may straddle cuts and fills of approximately 2 feet thick. Based on the competent subsoil conditions encountered and the structural loads anticipated for the subject project, it is our opinion that shallow foundations consisting of spread and/or continuous footings may be used for support of the proposed community center building, pool buildings, and other proposed buildings.

An allowable bearing pressure of up to 3,000 pounds per square foot (p.s.f.) may be used for the design of footing foundations bearing on the stiff clayey silt, clinker or basalt rock formation encountered at relatively shallow depths. This bearing value is for dead plus live loads and may be increased by one-third for transient loads, such as those caused by wind or seismic forces. A higher bearing pressure of up to 8,000 p.s.f. may be used for foundations on basalt rock formation.

The footings should be embedded a minimum of 18 inches below the lowest adjacent finished grade. If foundations are located next to utility trenches or easements, they should be embedded below a one horizontal to one vertical (1H:1V) imaginary plane extending upward from the bottom edge of the utility trench or as deep as the inverts of the utility lines. This requirement is necessary to avoid surcharging adjacent below-grade structures with additional structural loads and to reduce the potential for foundation settlement.

If the footings are designed in accordance with the recommendations presented herein, total settlement of footings is estimated to be on the order of less than 1 inch with differential settlements on the order of ½ inch.

Lateral loads acting on the structure may be resisted by frictional resistance between the base of the foundation and the bearing materials and by passive earth pressure developed against the near-vertical faces of the embedded portion of footings. A coefficient of friction of 0.4 may be used for footings bearing on the in-situ materials. Resistance to lateral loads due to passive pressure may be calculated using an equivalent fluid pressure of 350 pounds per square foot per foot of depth (p.c.f.). These values assume that the concrete for footings is cast neat against the footing excavation or the structural backfills are properly compacted. Unless covered by pavements or slabs, the passive resistance in the upper 12 inches below the finished grade should be neglected.

We recommend that footing excavations be observed by a representative of Geolabs-Hawaii prior to the placement of reinforcing steel or concrete to confirm the foundation bearing conditions and the required embedment depths.

Slabs-On-Grade

For the interior building slabs, which are not subjected to vehicular traffic, we recommend that a minimum 4-inch thick layer of cushion fill consisting of No. 3B Fine gravel (ASTM C 33, No. 67 gradation) or Basaltic Termite Barrier (BTB) be placed below the slabs to serve as a capillary break and to provide more uniform support of the slabs. To reduce future moisture infiltration and subsequent damage to floor coverings, an impervious moisture vapor barrier, such as a plastic membrane, is recommended on top of the gravel or BTB cushion layer. Two inches of moist sand or BTB should be placed above the plastic membrane to provide protection for the membrane and to aid in curing of the slab concrete.

Since the slabs-on-grade at the proposed swimming pool complex will be subjected to moisture infiltration due to the nature of the planned facility, it is our opinion that the normal gravel/vapor barrier/sand cushion recommended under slabs-on-grade for capillary break purpose will not be necessary for the swimming pool complex. In-lieu of the usual gravel/vapor barrier/sand cushion layer, we recommend that the building slab-on-grade be supported on at least 6 inches of granular fill material, such as select borrow or similar type of material, compacted to at least 95 percent relative compaction. The intent of the 6-inch granular fill layer is to reduce the potential for slab cracking due to differential settlements resulting from differing subgrade materials. This 6-inch granular fill should also be placed under the swimming pool slab deck planned for the subject project in order to provide more uniform support.

Where the slab will be subjected to vehicular traffic, a 6-inch layer of base course is recommended in-lieu of the 4-inch gravel/BTB cushion layer. The 2-inch sand/BTB and vapor barrier should be omitted for these slabs. The base course should consist of crushed basalt aggregate compacted to a minimum of 95 percent relative compaction. For the design of structural slabs, a modulus of subgrade reaction of 250 pounds per square inch per inch of deflection (p.c.i.) may be used for the compacted base course. A minimum slab thickness of 8 inches may be used for preliminary design purposes. Provisions should be made for proper load transfer across the slab joints which are subjected to vehicular traffic. Thickened edges of slabs adjacent to any unpaved area should be embedded at least 12 inches below the lowest adjacent grade.

Exterior concrete walkways may be required for the proposed project. In general, we recommend that a minimum 4-inch thick cushion layer of gravel/BTB be provided below the concrete walkway slab. Contraction joints should be provided at intervals equal to the width of the walkways with expansion joints at right-angle intersections.

Swimming Pool Walls

The following general guidelines may be used for preliminary design of the swimming pool walls at the project site:

Wall Foundations

Since the swimming pool will be a water retention structure, we envision that the foundation for the pool will consist of a mat slab foundation. For more uniform support of the mat slab foundation, we recommend that the mat slab foundation be supported on at least 6 inches of select borrow subbase material compacted to at least 95 percent relative compaction. In general, we believe that swimming pool wall foundations may be designed in accordance with the recommendations presented in the "Building Foundations" section of this letter.

Static Lateral Earth Pressures

All retaining structures should be designed to resist lateral earth pressures due to adjacent soils and surcharge effects. The recommended lateral earth pressures for design of retaining walls, expressed in equivalent fluid pressures, are presented below.

Walls unrestrained at the top (active condition, level backfill)	-	35 p.s.f. equivalent fluid pressure per foot of depth
Walls restrained at the top (at-rest condition, level backfill)	-	50 p.s.f. equivalent fluid pressure per foot of depth

The values provided above assume that on-site granular fill and/or select granular fill will be used to backfill behind the wall. It is assumed that the backfill behind retaining walls will be compacted to between 90 and 95 percent relative compaction. Over-compaction of the retaining wall backfill should be avoided. In

general, an active condition may be used for walls that are free to deflect by as much as 0.5 percent of the wall height. If the tops of the walls are not free to deflect beyond this degree or are restrained, the walls should be designed for the at-rest condition. These lateral earth pressures do not include hydrostatic pressures that might be caused by groundwater trapped behind the walls.

Surcharge stresses due to areal surcharges, line loads, and point loads within a horizontal distance equal to the height of the wall should be considered in the design. For uniform surcharge stresses imposed on the loaded side of the wall, a rectangular distribution with uniform pressure equal to 30 percent of the vertical surcharge pressure acting on the entire height of the wall, which is free to deflect (cantilever), may be used in design. For walls that are restrained, a rectangular distribution equal to 45 percent of the vertical surcharge pressure acting over the entire height of the wall may be used for design. Additional analyses during design may be needed to evaluate the surcharge effects of point loads and line loads.

Drainage

Retaining walls should be well-drained to reduce the build-up of hydrostatic pressures. A typical drainage system would consist of a 1 to 2-foot wide zone of permeable material, such as No. 3B Fine gravel (ASTM C 33, No. 67 gradation), placed immediately around a perforated pipe (perforations down) at the base of the wall, discharging to an appropriate outlet or weepholes. As an alternative, a prefabricated drainage product, such as MiraDrain or EnkaDrain, may be used instead of the drainage material. The prefabricated drainage product should also be hydraulically connected to a perforated pipe at the base of the wall.

Backfill behind the permeable drainage zone should consist of granular fill material less than 3 inches in maximum dimension. Unless covered by concrete slabs, the upper 12 inches of backfill should consist of non-expansive impervious material to reduce water infiltration behind the walls.

Site Preparation

Based on the existing topography and the anticipated finished floor elevation of the proposed community center and swimming pool complex, we anticipate that cuts and fills on the order of 5 feet will be required for the building construction. Due to the variable soil conditions below the site, we recommend that subgrades be proof-rolled with a

minimum 10-ton vibratory drum roller for a minimum of 6 passes prior to fill placement to assist in detecting near-surface soft spots. Any loose areas disclosed during clearing and proof-rolling operations should be excavated to expose firm materials and backfilled with compacted select fill. Therefore, contract documents should include additive and deductive unit prices for over-excavation and engineered-fill placement to account for variations in the over-excavation and backfill quantities. The proof-rolling operations should be observed by a representative of Geolabs-Hawaii to evaluate the presence of soft/loose pockets below the subgrade level.

Fill and backfill materials to be used as general and structural fill material up to the slab subgrade level should consist of well-graded granular materials less than 3 inches in largest dimension. The on-site excavated materials may be used as fill or backfill materials provided they are processed and reduced to a relatively well-graded select granular material with a maximum size of about 3 inches. Any imported material, if needed, should be well-graded from coarse to fine with no particles greater than 3 inches in largest dimension. The material should have a laboratory California Bearing Ratio (CBR) value of 20 or higher, and a swell potential of 1 percent or less when tested in accordance with ASTM Test Designation D 1883. It should contain between 10 and 30 percent passing the No. 200 sieve. Any imported material should be observed and/or tested by Geolabs-Hawaii for its suitability prior to being transported to the site.

Fills and backfills should be placed in level lifts not exceeding 12 inches in loose thickness, moisture-conditioned to above the optimum moisture content, and compacted to a minimum of 90 percent relative compaction. Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density determined by ASTM Test Designation D 1557-91. Optimum moisture is the water content (percentage by weight) corresponding to the maximum dry density.

Site grading operations should be observed by a representative of Geolabs-Hawaii to evaluate whether undesirable materials are encountered during the excavation and proof-rolling process and whether the exposed soil/rock conditions are similar to those encountered in our exploration.

Excavation

Our field exploration disclosed that the proposed swimming pool site is underlain at shallow depths by very hard volcanic rock. It is anticipated that the volcanic rock may be excavated with normal heavy excavation equipment, such as ripping with large bulldozers, where the rock is near the existing ground surface. However, excavations into the deeper formations may require the use of hoerams, chipping, or blasting.

The above discussions regarding the rippability of the surface materials are based on our visual observation of the existing rock formations and field data from the borings performed at the site. We recommend that all contractors proposing to bid on this project be encouraged to examine the site conditions and the boring data to make their own interpretation.

Closure

The preliminary recommendations provided above are for information and preliminary design purposes only. Detailed recommendations for design of foundations, site preparation, and pavements will be presented in our forthcoming report. If you have questions or need additional information, please contact our office.

Respectfully submitted,

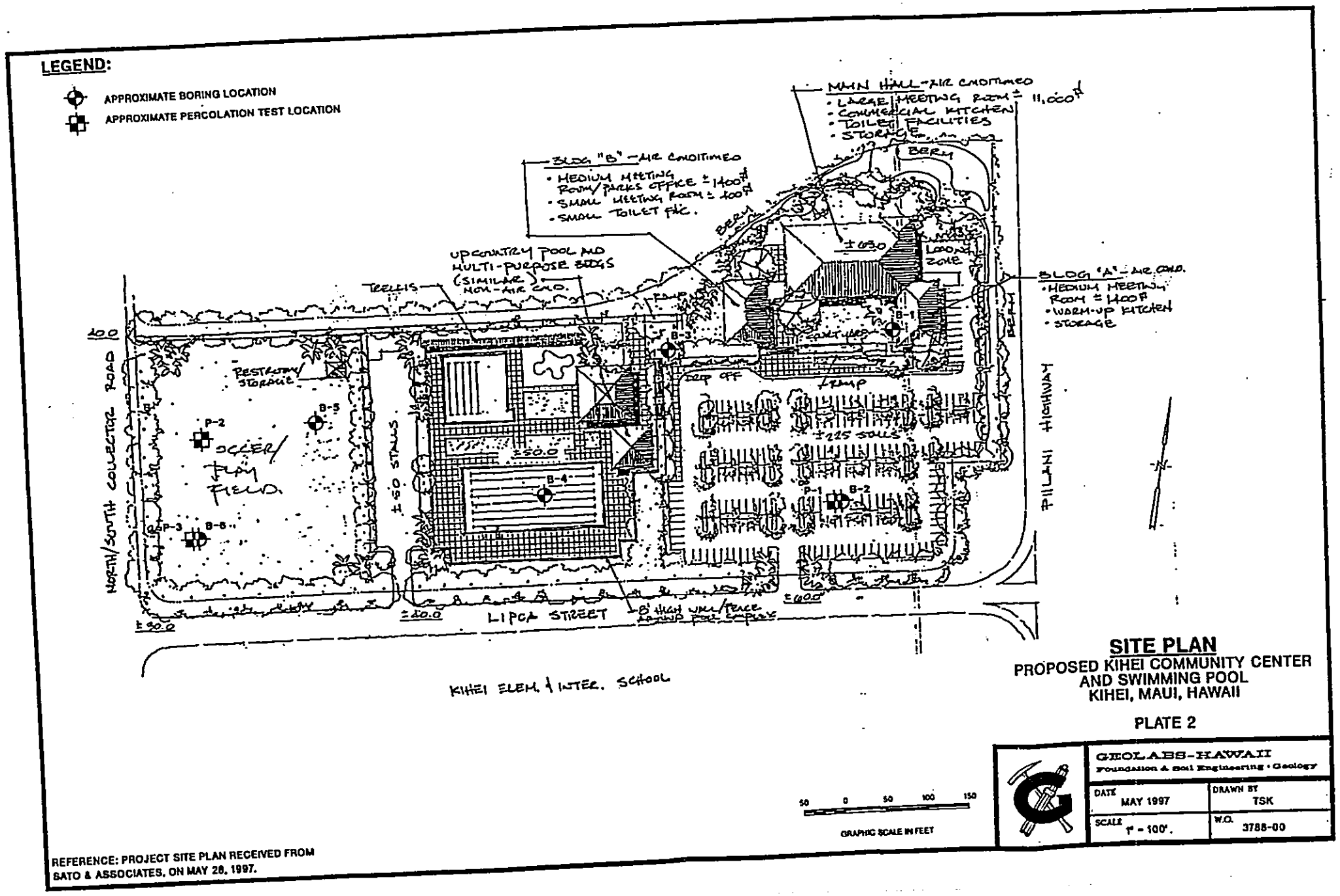
C.W. ASSOCIATES, INC.
dba **GEOLABS-HAWAII**

By _____
Clayton S. Mimura, P.E.
President

Attachments: Site Plan (Plate 2)
Boring Log Legend (Plate A)
Logs of Borings (Plates A-1 thru A-6)

CSM:MTL:sn

(h:\user\reports\3788-00.mtl)



SITE PLAN
PROPOSED KIHEI COMMUNITY CENTER AND SWIMMING POOL
KIHEI, MAUI, HAWAII

PLATE 2

GEOLABS-HAWAII Foundation & Soil Engineering • Geology	
DATE MAY 1997	DRAWN BY TSK
SCALE 1" = 100'.	W.O. 3788-00

REFERENCE: PROJECT SITE PLAN RECEIVED FROM SATO & ASSOCIATES, ON MAY 28, 1997.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE	GRAVELS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS LESS THAN 5% FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES MORE THAN 12% FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	SANDS 50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE	CLEAN SANDS LESS THAN 5% FINES	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES MORE THAN 12% FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS 50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT 50 OR MORE		MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

LEGEND:

	2-INCH O.D. STANDARD PENETRATION TEST	LL	LIQUID LIMIT
	3-INCH O.D. MODIFIED CALIFORNIA SAMPLE	PI	PLASTICITY INDEX
S	SHELBY TUBE SAMPLE	TV	TORVANE SHEAR (tsf)
	CORE SAMPLE	PEN	POCKET PENETROMETER (tsf)
REC	CORE RECOVERY		WATER LEVEL OBSERVED IN BORING
RQD	ROCK QUALITY DESIGNATION		

CW ASSOCIATES, INC. dba
GEOLABS-HAWAII
Geology Soils and Foundation Engineering

WORK ORDER NO. 3788-00 May 97

BORING LOG LEGEND
PROPOSED KIHEI COMMUNITY CENTER
AND SWIMMING POOL
KIHEI, MAUI, HAWAII

PLATE
A

Date Started: 5/19/97
Date Completed: 5/19/97
Logged By: M. Lee
Total Depth: 15.0 feet

Drill Rig: Mobile B-53
Drilling Method: 4" Auger, HQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

Depth, ft	FIELD: Sample	FIELD: Penetra. Resist. Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength ksf	Other Data	Pen, tsf	DESCRIPTION
								Approximate Surface Elevation (ft): 67*
		64	103	20				Reddish brown and gray mottled **CLAYEY SILT (MH)** with basalt gravel, hard, dry to damp (saprolite)
		50/.5' Ref.	98	27		LL=44 PI=26		Brown **SILTY CLAY (CL)** with sand and gravel, hard, damp
5						RUN 1 REC=69% RQD=50%		Gray moderately vesicular **BASALT**, slightly jointed, slightly weathered, hard
						RUN 2 REC=100% RQD=81%		highly weathered seam at approximately 12.2 feet
10								Gray **BASALT**, severely jointed, highly weathered, slightly friable (clinker)
15						RUN 3 REC=54% RQD=0%		Boring terminated at 15 feet Groundwater not encountered *Elevations estimated from Preliminary Planning Base for Proposed County Park/Aquatic Center by Warren S. Unemori Engineering, Inc. dated 4/24/97.
20								
25								

tk

CW ASSOCIATES, INC. dba
GEOLABS-HAWAII
Geology Soils and Foundation Engineering

WORK ORDER NO. 3788-00 KHN May 97

LOG OF BORING 1
PROPOSED KIHEI COMMUNITY CENTER AND SWIMMING POOL
KIHEI, MAUI, HAWAII

PLATE
A-1

Date Started: 5/20/97
Date Completed: 5/20/97
Logged By: M. Lee
Total Depth: 15.0 feet

Drill Rig: Mobile B-53
Drilling Method: 4" Auger, HQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

Depth, ft	Sample	FIELD: Penetra. Resist. Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength ksf	Other Data	Pen, tsf	DESCRIPTION
								Approximate Surface Elevation (ft): 58*
		66	85	23				Reddish brown and gray mottled **CLAYEY SILT (MH)** with basalt gravel, hard, dry (saprolite)
		36	86	18				
5		24	101	20				grades to brown without mottling, damp
								Gray slightly vesicular **BASALT**, severely jointed, highly weathered, hard (clinker)
10						RUN 1 REC=100% RQD=83%		Gray slightly vesicular **BASALT**, slightly to moderately jointed, slightly to moderately weathered, hard
15						RUN 2 REC=100% RQD=83%		Boring terminated at 15 feet
								Groundwater not encountered
20								
25								

tk

CW ASSOCIATES, INC. dba
GEOLABS-HAWAII
Geology Soils and Foundation Engineering

WORK ORDER NO. 3788-00 KHN May 97

LOG OF BORING 2
PROPOSED KIHEI COMMUNITY CENTER
AND SWIMMING POOL
KIHEI, MAUI, HAWAII

PLATE
A-2

Date Started: 5/19/97
Date Completed: 5/19/97
Logged By: M. Lee
Total Depth: 15.0 feet

Drill Rig: Mobile B-53
Drilling Method: 4" Auger, HQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

Depth, ft	FIELD: Sample	FIELD: Penetra. Resist. Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength ksf	Other Data	Pen, tsf	DESCRIPTION
								Approximate Surface Elevation (ft): 50*
		77		11				Reddish brown CLAYEY SILT (MH) with basalt gravel, hard, dry to damp (saprolite)
		35	94	19				grades with more gravel
5		41	100	17				
10		50/.1'				RUN 1 REC=93% RQD=52%		grades with less gravel Gray slightly vugular BASALT, severely jointed, highly weathered, medium hard (clinker)
						RUN 2 REC=92% RQD=63%		Gray slightly vugular BASALT, slightly jointed, slightly weathered, medium hard
15								Boring terminated at 15 feet Groundwater not encountered
20								
25								

†k

CW ASSOCIATES, INC. dba
GEOLABS-HAWAII
Geology Soils and Foundation Engineering

WORK ORDER NO. 3788-00 KHN May 97

LOG OF BORING 3
PROPOSED KIHEI COMMUNITY CENTER AND SWIMMING POOL
KIHEI, MAUI, HAWAII

PLATE
A-3

Date Started: 5/20/97
Date Completed: 5/20/97
Logged By: M. Lee
Total Depth: 15.0 feet

Drill Rig: Mobile B-53
Drilling Method: 4" Auger, HQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

Depth, ft	FIELD: Sample	FIELD: Penetra. Resist. Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength ksf	Other Data	Pen, tsf	DESCRIPTION
								Approximate Surface Elevation (ft): 47*
		50/.2'	88	20				Reddish brown and gray mottled CLAYEY SILT (MH) with basalt gravel, hard, dry (saprolite)
		50/.3'	105	13				
5						RUN 1 REC=96% RQD=77%		Gray vesicular BASALT, severely jointed, highly weathered, friable (clinker)
								Gray slightly vesicular BASALT, slightly jointed, slightly weathered, hard
10						RUN 2 REC=100% RQD=95%		
						RUN 3 REC=89% RQD=89%		
15								Boring terminated at 15 feet
								Groundwater not encountered
20								
25								

tk [illegible]

CW ASSOCIATES, INC. dba
GEOLABS-HAWAII
Geology Soils and Foundation Engineering

WORK ORDER NO. 3788-00 KHN May 97

LOG OF BORING 4
PROPOSED KIHEI COMMUNITY CENTER
AND SWIMMING POOL
KIHEI, MAUI, HAWAII

PLATE
A-4

Date Started: 5/19/97
Date Completed: 5/19/97
Logged By: M. Lee
Total Depth: 15.0 feet

Drill Rig: Mobile B-53
Drilling Method: 4" Auger, HQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

Depth, ft	FIELD: Sample	FIELD: Penetra. Resist. Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength ksf	Other Data	Pen, tsf	DESCRIPTION
								Approximate Surface Elevation (ft): 43.5*
		61/.5'	98	21			>4.5	Reddish brown and gray mottled **CLAYEY SILT (MH)** with basalt gravel, hard, dry (saprolite)
		54	98	27			>4.5	Brown **SILTY CLAY (CH)** with basalt gravel, hard, dry to damp
5		50/.5' Ref.	101	19		RUN 1 REC=88% RQD=54% RUN 2 REC=40% RQD=19%		Gray **BASALT**, severely jointed, highly weathered, medium hard to hard (clinker)
10						RUN 3 REC=100% RQD=80% RUN 4 REC=100% RQD=69%		Gray slightly vesicular **BASALT**, moderately jointed, moderately weathered with calcite seams
15								Boring terminated at 15 feet Groundwater not encountered
20								
25								

tk

CW ASSOCIATES, INC. dba
GEOLABS-HAWAII
Geology Soils and Foundation Engineering

WORK ORDER NO. 3788-00 KHN May 97

LOG OF BORING 5
PROPOSED KIHEI COMMUNITY CENTER AND SWIMMING POOL
KIHEI, MAUI, HAWAII

PLATE
A-5

Date Started: 5/20/97
Date Completed: 5/20/97
Logged By: M. Lee
Total Depth: 15.0 feet

Drill Rig: Mobile B-53
Drilling Method: 4" Auger, HQ Coring
Driving Energy: 140 lb. wt., 30 in. drop

Depth, ft	FIELD: Sample	FIELD: Penetra. Resist. Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength ksf	Other Data	Pen, tsf	DESCRIPTION
								Approximate Surface Elevation (ft): 34*
		25/.0' Ref.						Brown **CLAYEY SILT (MH)** with gravel and cobbles, hard, dry
		50/.3'		15				**BOULDER** at 1 foot
								Reddish brown and gray mottled **CLAYEY SILT (MH)** with gravel, hard, dry (saprolite)
5						RUN 1 REC=29% RQD=0%		Gray slightly vesicular **BASALT**, severely jointed, highly weathered, hard (clinker)
10						RUN 2 REC=100% RQD=92% RUN 3 REC=78% RQD=70%		Gray slightly vesicular **BASALT**, moderately jointed, slightly to moderately weathered with calcite veins and seams
15						RUN 4 REC=33% RQD=0%		Gray slightly vesicular **BASALT**, severely jointed, highly weathered, medium hard (clinker)
								Boring terminated at 15 feet
								Groundwater not encountered
20								
25								

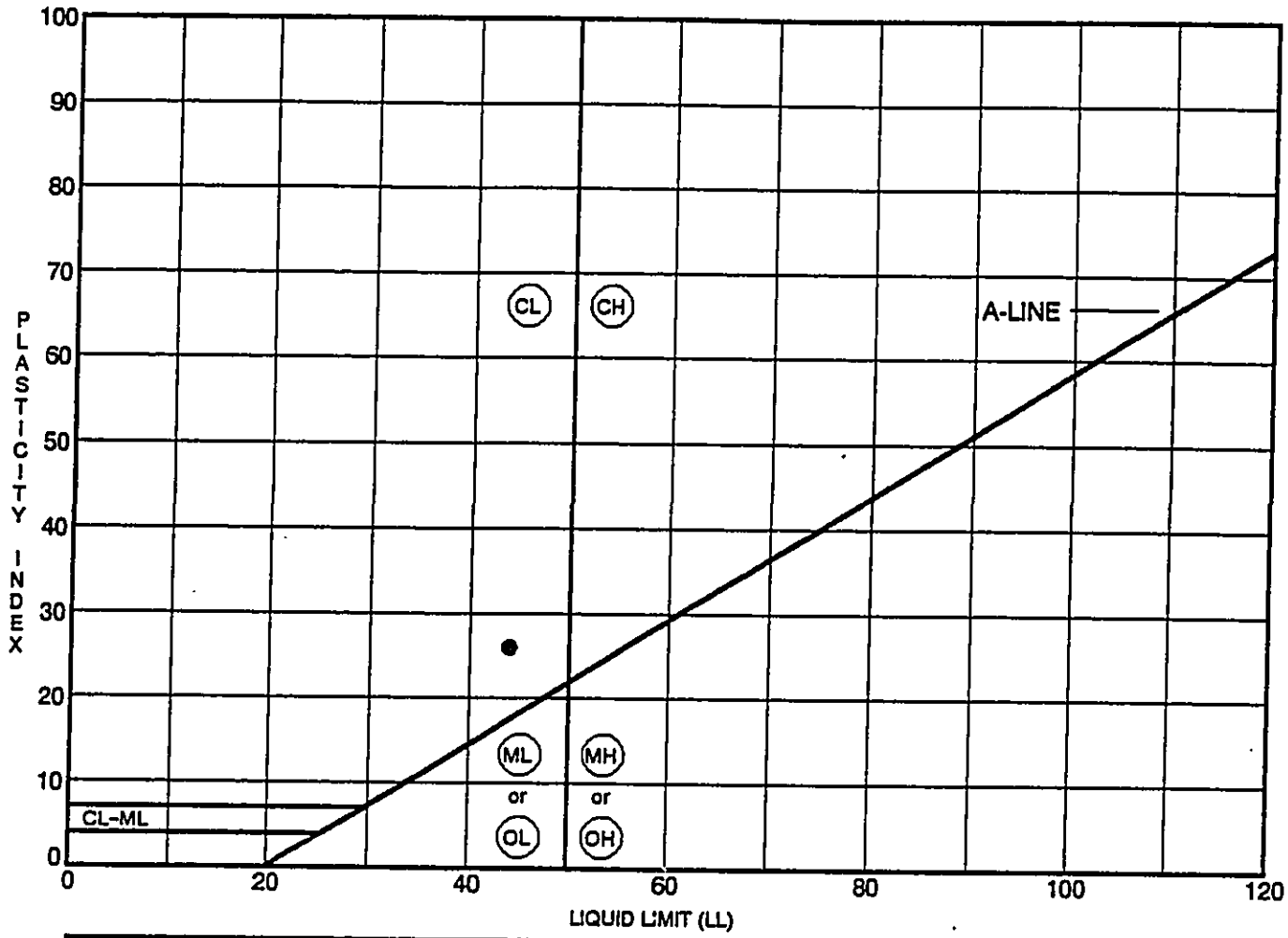
tk [illegible]

CW ASSOCIATES, INC. dba
GEOLABS-HAWAII
Geology Soils and Foundation Engineering

WORK ORDER NO. 3788-00 KHN May 97

LOG OF BORING 6
PROPOSED KIHEI COMMUNITY CENTER AND SWIMMING POOL
KIHEI, MAUI, HAWAII

PLATE
A-6



	Location	Depth (feet)	Description	LL	PL	PI
●	B - 1	3.0 - 3.5	Brown SILTY CLAY (CL) with sand and gravel	44	18	26

PROJECT:
PROPOSED KIHEI COMMUNITY CENTER AND SWIMMING POOL
KIHEI, MAUI, HAWAII

ATTERBERG LIMITS SUMMARY	
C.W. ASSOCIATES, Inc. dba **Geolabs-Hawaii**	
DATE May 97	W.O. 3788-00

PLATE B - 2

D

Archaeological Inventory and Botanical Survey

INVENTORY SURVEY REPORT FOR ROAD "C" CORRIDOR, WAIOHULI *AHUPUA'A*, MAKAWAO AND WAILUKU DISTRICTS, MAUI ISLAND (TMK 2-2-02: por. 66, 67; 3-9-02: 109)

Prepared for:

Munekiyo and Arakawa, Inc.
Wailuku, Hawaii

Prepared by:

Xamanek Researches
P.O. Box 131
Pukalani, Hawaii 96788

Erik M. Fredericksen
Demaris L. Fredericksen

BOTANICAL SURVEY
by
David Paul, B.A.

Revised April, 1995

ERRATA

Page 2, Paragraph 2: *i'lima* should be spelled *'ilima*.

Page 3, Paragraph 1: Reference to Donham, 1990, should read Donham, 1990a.

ABSTRACT

In May of 1994, an archaeological inventory level survey was conducted by Xamanek Researches along the corridor of the proposed collector road known as "Road C". The subject parcel consists of c. 150 foot wide road corridor which would connect South Kihei Road with Pi'ilani Highway, and is located in Waiohuli *ahupua'a*, Wailuku and Makawao Districts, Kihei, Maui, Hawaii. One archaeological site, a low overhang rock shelter was located during the pedestrian portion of the survey. Evaluation of Site 3529 formed the second phase of the inventory survey.

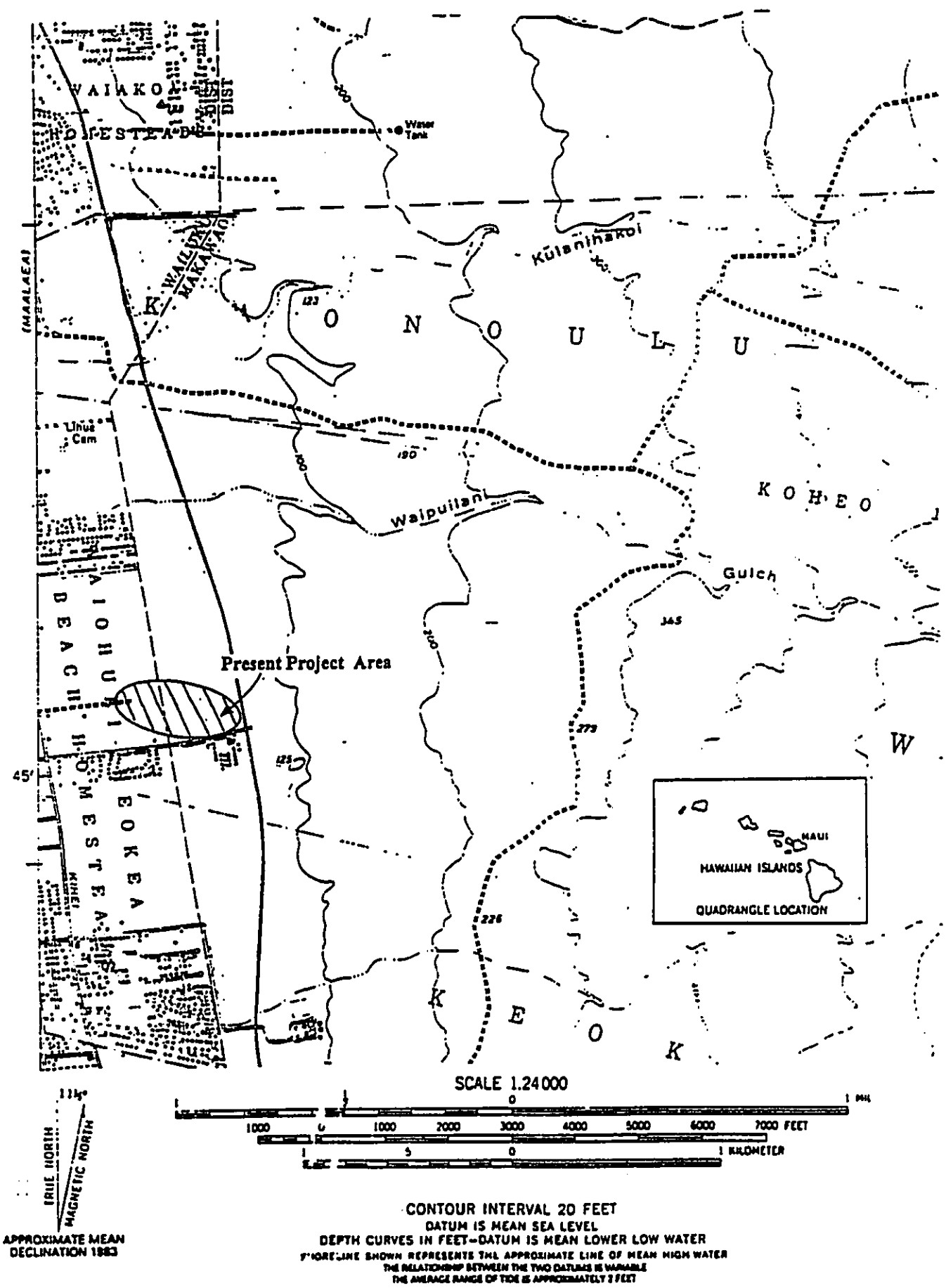
Intensive surface inspection of the site indicated that it had not been disturbed during historic times. Overall site condition ranged from good near the rock shelter to fair on the areas downslope.

Subsurface investigation revealed a c. 20 to 25 cm. thick *in situ* cultural deposit about 20 to 25 square meters in area directly west or *makai* of the rock shelter. In addition, somewhat eroded, thin cultural deposits extended up to 16 m. west, north and south from the rock overhang. In all, 17 shovel tests (ST) and 1 test unit (0.5 m. by 0.5 m. by 0.6 mbs) were excavated at Site 3529. Test Unit #1 yielded quantities of midden, and several indigenous artifacts, including a small coral abrader, a small coral file, a possible bone fish hook blank, a fish bone pick, a pencil urchin file, 2 utilized basalt flakes, and 23 waste flakes of volcanic glass. The majority of the above portable remains were recovered from c. 25 to 50 cmbs. Charcoal flecking was noted in TU #1, but it was not possible to obtain a sufficient sample to submit for analysis. Nine of the 17 shovel tests contained cultural materials. In addition to food midden, 3 waste flakes of volcanic glass and the shank of a 2-piece bone fish hook were found.

Inventory level survey work identifies Site 3529 as an apparently undisturbed precontact temporary habitation site. This well-preserved site lies in the "intermediate or barren zone" of Kihei, an area which has not been intensively examined. Site 3529 is deemed significant under Criterion "D" of Federal and State historic preservation guidelines. Because of its research potential, it is still considered significant for its information content and requires further mitigative work. The site will be impacted by road construction activities. Consequently, data recovery work is recommended for this archaeological resource.

TABLE OF CONTENTS

List of Maps, Figures and Photographs



MAP 1 - Topographic Map, U.S.G.S., Puu O Kali Quadrangle, Scale 1:2400, 1983.

INTRODUCTION

In October of 1993, Xamanek Researches was approached by MTM Consulting, Inc., on behalf of the County of Maui Public Works Division, regarding the undertaking of an archaeological inventory survey along the corridor of the proposed collector road, identified as Road "C". This proposed road would run from Azeka Place II and Longs Drug Store and meet Pi'ilani Highway at the intersection of Lipoa Street near the entrance to Kihei Elementary School and Lokelani Intermediate School. Since the proposed roadway would pass through an existing Federal Wetlands Sanctuary for a portion of its extent, a botanical survey was also requested. We prepared a proposal and it was accepted. The area of the roadway had been surveyed on at least 2 previous occasions by different archaeological firms, so it was not anticipated that significant archaeological finds would be located.

The eastern portion of the Road "C" corridor transects part of the Baldwin*Malama Partnership Pi'ilani Village 187-acre residential and commercial subdivision, and would direct the bulk of the traffic between South Kihei Road and Pi'ilani Highway that is now born by Lipoa Street. Lipoa would dead-end at Kihei Elementary School and Lokelani Intermediate School, taking school traffic out of the mix. The western part adjacent to the Baldwin*Malama property is designated as Lot 10-C "Road Reserve", and is 56 feet wide and consists of 2.480 acres and cuts through Waiohuli-Keokea Beach Homesteads. The final portion which intersects with South Kihei Road is made up of Easement "B" from Stewart Fern, et. al, for access and utility purposes, which bisects the wetlands sanctuaries, and Easement "A", also for access and roadway purposes, which crosses the shopping complex.

On May 21, 1994, our surface archaeological inventory work and botanical fieldwork started. The entire project area, which consisted of a corridor 150 feet in width and approximately three-quarters of a mile in length, was covered by observers.

SURVEY AREA

Natural History

The survey area is located in Kihei, in the *ahupua'a* of Waiohuli, Makawao and Wailuku District, on the island of Maui. It is comprised of a c. 150 foot wide corridor that begins at the Longs Drug and Azeka's Place II developments and ends at the intersection of Pi'ilani Highway and Lipoa Street (Map 3). The total land area is c. 4.5 acres. Elevations range from a low of c. 3 ft. AMSL near the western or *makai* boundary

to c. 66 ft. AMSL near the eastern or *mauka* boundary near the Pi'ilani Highway and Lipoa Street intersection.

This portion of the Kihei coastal plain is composed of eroded lava from the Kula Series, alluvium from Haleakala volcano, and aeolian deposits primarily associated with the prevailing trade winds. The study parcel is located in an area of generally thin, eroded soil deposits and exposed bedrock outcrops.

Annual rainfall in this area of Kihei is less than 20 inches. The vegetation tends to be dominated by xerophytic species such as buffelgrass (Cenchrus ciliaris), *kiawe* (Prosopis pallida) trees, and scattered *i'lima* (Sida fallax). However, a wetland plant community is present near the western or *makai* boundary of the study area, and there are disturbance plant communities on other portions of the project area (see Appendix B).

BACKGROUND RESEARCH

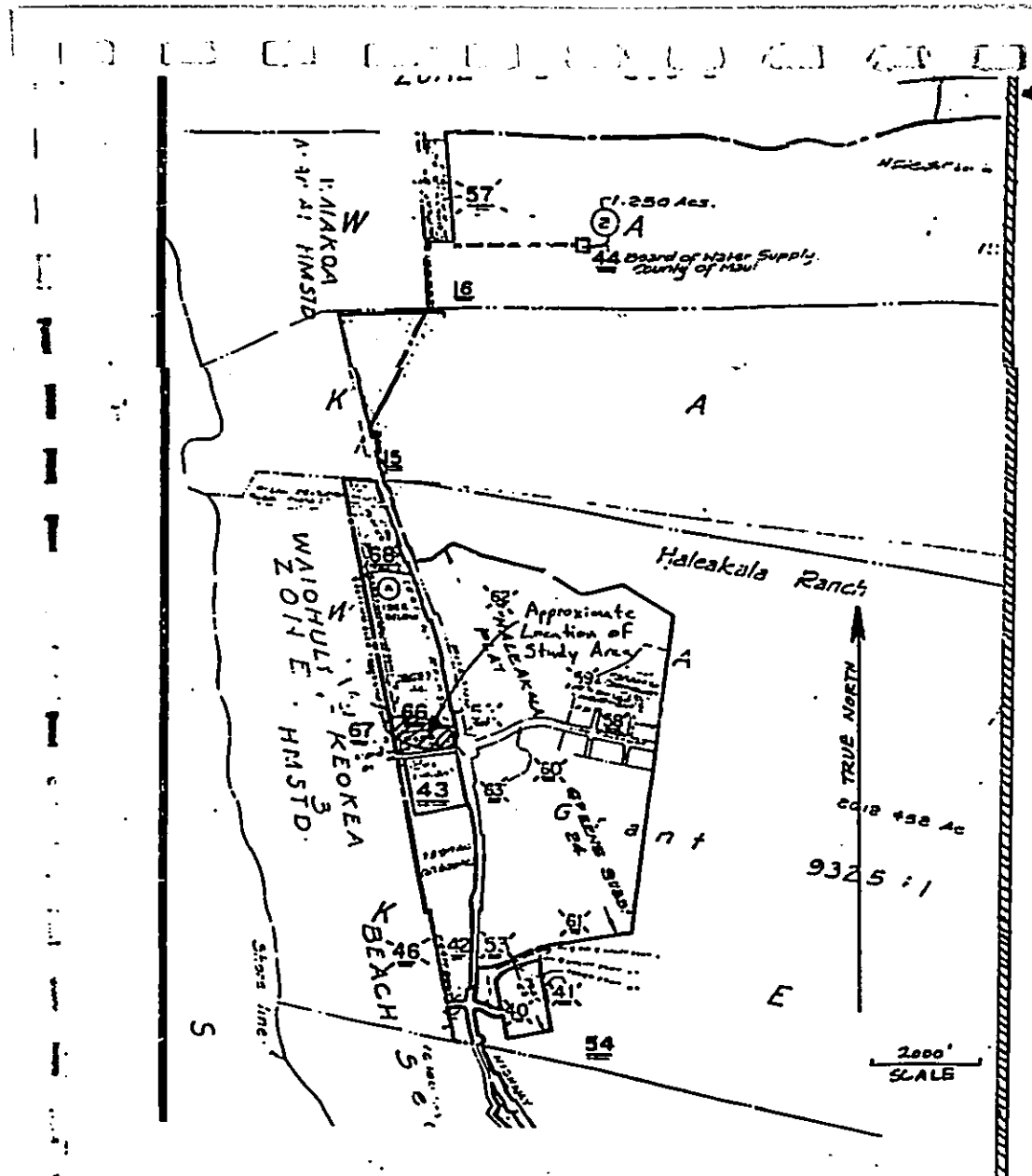
Previous archaeological work

The subject parcel (TMK 3-9-02: 109 and 2-2-02: por. 66, 67) is located within the large *ahupua'a* of Waiohuli. This land division has been studied by several archaeologists within the last 20 years, in conjunction with tourist resort and commercial development. After consultation with the State Historic Preservation Division, we found that the area that the proposed Road "C" corridor crosses had been part of 2 other, earlier archaeological inventory surveys. One was by Environmental Impact Study Corp. in 1982, and the other was by PHRI in July of 1989, for Baldwin Pacific's Pi'ilani Residential Community, Phase I (TMK 2-2-02: por 42).[1]

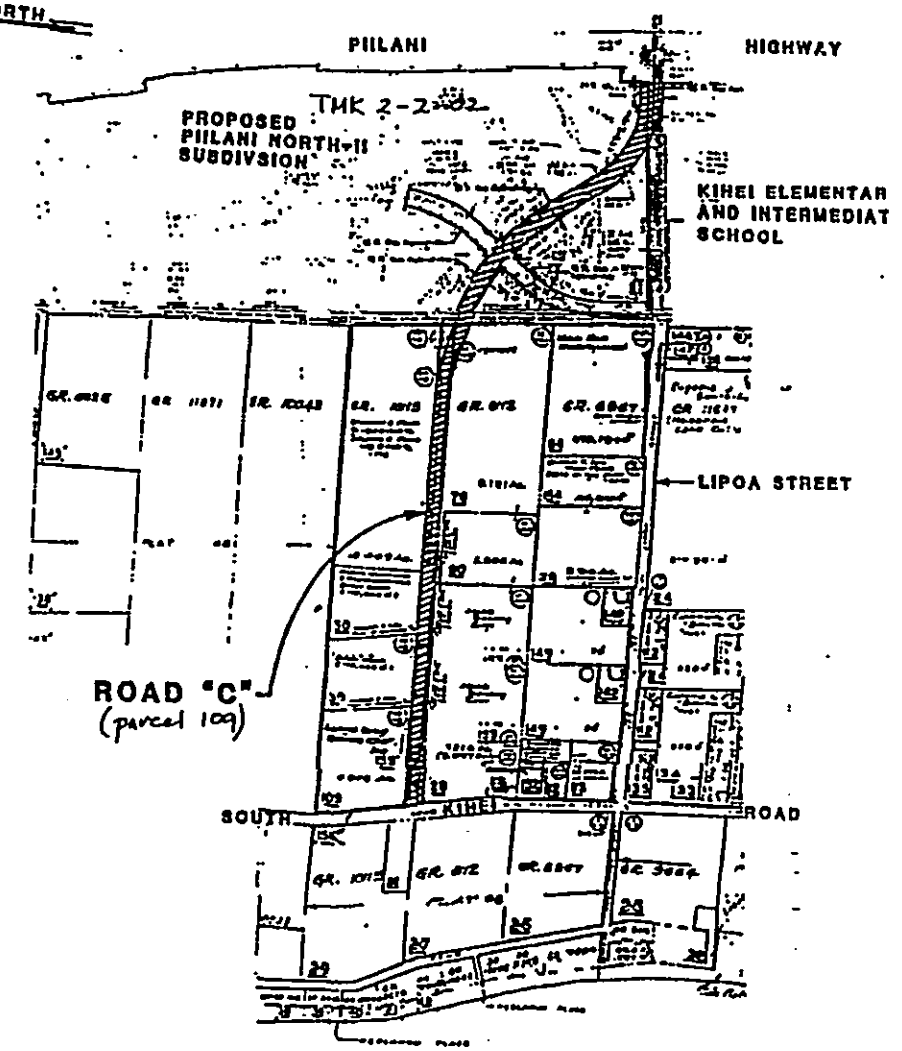
The EISC study located one site which was described as "a possible alignment of very loosely stacked basalt extending downslope from an outcrop knoll" (1982, pg. B-4), and did not recommend further work because of low research potential. The PHRI survey, conducted by Theresa Donham (July, 1989), encompassed 114 acres situated along the west side of Pi'ilani Highway, between Kihei Elementary School and Lokelani Intermediate School and the northern border of Waiohuli *ahupua'a*. During that survey 5 new sites were discovered, and 2 others relocated--Site 2476 identified by EISC, and Site 1705 initially recorded by Cordy during his reconnaissance survey for the Corps of Engineers (1977).

Donham's work on all 7 identified sites determined that 2 were bulldozer push piles, and were not assigned SIHP numbers. The other 5 sites were mapped and tested in order to determine their significance. Site 1705 was described as a biface wall, possibly a corral. Sites 2473 and 2475 are thought to be historic dependency structures associated

[1]This large parcel has subsequently been divided and now is identified as Parcels 66, 67 and 68.



MAP 2 - Tax Map, Zone 2, Section 2, Plat 02, State of Hawaii Tax Map Service.



Map 2a - Portion of Tax Map, Zone 3, Section 9, Plat 2, showing parcel 109.

VICINITY MAP- ROAD "C"	ATA AUSTIN, TSUTSUMI, & ASSOC., INC. ENGINEERS. SURVEYORS TMK: 3-9-2 SCALE : 1"=800' 4/26/94	EXHIBIT 1

with ranching activities. Site 2475 consists of 2 stone cairn features, one of which was recommended for data recovery, as it was thought it might contain human remains. The fifth site, Site 2476 is a complex of 5 rock alignments, which may have had an agricultural function (Donham, 1989, pp. 8-14).

Archaeological data recovery was undertaken in 1990 on Site 2475, to determine if it was a burial complex. Subsurface test excavations did not produce human remains, or evidence of cultural deposits, midden or charcoal. However, further data recovery "indicated that it was a terrace complex covering a major portion of the natural terrace crest and its slopes" (Donham, 1990, p. 10). The site was interpreted as an agricultural complex and appeared "to represent relatively intensive modification of natural slopes for purposes of planting" (Ibid.). The rock alignments that make up Site 2476, which lies nearby, may also be additional terracing. The location of the site, one-half mile *mauka* of the coastal zone, as defined by Cordy (1977), leads Donham to suggest a "coastal perimeter zone", an area which was exploitated more heavily than the "intermediate zone" in general. She suggests the possibility of seasonal usage during periods of increased rainfall, or simply the response to land availability pressures in the coastal zone (Donham, 1990, p. 10).

Two of the first studies in the lowland portion of the *ahupua'a*, were conducted in association with the construction of Pi'ilani Highway (Cox, 1976; Cordy, 1977). The studies by Cox (1976) along the coastal area included information about two *heiau*, Kalaihi Heiau (in the neighboring *ahupua'a* of Kaonoulu), and Kealaipoa Heiau in Waiohuli *ahupua'a*. He also mentions 3 fishponds noted from historic sources, one of which may have been rebuilt by Kamehameha I. Cordy found wall remnants at the mouth of Waipuilani Gulch (Site 1704), which may be the remains of one of these ponds (1977). He also located Site 1705, mentioned earlier, which was in the Pi'ilani Residential Subdivision, of which the present study area is a part.

In 1986, Kennedy conducted a surface reconnaissance survey for the Silversword Golf Course, and reported in a brief letter that no archaeological features were found in the approximate 125-acre survey area. This golf course lies directly to the east of the present project area, and will share the intersection on Pi'ilani Highway with the proposed Road "C".

On the grounds of Lokelani Intermediate School, about 500 meters southeast of the project area, Xamanek Researches excavated a rock shelter, Site 3193, in July of 1993 (Fredericksen, et. al., September, 1993). The shelter was 5.5 meters in length, extended a maximum of 1.6 meters inward, and had a maximum interior height was 0.85 m. The ceiling was dome shaped and dropped to the ground level at either side. A large *kiawe* tree, which had recently burned, had formerly grown at the drip line. The site appears to have been used intermittently, and contained midden, artifacts, and over 100 pieces of volcanic glass. Much of the volcanic glass was waste material, the by-product of knapping activity. Midden was made up primarily of *pipipi* (Nerita picea), cowrie

(Cypraea sp.), and cone shell (Conus sp.). Artifacts consisted of bone picks, coral abraders and a piece of worked bone. Three hearths were excavated, and charcoal from one produced a radiocarbon date of AD 1560-1800 (270 ± 120 RCYBP).

Other archaeological work west or *makai* of the study area in Waiohuli *ahupua'a* was conducted by Xamanek Researches for the Azeka II Shopping Center and Longs Drug Center (Fredericksen, et. al., 1990a and 1990b). No significant archaeological finds were made. However, identification of the wetland areas was established at this time, and subsequently the Federal and State Wetlands Sanctuary was developed. A parcel at the intersection of Lower Kihei Road and Lipoa was also surveyed (Fredericksen, et. al., February 1994), and no significant archaeological finds were made. The above study areas would have likely been within a wetlands area directly east or *mauka* of the coastal zone sand dunes in precontact times.

In the upland region of the *ahupua'a*, PHRI did an inventory survey of Keokea and Waiohuli Subdivision for the Department of Hawaiian Homes Lands (Brown and Haun, 1989). The University of Hawaii-Manoa held an archaeological field school there in the summer of 1994, under the direction of Michael Kolb. Both of these studies identified numerous precontact sites, indicating fairly extensive habitation and agricultural activity in the uplands region.

Historical Background Research

The *ahupua'a* of Waiohuli lies within Makawao District which was considered to be government lands after the Great Mahele. It was officially approved as being Crown Land in 1890 by King Kalakaua (Wong-Smith, 1990, B-3). While a good deal of agricultural activity took place in the mid- and latter 1800's in the upland Kula region, little activity is noted for the lower portions of the *ahupua'a*. No Land Commission Awards (LCA) of native *kuleana* (house and/or garden plots) are found within the project area, nor were any claimed (Donham, 1989, p. 6). The eastern portion of the project area is part of Apana I of Grant 9325 to Haleakala Ranch Company. During the early part of this century, the area had been used primarily for cattle grazing. The importation of grasses (i.e., buffelgrass) for livestock feed has altered the natural flora and ranching activities have no doubt impacted archaeological features that might have existed in the area. The western part of the corridor crosses through Waiohuli-Keokea Beach Homesteads, which were opened for sale in the 1930's.

During World War II, much military activity affected the Kihei area, including operations of the Naval Combat Demolition Training and Experimental Base, the Kamaole Amphibious Training Base, and the Puunene Naval Air Station. The present study area was also likely to have been impacted. Archaeological evidence of such militaty activity was found by the authors during an inventory survey in Kaonoulu *ahupua'a* approximately 1 mile to the north (Fredericksen, et. al., July 1994).

Since the beginning of the 1970s intensive commercial, resort and residential development has altered the landscape of Kihei. This pattern of development is scheduled to continue into the future.

Overview of settlement patterns

The study area lies within what is known as the "barren zone, or intermediate zone" as postulated by Cordy (1977). This is the area between the inhabited coastal and inland zones. Because of generally inhospitable conditions, little human activity is expected, with the exception of intermittent and/or transitory habitation. Donham's identification of agricultural terraces *mauka* of the study area, suggests that the perimeter of the coastal zone may have been more heavily utilized for food production activity than had been previously thought. However, she also noted that agricultural activity could have been intermittent during seasonal increases in rainfall, or periods of overall increased moisture. She proposed another zone, the "coastal perimeter zone" to designate this area.

At present there are relatively few clearly precontact archaeological sites identified in the "intermediate zone". A few radiocarbon dates have been obtained, the majority of which seem to fall within the late precontact to early post-contact period (refer to Table 4), suggesting that little human activity occurred in this region prior to that time. Again, given the somewhat harsh climatic conditions of the area, this is not surprising. As overall population of the island increased, it likely became necessary to begin exploitation of less desirable areas in the late precontact to early post-contact period.

Cordy also postulates (1977, p. 12) that the few sites that would be found in the "intermediate zone" would be temporary in nature, and would be "associated with transportation routes (e.g. trails)". The present study area may represent one of these transportation routes.

ARCHAEOLOGICAL SURVEY METHODS

The field director for the area inventory survey was Erik M. Fredericksen (M.A.), and project directors and coordinators were Walter M. Fredericksen (Professor emeritus) and Demaris L. Fredericksen (Ph.D., abd). Three to 5 persons participated in the inventory level archeological field work phases.

The archaeological inventory survey consisted of two phases. Initially, a pedestrian survey covering 100% of the Road "C" corridor was undertaken (Photos 1-3). The approximately 4.5 acre parcel was visually inspected by crew members spaced c. 5 m. apart. Visibility on the portion of the study area immediately to the east of the

enhanced water fowl habitat was generally poor, due to dense *kiawe* trees and undergrowth. The remainder of the survey area was primarily vegetated with moderate to dense buffelgrass cover and visibility was fair. During the course of the walk-over survey, Site 3529, a low rock shelter, was located in an area of dense buffelgrass cover (see Map 3). No other archaeological sites were identified during the pedestrian survey.

The second phase of the inventory level survey consisted of an evaluation of Site 3529. Initially, the area around the rock shelter was cleared of vegetation. A 0.5 m. by 0.5 m. by 0.6 m. deep test unit (TU #1) and 17 shovel tests (STs #1 to #17) were excavated at Site 3529, in an effort to determine site extent and function (Figure 1). Shovel Tests #15, #16 and #17 were placed at the site after initial fieldwork for the inventory level survey had been completed. These additional 3 tests were excavated to further investigate the shallow soil deposits near ST #5 and an area of exposed surface shell found eroding next to the dirt access road (see Figure 1). The shovel tests were c. 0.3 m. by 0.5 m. by 0.1 to 0.3 m. deep. It was not possible to utilize auger testing at the site because of very stony soil conditions. All units were excavated in 10 cm. levels. All soil from TU #1 was sifted with 1/8" hardware mesh screen, and all soil from the shovel tests was screened through 1/4" hardware mesh cloth. One hundred percent of material culture remains found in the screening process were saved from each 10 cm. level for later laboratory analysis.

A site map was prepared using a hand bearing electronic compass and metric survey tapes. Descriptive notes were kept in the field, and photographs were taken with T-Max 400, black and white film. All notes, photographs, cultural materials, and midden are curated by Xamanek Researches, Pukalani, Maui, Hawaii.

ARCHAEOLOGICAL FIELD RESULTS

The pedestrian survey located one archaeological site with two components. Site 3529 consists of a rock shelter and an associated subsurface *in situ* cultural deposit (Figure 1). Upon discovery, the rock shelter was identified by a low overhang with an exposed opening c. 3 m. wide by 0.4 m. at its highest point (Photo 4, Figure 2). The entrance to this small lava tube and the area in front of it appear to have been filled in over time by aeolian soil deposits. Intensive observation of the general area in front of the rock shelter did not reveal any surface evidence of historic disturbance. Limited subsurface testing at Site 3529 indicated that a relatively thick *in situ* cultural deposit was present in the area directly to the west, or *makai* of the rock overhang. This *in situ* cultural deposit appeared to be c. 20 to 25 square meters in area. In addition, the subsurface deposit fans out from the rock shelter further to the west, north and south, with thin, eroded soil deposits generally less than 15 cm. thick overall. Cultural materials recovered during limited excavation indicate that the rock shelter was likely used as a temporary habitation site. Overall areal dimensions of the Site 3529 subsurface cultural

layer are c. 14 m. N-S by c. 16 m. E-W. A discussion of the above findings follows. Refer to Table 1 for a summary of midden recovered from TU #1, Table 2 for a summary of artifacts recovered at Site 3529, Table 3 for a summary of shovel test results, and Appendix A for detailed descriptions of stratigraphic profiles.

Site 50-50-10-3529

This site is located on a gently sloping open grassland at c. 30 to 34 ft. AMSL (Photos 2 & 4). Surface evidence such as charred *kiawe* stumps and charcoal staining indicate that one or more brush fires have occurred in the general area in the relatively recent past. Xerophytic vegetation is dominated by buffelgrass. In general, soils are somewhat eroded and thin. However, a marked exception occurs in the immediate area west or *makai* of the rock shelter (Figure 1). It appears that the mouth of the small lava tube has served as a catchment for wind-born sediment over time. Initial testing indicates that aeolian soil deposits may exceed 60 cm. in depth on this portion of Site 3529. In addition, the small lava tube also appears to have been nearly filled in by wind-sorted soil over time. Intensive surface inspection of the site indicates that it has not been disturbed in historic times, although evidence of past bulldozing activity is present near the western and southeastern borders of the site and c. 50 m. to the southeast. In general, site condition ranges from good to fair. The area of deep soil deposits directly to the west of the rock shelter is in good condition, while the outer portions of the site consisting of thin soils are somewhat eroded and in fair condition. Overall areal dimensions of Site 3529 are c. 14 m. N-S by 16 m. E-W (see Figure 1). The thicker *in situ* cultural deposits directly to the west or *makai* of the rock shelter appear to be c. 20 to 25 square meters in area.

Excavation at Site 3529

As noted earlier, one test unit (TU #1) and 17 shovel tests (STs #1 to #17) were excavated at Site 3529 in order to determine site extent and function. A discussion of subsurface results follows.

Test Unit #1

This unit was placed near the mouth of the small lava tube entrance, in order to investigate subsurface conditions (Figure 2). Surface observation had earlier revealed 2 pieces of echinoderm and 1 *pipipi* (Nerita picea) shell which had been unearthed by a mongoose burrowing into the soil under the rock overhang. Unit dimensions were 0.5 m. by 0.5 m. by 0.6 m. deep.

In all, four wind-sorted soil layers were encountered (Figure 3). The top soil layer yielded very low amounts of midden. Layer I (0 to 20 cmbs) consisted of reddish brown (5 YR 4/3) sandy clay and was slightly stony. Level I (0 to 10 cmbs) of this layer contained 2.5 gm. of marine invertebrates, and 3.3 gm. of bird bone that was close to the surface. Level II (10 to 20 cmbs) also yielded small amounts of marine invertebrate remains (1.5 gm.), a small piece of coral (0.3 gm.) and an unworked basalt flake.

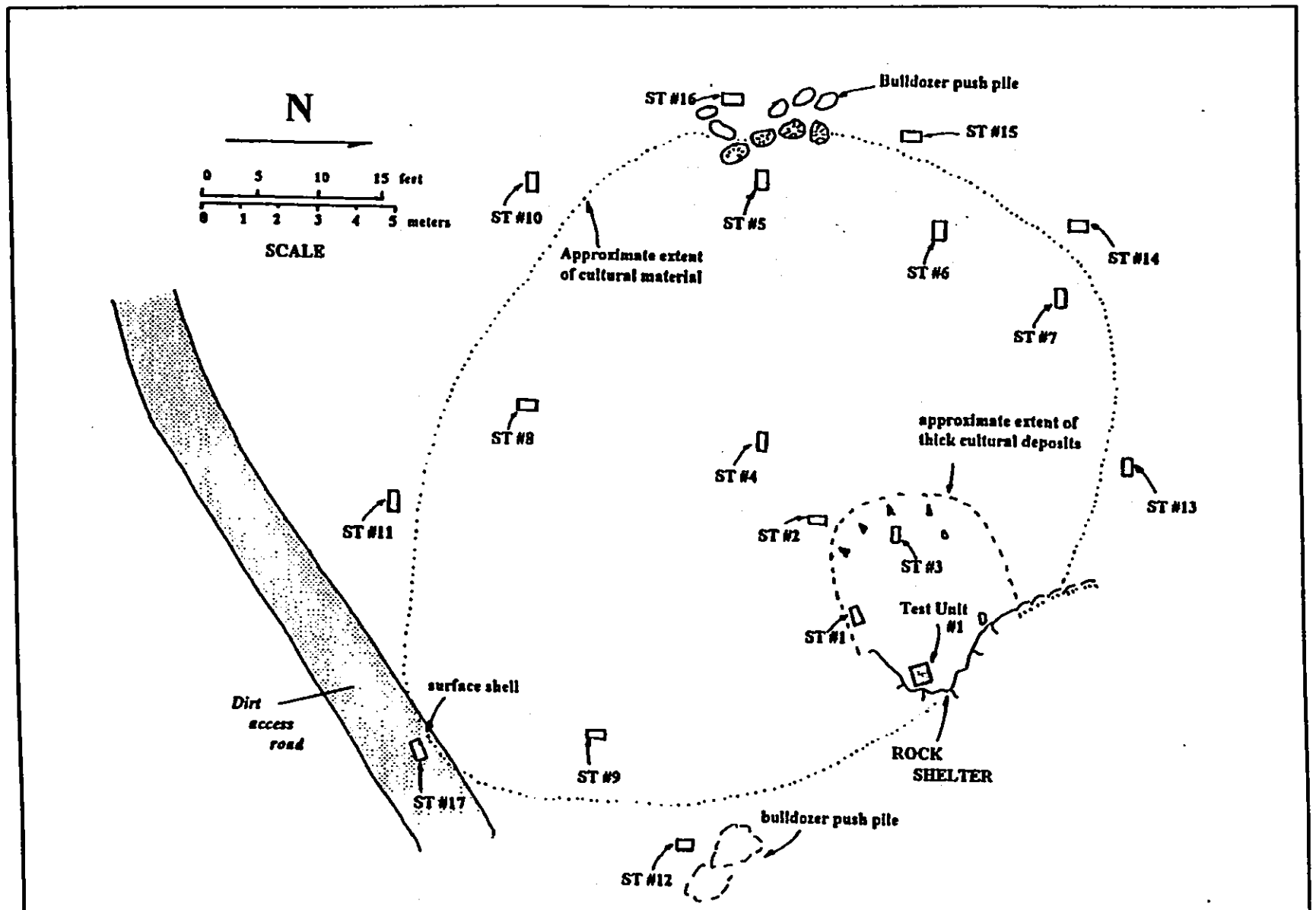
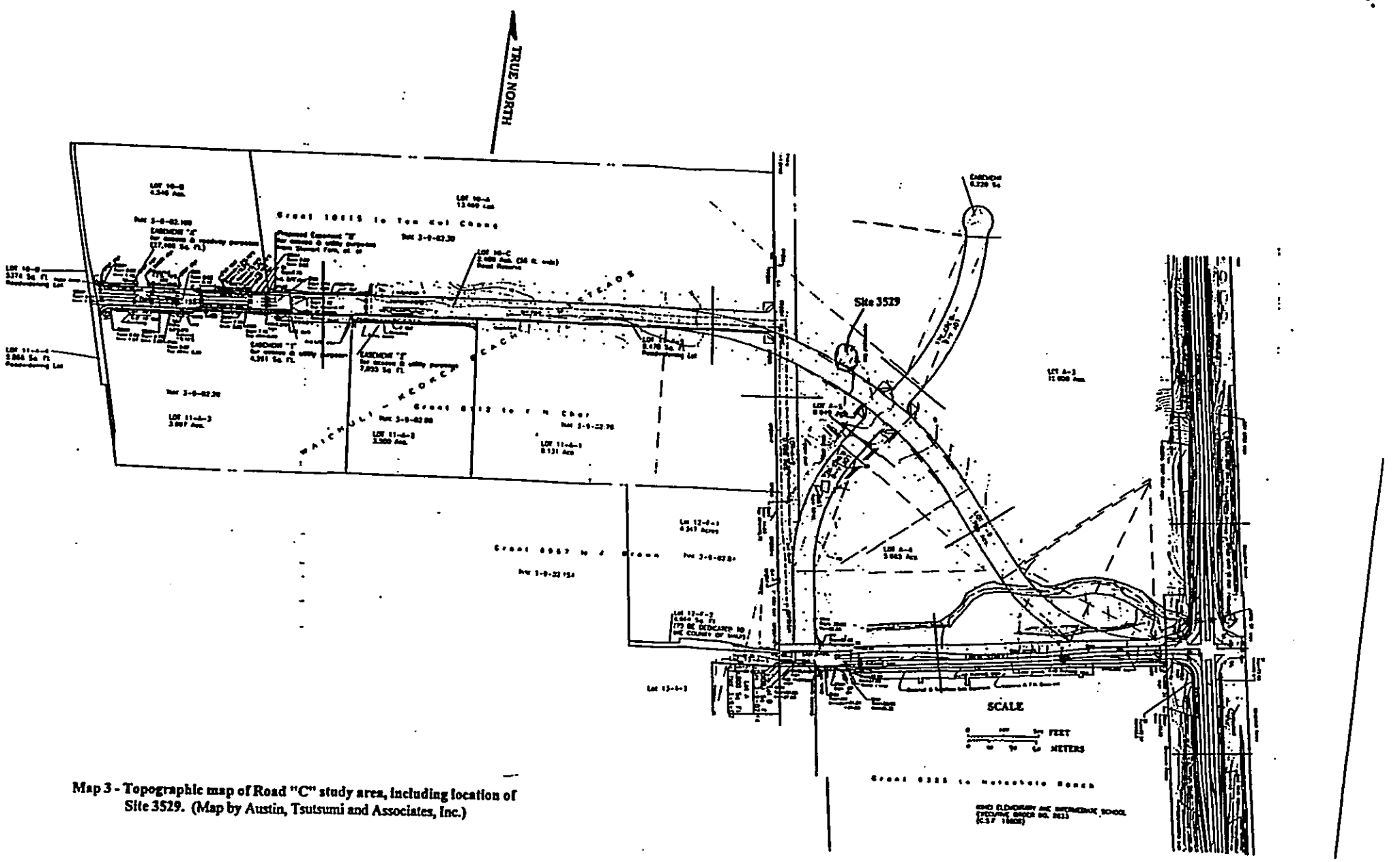


FIGURE 1 - Plan view of Site 3529, including locations of Test Unit #1 and Shovel Tests #1 through #17.



Map 3 - Topographic map of Road "C" study area, including location of Site 3529. (Map by Austin, Tsutsumi and Associates, Inc.)

Layer II (c. 20 to 30 cmbs) was comprised of dark brown (7.5 YR 3/4) sandy clay and was moderately stony. This soil layer (i.e. Level I - 20 to 30 cmbs) contained a total of 55 gm. of marine invertebrate remains. *Pipipi* (Nerita picea) accounted for 57.6% of the total, followed by planaxids (7.1%), cowrie (Cypraea sp. - 6.0%) and lesser amounts of other marine invertebrates. In addition, four waste flakes of volcanic glass and 2 unworked basalt flakes were located in the screen. During excavation, it appeared that the lower 5 cm. of Level I (20 to 30 cmbs) contained the bulk of the cultural material found in Layer II.

Underlying Layer II was Layer III, an *in situ* cultural deposit which contained charcoal staining. Layer III (c. 30 to 50 cmbs) was dark grayish brown to dark brown (10 YR 3/2 to 3/3) sandy clay, and was moderately stony. This layer yielded a total of 183.1 gm. of common marine invertebrates, 3.8 gm. of crustacean, 2.2 gm. of fish bone, and 5.2 gm. of unidentified bone. Other portable remains located in Layer III included 2 possible utilized basalt flakes, a coral abrader, a coral file, an incised piece of bone, 19 waste flakes of volcanic glass, 5 unworked basalt flakes, a piece of coral, a bone pick, and a pencil urchin file. In addition, 3 firecracked rocks and charcoal flecking were encountered. Level I (c. 30 to 40 cmbs) yielded a total of 142.0 gm. of common marine shellfish, 11.7 gm. of echinoderm, 2.6 gm. of crustacean, 1.3 gm. of fish bone, 3.1 gm. of unidentified bird bone fragments, a small coral abrader, a small coral file, a small piece of incised bone, 5 unworked basalt flakes, 10 waste flakes of volcanic glass, and a piece of unworked coral. The most common marine shellfish included *pipipi* (Nerita picea-54%), cowrie (Cypraea sp.-27.8%), bivalves (Isognomon sp.-7.2%), and cone shell (Conus sp.-3.7%).

Indigenous artifacts recovered from Level I of Layer III included an incised piece of bone, a small coral file, and a small coral abrader (Photo 5). The small piece of incised bone (a) measures 13.9 mm. long by 6.9 mm. wide by 1.6 mm. thick and weighs 0.6 gm. It appears to have been filed at its tapered end, and an incision crosses the artifact near this end as well. It may be part of a fish hook blank which was discarded. The first coral artifact is a file (b) that weighs 0.8 gm. with dimensions of 22.1 mm. in length by 7.4 mm. in width by 6.1 mm. in thickness. This small, well-used file is roughly triangular in cross section, and appears to have been broken in the past. It also appears to have been used for detailed work, possibly fish hook manufacture. The coral abrader (c) weighs 1.2 gm. and is 27.2 mm. long by 12.8 mm. wide by 6.7 thick. It is roughly triangular shaped in cross-section and has one faceted edge. Its small size suggests that it was used for detailed work such as fish hook manufacture.

The 5 unworked basalt flakes weighed a total of 5.3 gm. and are of generally poor quality material, possibly the result of breakage due to intense heating by fires or natural exfoliation. The 10 waste flakes of volcanic glass weighed a total of 5.1 gm. and ranged in size from 2.5 by 5.5 by 7.1 mm. to 15.9 by 12.1 by 6.2 mm. Many of these volcanic glass flakes were of very poor quality and included an outer weathered "rind", indicating that reduction of raw material occurred at the site, prior to transport inland. In addition to the previously noted portable remains, 3 firecracked rocks and some charcoal flecking

were encountered in Level I. Unfortunately, it was not possible to collect enough charcoal flecks to obtain an adequate radiocarbon sample.

Level II (40 to 50 cmbs) of Layer III produced a total of 29.4 gm. of marine invertebrates. Nerita picea (31%) and echinoderm (50.7%) were most common and small amounts of crustacean, fish bone and unidentified bone were also located. In addition to the previously mentioned portable remains, 4 artifacts including 2 possible utilized basalt flakes, a bone pick and a pencil urchin file were recovered, along with 9 waste flakes of volcanic glass (see Photo 6). The first basalt flake recovered (d) may have been

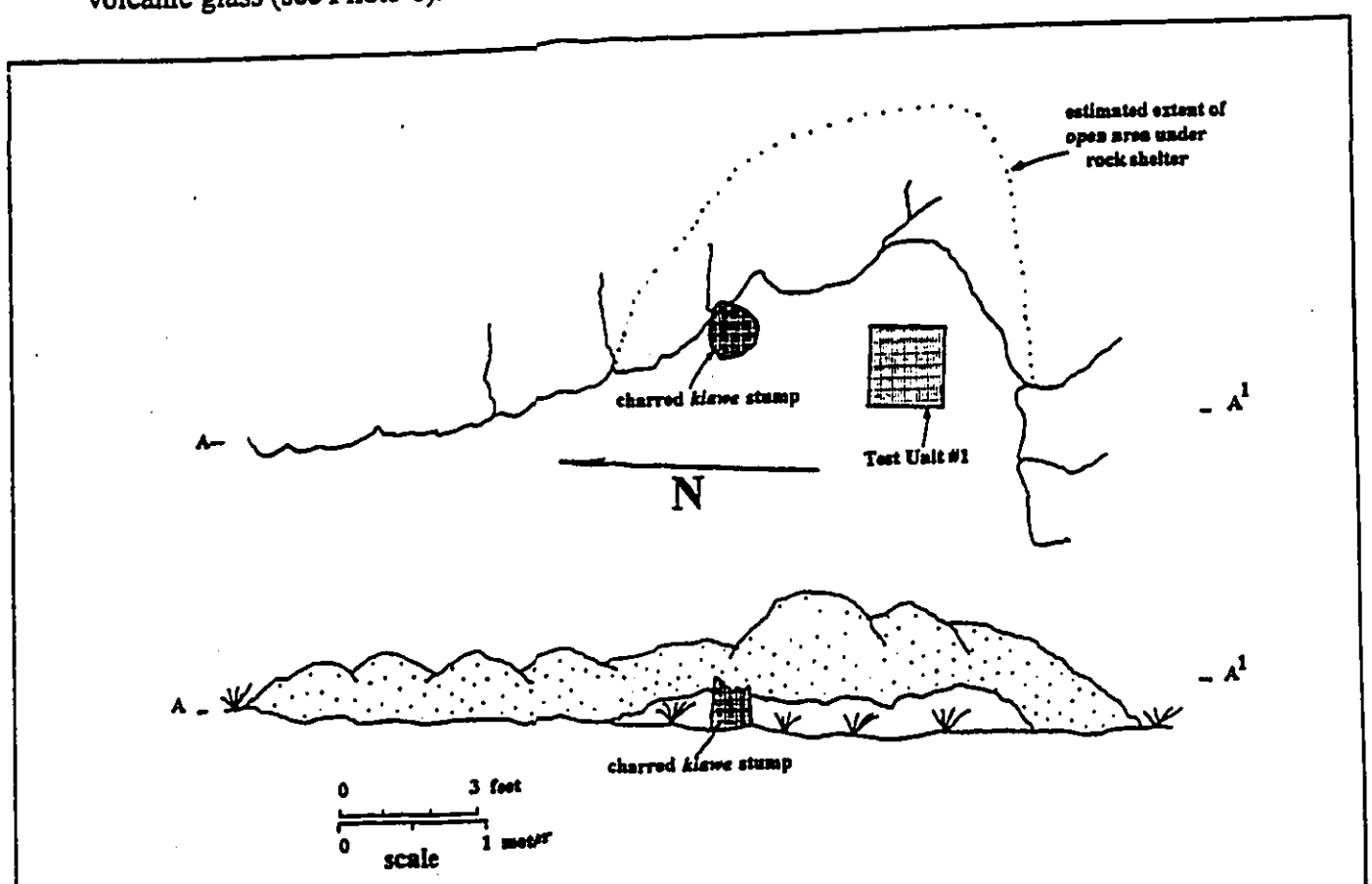


FIGURE 2 - Plan and profile views of Site 3529 rock shelter before excavation showing Test Unit #1.

utilized as a perforator. There appears to be some slight use wear on the tip of the flake. Its dimensions are 17.0 by 9.5 by 3.0 mm. and it weighs 1.8 gm. The second flake (e) may have some use wear along one of its edges. Its dimensions are 20.5 by 8.8 by 2.5 mm., and it weighs 2.2 gm. The bone pick (f) is a fish spine with use polish on its tip. It weighs 0.2 gm. and is 27.7 mm. long. The fourth artifact located in Level 2 is a broken pencil urchin spine (g) that appears to have been utilized as a file. It weighs 1.5 gm. and its dimensions are 29.0 by 8.8 by 7.9 mm. The 9 waste flakes of volcanic glass ranged in

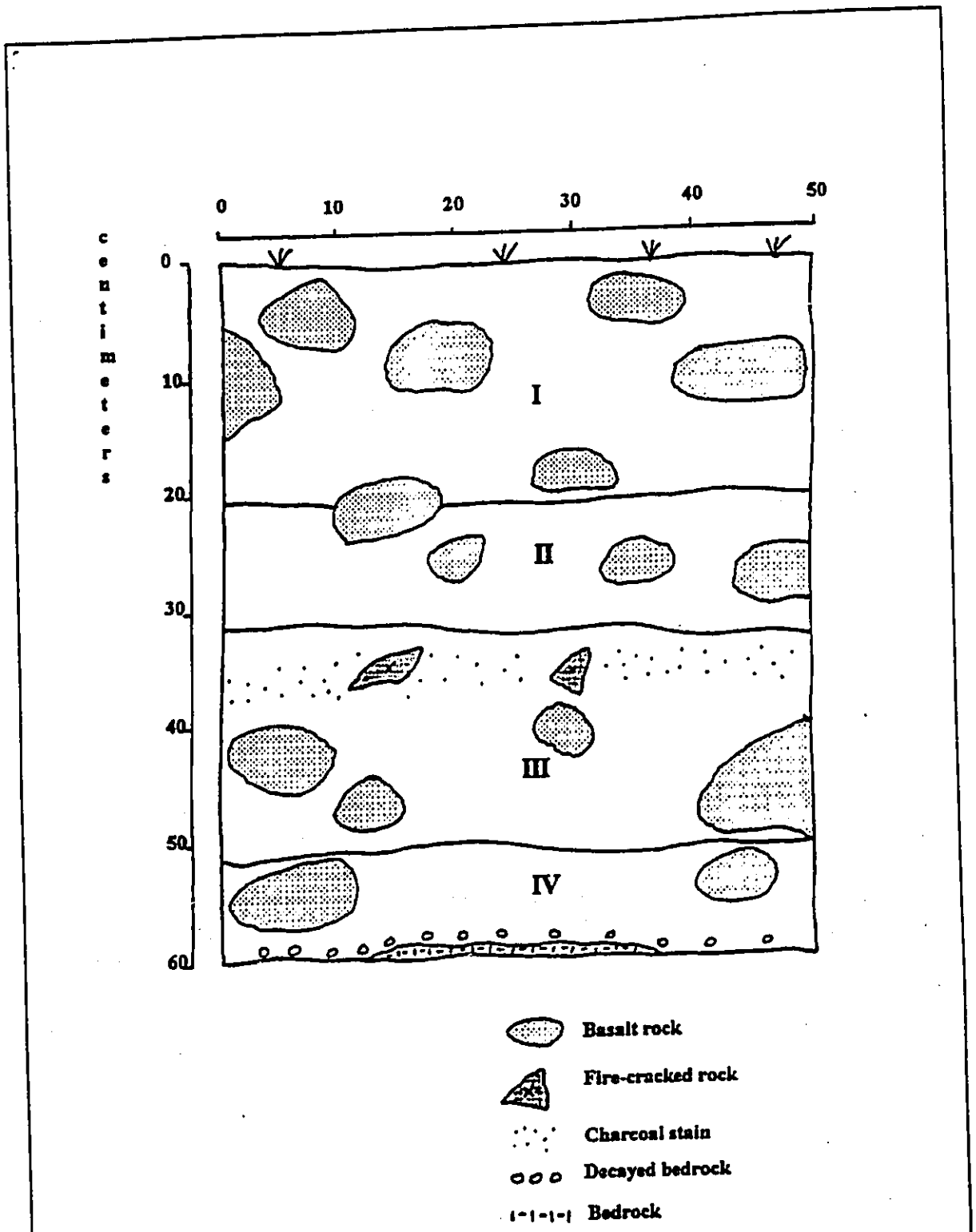


FIGURE 3 - East face profile Test Unit #1, Site 3529.

size from 8.3 by 6.6 by 1.1 mm. to 14.2 by 7.4 by 3.1 mm. and weighed a total of 4.3 gm. Layer III graded into Layer IV soil between 47 and 51 cmbs.

Layer IV (c. 50 to 60 cmbs) soil did not contain charcoal flecking and was dark yellowish brown (10 YR 3/4) sandy clay. It is likely that this soil layer rests on top of bedrock. It contained small amounts of midden and appears to grade to sterile. Level I (50 to 60 cmbs) of Layer IV yielded traces of cowrie (Cypraea sp.), *pipipi* (Nerita picea), fish bone, 1.1 gm. of echinoderm and 1.7 gm. of unidentified bone. Most of this midden material appeared to be associated with the overlying Layer III cultural deposit. However, the stony nature of Layer IV soil hampered efforts to determine whether or not cultural material was present throughout this layer. It appears likely that Layer IV soil grades to bedrock, because decayed bedrock increased as unit depth increased. However, it was not possible to excavate beyond 60 cmbs due to time constraints and test unit size.

Additional Subsurface Testing at Site 3529

Once it was determined that an intact subsurface cultural deposit was associated with the rock overhang, a series of shovel tests (ST) were placed in the general area, in an effort to determine overall site extent. In all, 17 shovel tests, each c. 30 cm. by 50 cm. and ranging in depth from c. 8 to 27 cm. , were excavated at Site 3529 (Figure 1). Of these, STs #1 to #9 contained some cultural materials, while STs #10 to #17 were sterile.

In general, most shovel tests did not exceed 20 cm. in depth, due to shallow soil conditions. Shovel Tests #1 and #3 contained stratigraphy similar to that encountered in TU #1. However, ST #1 was only c. 15 to 17 cm. deep and contained only Layers I and II, while ST #3 contained all 4 soil layers found in TU #1. Shovel Tests #2 and #4 through #17 contained 2 shallow soil layers. Layer I was typically less than 15 cm. thick in tested areas. It consisted of reddish brown (5 YR 5/4) sandy clay and was moderately stony. When present, cultural materials were found in only the top 10 cm. of this layer. Layer II consisted of sterile dark yellowish brown (10 YR 4/6) sandy clay which was very stony. This layer overlaid bedrock in tested areas and tended to be less than 10 cm. thick.

Shovel Test #1

This unit was located c. 3.5 m. southwest of the rock shelter entrance in an area that appeared to contain thick soil deposits. Layer I reddish brown (5 YR 4/3) sandy clay soil was located in this unit. As with Layer I in TU #1, there were relatively small amounts of midden located, adjusting for two large, unutilized pieces of somewhat weathered cone shell (Conus sp.-37.1 gm.) found near the surface of the unit. Layer I was approximately 10 to 12 cm. thick and was underlain by Layer II dark brown (7.5 YR 3/4) sandy clay. It was only possible to excavate c. 5 cm. into Layer II (i.e., c. 15 to 17 cmbs) due to extremely stony soil conditions. It appears probable that excavation could

proceed with a larger unit (i.e. 1.0 by 1.0 m.). Excavation was halted at c. 15 to 17 cmbs and no profile was drawn.

Shovel Test #2

This unit was placed c. 3 m. west of ST #1. Slightly different soil conditions were encountered, and are representative of those also found in STs #4 through #17. Two thin soil layers were noted in this unit (Figure 4). Layer I (0 to 10 cmbs) reddish brown (5 YR 5/4) sandy clay contained a total of 9.3 gm. of marine invertebrates. Cone shell (Conus sp.) was most common, accounting for 63.4% of the total, followed by echinoderm (30.1%) and traces of cowrie (Cypraea sp.) and bi-valve (Isognomon sp.). Layer I was underlain by sterile Layer II subsoil which consisted of dark yellowish brown (10 YR 4/6) sandy clay. This soil layer contained numerous pieces of decayed bedrock and extended from c. 10 cmbs to bedrock at c. 17 cmbs.

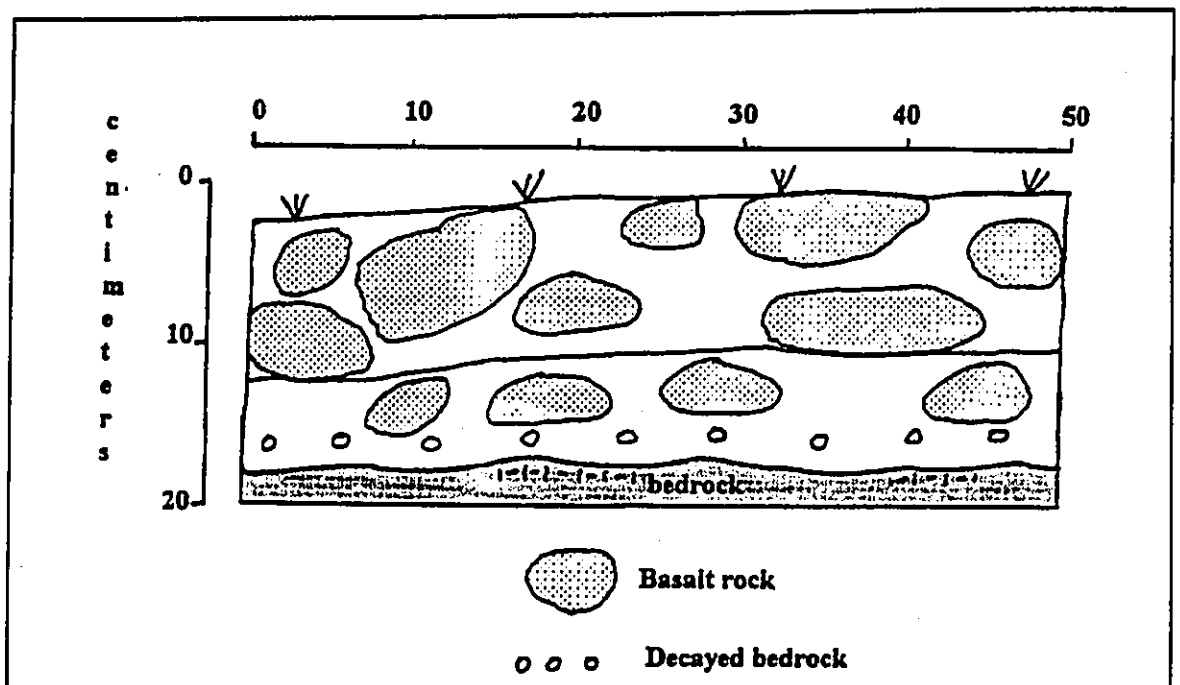


FIGURE 4 - East face profile, Shovel Test #2 .

Shovel Test #3

This unit was placed c. 4 m. from the partly filled-in rock shelter. It was excavated to c. 30 cmbs until very stony soil conditions halted further progress. It is likely that excavation could continue to bedrock with a larger unit size (i.e. 1.0 m. by 1.0

m.) Stratigraphy similar to that encountered in TU #1 was present in ST #3. In all, 4 soil layers were located (Figure 5).

Layer I (0 to 10 cmbs) reddish brown (5 YR 4/3) sandy clay was charcoal stained and yielded 9.3 gm. of common marine invertebrates, including cowrie (Cypraea sp. - 44.1%), cone shell (Conus sp.-38.7%) and bi-valve (Isognomon sp.-17.1%). The surface charcoal staining appears to be associated with recent brush fires in the area. This layer was underlain by soil similar to that found in TU #1. Layer II (c. 10 to 20 cmbs) dark brown (7.5 YR 3/4) sandy clay was moderately stony and appeared to be sterile.

Layer III (c. 18 to 20 cmbs to 26 cmbs) consisted of very dark grayish brown to dark brown (10 YR 3/2 to 3/3) sandy clay. However, this layer was stonier than the corresponding one in TU #1. This layer yielded 7.4 gm. of marine invertebrates. Cowrie (Cypraea sp.-31.1%) and echinoderm (50%) were most common. In addition, 3 waste flakes of volcanic glass were recovered from the screen. Some slight charcoal flecking was noted, but quantities were insufficient to collect for a radiocarbon sample. Layer III appeared to grade into Layer IV soil between 24 and 28 cmbs. However, very stony conditions hampered determination of the soil boundary.

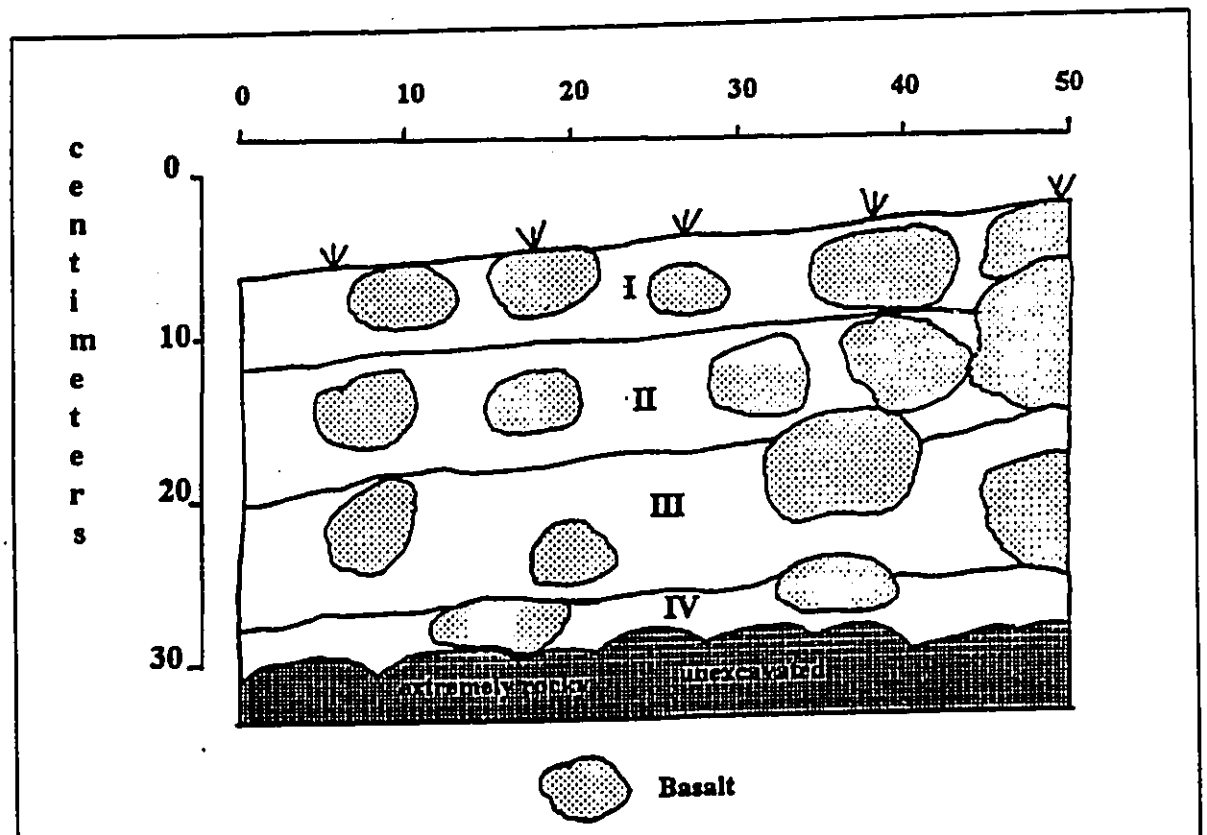


FIGURE 5 - North face profile, Shovel Test # 3.

Layer IV consisted of the dark yellowish brown (10 YR 3/4) sandy clay also noted in TU #1. However, this soil did not appear to have any cultural materials associated with it. Once again, very stony conditions were present in this layer, and excavation was abandoned at c. 30 to 32 cmbs.

Shovel Test #4

This unit was dug about 7 m. downslope from the rock shelter. Two shallow soil layers similar to those present in ST #2 were encountered (see Figure 4). Layer I soil consisted of weathered reddish brown (5 YR 5/4) sandy clay which was quite stony. Layer I (0 to 8-10 cmbs) contained a total of 18.8 gm. of marine invertebrates. Cowrie (Cypraea sp.) accounted for 75.5% of this total, followed by heavily weathered, unidentifiable shell fragments (16.5%), echinoderm (6.4%), and traces of bi-valves and planaxids. There was no evidence of charcoal flecking observed in the soil except near the surface. Layer I graded to Layer II subsoil at about 6 to 10 cmbs. Very stony conditions tended to obscure the soil boundary.

Layer II (8-10 to 18 cmbs) consisted of the dark yellowish brown (10 YR 4/6) sterile sandy clay subsoil. This layer was common in all shovel tests except STs #1 and #3 which were dug near the rock shelter in the area of thicker soil deposits. Excavation was halted when bedrock was reached c. 14 to 18 cmbs.

Shovel Test #5

This test was located c. 15 m. west or *makai* of the rock overhang in an area of shallow soil and exposed outcrop bedrock and apparent bulldozer push. Two stony soil layers were encountered in this 12 cm. deep unit.

Layer I (0 to 4 cmbs) consisted of the common somewhat weathered reddish brown (5 YR 5/4) sandy clay. This stony layer contained 10.8 gm. of common marine invertebrates. Cone shell (Conus sp.) was most common (48.1%), followed by *pipipi* (Nerita picea-24.1%), cowrie (Cypraea sp.-19.4%), and echinoderm (8.3%). In addition, the shank of a 2 piece bone fish hook was recovered (Photo 5). This artifact weighs 0.8 gm., and measures 31.5 mm. by 8.4 mm. by 10.1 mm. It is well made and appears to have been broken in the past. Efforts to locate the other piece(s) were not successful.

Layer I graded into Layer II common dark yellowish brown (10 YR 4/6) subsoil. This soil layer was c. 4 to 6 cm. thick and was sterile. No soil profile was recorded for this unit, due to very stony conditions.

Shovel Test #6

This unit contained 2 soil layers similar to those found in other test instances (see Figure 4). Soil conditions were very stony in ST #6. Layer I (c. 0 to 10 cmbs) consisted of the common weathered reddish brown (5 YR 5/4) sandy clay. A small amount of

common marine mollusks (2 gm.) were recovered in the screen [cowrie (Cypraea sp.), cone shell (Conus sp.) and bi-valve (Isognomon sp.)]. Layer I soil graded into Layer II subsoil between 8 and 10 cmbs.

Layer II (c. 10 to 16 cmbs) was composed of the common dark yellowish brown (10 YR 4/6) sandy clay subsoil. This very stony layer contained pieces of decayed bedrock and was sterile. Excavation was halted when bedrock was reached c. 14 to 16 cmbs. No unit profile was drawn.

Shovel Test #7

This test revealed the 2 common soil layers found elsewhere (see Figure 4). A low quantity of shell midden was recovered from the screen, primarily within c. 6 cm. of the surface. Layer I (0 to 14 cmbs) was comprised of the common reddish brown (5 YR 5/4) sandy clay. Just under 2 gm. of marine shellfish were recovered, including 1.3 gm. of *pipipi* (Nerita picea) and 0.6 gm. of unidentifiable, weathered shellfish remains. Level I (0 to 10 cmbs) contained the above noted materials. The lower 4 cm. of Layer I were sterile (i.e. 10 to 14 cmbs). Layer I soil graded into Layer II subsoil (10 YR 4/6) between 12 and 16 cmbs. Bedrock was encountered between c. 16 and 22 cmbs. No unit profile was recorded for ST #7.

Shovel Test #8

This unit was placed in an area of shallow soil and exposed bedrock. Subsurface results were similar to other tested portions of the site with thin soil deposits (see Figure 4). A small amount of shell was found in the upper 5 cm. of ST #8. Layer I consisted of reddish brown (5 YR 5/4) sandy clay and was moderately stony. This shallow soil layer was c. 8 to 10 cm. thick and contained a total of 1.2 gm. of cone shell (Conus sp.) fragments. These fragments were weathered and may have been exposed to surface conditions in the past. No other portable remains were encountered in ST #8.

Layer II soil was located c. 8 to 10 cmbs and was composed of the common dark yellowish brown (5 YR 4/6) sandy clay subsoil. This soil stratum was sterile. Excavation was halted when bedrock was located c. 12 to 16 cmbs and no unit profile was recorded.

Shovel Test #9

This test was also located in an area of shallow soil. Overall unit depth was c. 10 to 14 cmbs. Less than 1 gm. of common marine shellfish was present in Layer I of this unit. Stratigraphy was similar to other portions of the site with shallow soil deposits. Layer I reddish brown (5 YR 5/4) sandy clay was moderately stony and c. 6 to 8 cm. thick. A total of 0.8 gm. of cone shell (Conus sp.) fragments were recovered in the screen. No other portable remains were encountered. Layer I graded to sterile Layer II dark yellowish brown (10 YR 4/6) sandy clay subsoil. Layer II (c. 8 to 14 cmbs) was

very stony and overlaid bedrock which was encountered between 12 and 14 cmbs. No unit profile was prepared.

Shovel Test #10 through #17

As noted earlier in this report, only STs #1 through #9 contained portable remains. Shovel Tests #10 through #17 contained stratigraphy similar to the above units, but they lacked any cultural materials (see Figures 4 and 6). Layer I reddish brown (5 YR 5/4) sandy clay ranged from c. 4 to 12 cm. deep, while Layer II dark yellowish brown (10 YR 4/6) sandy clay subsoil ranged from c. 4 to 8 cm. deep.

In general, STs #10 through #17 contained shallow soil deposits. Shovel Tests #10, #11, #16 and #17 were less than 10 cm. deep, while STs #12 through #15 were between 10 and 20 cm. deep. As mentioned in the previous paragraph, stratigraphy was similar to other tested portions of the site with shallow soil deposits.

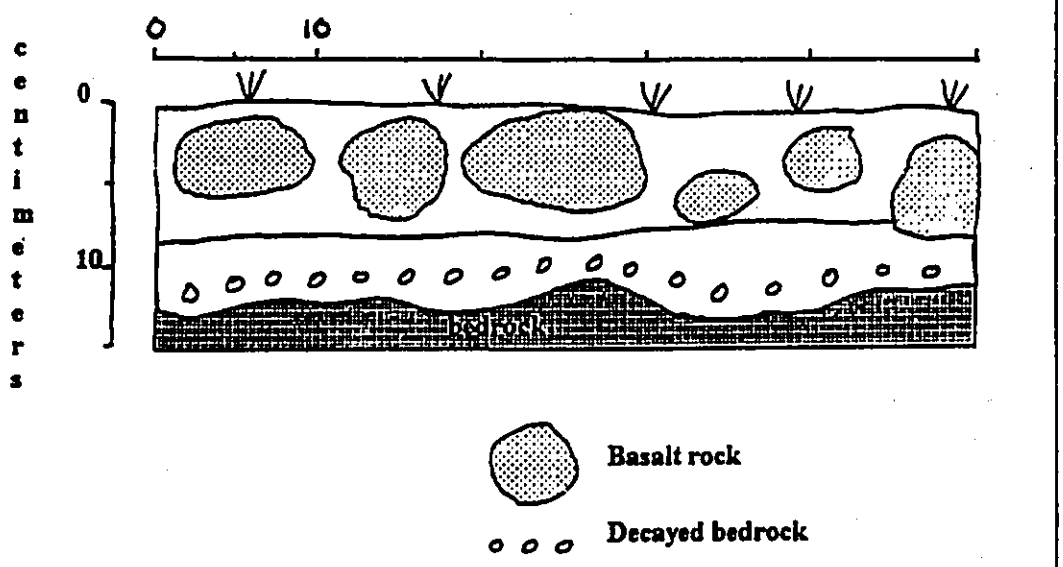


FIGURE 6 - North face profile, Shovel Test #11.

SUMMARY AND CONCLUSIONS

Site 3529 consists of a subsurface *in situ* cultural deposit associated with an overhang rock shelter. Inventory level survey work indicates that this site has not been utilized or disturbed during historic times. Overall site conditions range from good near the rock shelter to fair on the areas downslope. Subsurface investigation indicates that cultural materials are present in small quantities up to about 16 m. west, or *makai,* of the overhang shelter, while thicker cultural deposits, approximately 20 to 25 square meters in area, are present to the immediate west, or *makai,* of the rock shelter.

Limited subsurface testing at Site 3529 suggests that substantial cultural deposits are present in the approximate 20 to 25 square meter area in front of the shelter. Test Unit #1 yielded quantities of midden, including 212.6 gm. of common marine shellfish, 31.4 gm. of echinoderm, 3.8 gm. of crustacean, 2.4 gm. of fish bone, 6.4 gm. of bird bone and 3.8 gm. of unidentified bone fragments. This 0.5 m. by 0.5 m. by 0.6 m. deep test unit also produced several indigenous artifacts including a small coral abrader, a small coral file, a piece of incised bone, a bone pick, a pencil urchin file, 2 possible utilized basalt flakes, and 23 waste flakes of volcanic glass. It is possible that the small coral abrader and file were utilized for detailed work such as fish hook manufacture. It also appears possible that the incised bone is a discarded fish hook blank. Several of the volcanic glass waste flakes were of very poor quality, and possessed outer weathered crust or rind indicating that reduction of raw material took place at the site. The majority of marine shellfish remains (nearly 99%), echinoderm (nearly 92%) and other food material remains as well as almost all other portable remains came from the lower portion of Layer II (20 to 30 cmbs) and all of Layer III (30 to 50 cmbs).

In addition to the above noted portable remains, charcoal flecking and 3 firecracked rocks were encountered in TU #1. Although it was not possible to collect a sufficient amount of charcoal to submit for radiocarbon analysis, it appears probable that adequate quantities of charcoal could be collected from expanded excavation on this portion of the site.

While TU #1 was excavated in order to assess subsurface deposits near the rock shelter, the 17 shovel tests were dug in an effort to evaluate overall site extent. Subsurface results indicate that deposits of material culture remains extend for approximately 220 square meters. Approximately 80 to 90% of the subsurface deposits appear to be relatively thin and somewhat eroded (i.e. 10 cm. or less). In contrast, the area immediately west, or *makai,* of the rock shelter contains thick deposits of soil, possibly greater than 60 cm. in depth, and *in situ* cultural deposits of c. 20 to 25 cm. thick. Portable remains recovered from Shovel Tests #1 through #9 included a total of 89.5 gm. of common marine shellfish, 0.7 gm. of crustacean, 9.9 gm. of echinoderm, 1.9 gm. of bone, 3 waste flakes of volcanic glass and the shank of a 2-piece bone fish hook. These material culture remains are also suggestive of temporary habitation usage.

While it was not possible to recover any adequate radiocarbon samples from tested areas at Site 3529 to submit for analysis, it appears very probable that this site is a precontact one. It is important to note that no historic materials were located during intensive survey of the surface, or limited subsurface investigation. This site appears to be intact and undisturbed. Because Site 3529 is located in the "intermediate or barren zone", an area that has only relatively recently begun to be more closely examined, it is of special interest.

The authors have investigated 2 other rock shelters and a subsurface deposit in this region of Kihei (see Map 4). Site 50-50-10-3193, located on the grounds of Lokelani Intermediate School (Waiohuli *ahupua'a*, Makawao District), lies c. 600 m. to the south of the present study area. This site yielded a radiocarbon date of AD 1560 to 1800, and appears to have been utilized for temporary habitation (Fredericksen, et. al., September 1993). The second overhang shelter, Site 50-50-10-3541, lies in Kama'ole Gulch (Kama'ole *ahupua'a*, Wailuku District) c. 2.5 km. to the south. A radiocarbon date of 220 ± 60 BP, with calibrated results at 2 sigma of AD 1520 to 1570, 1630 to 1890 and AD 1910 to 1950 was obtained (Fredericksen et al, June 1994). The lack of any historic materials associated with this deposit tends to indicate the earlier date range. This site also was utilized for temporary habitation. The third site, Site 50-50-10-2636, is located c. 600 m. to the southwest of Site 50-50-10-3541, upslope from the Coast. It consists of 2 historic modified outcrop features, one possible indigenous feature heavily modified during historic times, and a subsurface *in situ* indigenous cultural deposit. This subsurface deposit produced 2 dates. While the first was based on scattered charcoal which may have been contaminated with charred *kiawe* root, the second was recovered from a subsurface fire hearth remnant and yielded a date of 530 ± 80 BP, with calibrated results at 2 sigma of AD 1295 to 1495 (Fredericksen et. al., November 1994). The first 2 sites suggest indigenous usage of the intermediate zone in the late precontact to early post-contact period, when population pressures stimulated increased utilization of this marginal area. The date from the third site is earlier, and indicates human activity in lower Kama'ole *ahupua'a* at a period considerably prior to contact.

Inventory level survey work identifies Site 3529 as an apparently undisturbed and very probably a precontact temporary habitation site. The undisturbed nature of this site offers a unique opportunity to investigate a precontact site in the intermediate zone, adding further to the body of knowledge for this area.

Site 3529 is deemed significant under Criterion "D" of Federal and State historic preservation guidelines. Because of the research potential of Site 3529, it is still considered significant for its information content and requires further mitigative measures. Site 3529 is in the Road "C" corridor and will likely be impacted by road construction activities. Consequently, data recovery work is recommended for this archaeological resource. A data recovery plan for this site was approved by the DLNR in June of 1994. At the writing of this inventory level report, the data recovery project is nearing completion and a report will be forthcoming.

REFERENCES

Brown, Roderick, and Alan E. Haun
1989 Archaeological Inventory Survey Keokea and Waiohuli Subdivisions, Lands of Keokea and Waiohuli, Makawao District, Island of Maui, prepared for the Department of Hawaiian Home Lands, by PHRI, Hilo.

Cordy, Ross
1977 Kihei Flood Control Project: Archaeological Reconnaissance and Literature Search. Fort Shafter, Hawaii, U.S. Army Corps of Engineers.

Cox, D.
1976 The Archaeology of Kula, Maui from Pulehu Nui Ahupuaa to Kamaole ahupuaa. Surface Survey, Piilani Highway. Department of Transportation, State of Hawaii, Honolulu.

Donham, Theresa
1989 Archaeological Inventory Survey, Piilani Residential Community, Phase I, Land of Waiohuli, Makawao District, Island of Maui (TMK: 2-2-02: por. 42), prepared for Baldwin Pacific, c/o Belt Collins and Associates, Honolulu, by PHRI, Hilo.

1990a Archaeological Data Recovery Program, Site 50-50-10-2475, Piilani Residential Community-Phase I, Land of Waiohuli, Makawao District, Island of Maui (TMK: 2-2-02: por 42), prepared for Belt Collins & Associates, by PHRI, Hilo.

1990b Archaeological Inventory Survey, Piilani Residential Community-Phase II, Land of Keokea, Makawao District, Island of Maui, prepared for Belt Collins & Associates, Honolulu, by PHRI, Hilo.

Environmental Impact Study Corporation
1982 Biological and Archaeological Reconnaissance TMK: 2-2-02: portion of 42, Kihei, Maui, Hawaii.

Fredericksen, Walter M. and Demaris L.
1990 An Archaeological Inventory Survey of an 8.5 Acre Parcel, TMK: 3-9-20: 07, Kihei, Maui, Hawaii, prepared for Richard Takase, Maui Realty, Lahaina, Hawaii, by Xamanek Researches, Pukalani.

July 1990a Report on Archaeological Monitoring of Azeka Place Commercial Center, Kihei, Maui, Hawaii, prepared for Rieke, Sunnland & Kono Architects, Ltd., Kahului, by Xamanek Researches, Pukalani.

July 1990b Report on Archaeological Monitoring of Longs Drug Project, Kihei, Maui, Hawaii, prepared for Rieke, Sunnland & Kono Architects, Ltd., Kahului, by Xamanek Researches, Pukalani.

1991 An Archaeological Inventory Survey of a 3.14 Acre Parcel in Kihei, Maui, Hawaii (TMK: 3-9-17: 26), prepared for Joseph Donaghy, MLH Development Co., Kahului, by Xamanek Researches, Pukalani.

1992 Additional Archaeological Research at Keawakapu View Subdivision (TMK: 3-9-04: 79), Kihei, Maui, prepared for Gresham and Associates, Inc., Kihei, by Xamanek Researches, Pukalani.

Fredericksen, Demaris L., Walter M. and Erik M.
September 1993 An Archaeological Inventory Survey and Data Recovery Report for Lokelani Intermediate School, located in the *Ahupua'a* of Waiohuli, Makawao District, Island of Maui, (TMK: 2-2-02: por. 43), prepared for Murayama, Kotake, Nunokawa & Associates, Honolulu, by Xamanek Researches, Pukalani.

Fredericksen, Demaris L., Erik M. and Walter M.
August 1994 An Archaeological Inventory Survey for Keala Hills Sub-Division, Kama'ole *Ahupua'a*, Wailuku District, Maui Island (TMK: 3-9-30: 21), prepared for Max D. and Ruth A. Soriano, Seattle, by Xamanek Researches, Pukalani.

Fredericksen, Erik M., Demaris L. and Walter M.
June 1994 An Archaeological Inventory Survey of a 24-Acre Parcel, Kama'ole *Ahupua'a*, Wailuku District, Island of Maui (TMK: 3-09-18: 1), prepared for Grant Y.M. Chun, Attorney, by Xamanek Researches, Pukalani.

November 1994 — Archaeological Subsurface Testing at Site 50-50-10-2636, Kama'ole *Ahupua'a*, Wailuku District, Maui Island, prepared for Munekiyo and Arakawa, Inc., Wailuku, by Xamanek Researches, Pukalani.

Fredericksen, Erik M., Walter M., and Demaris L.
July 1994 — Archaeological Inventory Survey and Botanical Survey Report, Kaonoulu Light Industrial Project, Kaonoulu *Ahupua'a*, Wailuku and Makawao Districts, Island of Maui (TMK: 3-9-01: 16 and 2-2-02: por. 15), prepared for Michael T. Munekiyo Consulting, Inc., Wailuku, by Xamanek Researches, Pukalani.

Fredericksen, Walter M., Erik M., and Demaris L.
February 1994 — Archaeological Inventory Survey on Smith Trust Property (Kihei), in Waiohuli *Ahupua'a*, Wailuku District, Maui Island, Hawaii (TMK: 3-9-02: 91, 92, 93, 94, 133, 134, 135), Prepared for Milton Arakawa, MTM Consultants, Wailuku, by Xamanek Researches, Pukalani, Hawaii.

Hammatt, Hallett H. and David Shideler
1989 — Archaeological Reconnaissance of a 54-acre parcel at Kama'ole, Wailuku District, Island of Maui, Prepared for Kama'ole Land Ventures by Cultural Surveys Hawaii.

1992 — Archaeological Survey and Testing of a 54-Acre Parcel at Kama'ole. Wailuku District, Island of Maui, prepared for Kama'ole Land Ventures, by Cultural Surveys Hawaii.

Kennedy, Joseph
1986 — Letter report on Preliminary Archaeological Reconnaissance of Proposed Golf Course. Archaeological Consultants of Hawaii, Honolulu. Prepared for Haleakala Greens Corporation.

1991 — An Archaeological Inventory Survey for Keawakapu View Subdivision, located at TMK: 3-9-04: 79, Kama'ole Ahupua'a, Makawao District, Island of Maui, prepared for DKY Realty, Wailuku, Hawaii, by Archaeological Consultants of Hawaii, Haleiwa, Hawaii.

Neller, Earl
1992 An Archaeological Reconnaissance at the Kalama County Beach Park, Kamaole, Maui (TMK: 3-9-12: 13 and 3-9-05: 52).

Pantaleo, Jeffrey, et. al.
1991 Archaeological Inventory Survey of Proposed Kihei Elementary School Sites, Lots 1 and 2, Kama'ole, Wailuku, Maui Island, for Comprehensive Consulting Services of Hawaii, by Public Archaeology Section, Applied Research Group, Bishop Museum, Honolulu.

Rosendahl, Paul
1988 Subsurface Archaeological Reconnaissance Testing, Auhana Road Drainage Project Area, Land of Kama'ole, Wailuku District, Island of Maui, Contract No. 524, for County of Maui, Public Works.

Rotunno-Hazuka, Lisa and Jeffrey Pantaleo
1991 Diamond Resort Parcel--Final Report, for MTM Consulting, Inc., by Public Archaeology Section, Applied Research Group, Bishop Museum, Honolulu.

Sinoto, Aki
1989 Post field Summary of Surface Survey for the Residential Subdivision Development of TMK 3-9-18: 01, Letter report to Michael T. Munekiyo, MTM Consulting, Wailuku, by Bishop Museum Public Archaeology Section, Applied Research Group.

1991 Letter (April 25, 1991) to Martin Luna, Esq., Carlsmith, Ball, Wichman, Murray, Case, Mukai, & Ichiki, Wailuku.

Wong-Smith, Helen
1990 Limited Historical Documentary Research, in Donham, Theresa, Archaeological Inventory Survey, Piilani Residential Community, Phase II (listed above).

TABLE 1

Summary of Midden Recovered at Site 3529, TU #1

Depth in cmbs	0-10	10-20	20-30	30-40	40-50	50-60	TOTAL
Cypraea sp.	-	-	6.0	39.5	2.5	0.5	48.5
Conus sp.	-	-	2.7	5.3	0.9	-	8.9
Isognomon sp.	-	0.1	1.5	10.2	0.1	-	11.9
Granula sandwicensis	-	-	0.4	5.0	0.8	-	6.2
Nerita picea	0.3	0.1	31.7	77.0	9.1	0.3	118.5
Planaxis labiosa	-	-	7.1	0.1	-	-	7.2
Turbo sandwicensis	-	-	-	0.4	-	-	0.4
Thaididae	-	-	-	1.5	-	-	1.5
unidentified shell	0.7	1.2	3.5	3.0	1.1	-	9.5
Echinoderm	1.5	0.1	2.1	11.7	14.9	1.1	31.4
Crustacean	-	-	-	2.6	1.2	-	3.8
fish bone	-	-	-	1.3	0.9	0.2	2.4
bird bone	3.3	-	-	3.1	-	-	6.4
unidentified bone	-	-	-	-	2.1	1.7	3.8

Weight in grams

TABLE 2

Summary of Portable Remains Found at Site 3529

PORTABLE REMAINS	UNIT #	DEPTH (cmbs)	GM.	PIECES	L x W x H (mm)
coral	TU #1	10-20	0.3	1	-
unworked basalt flake	TU #1	10-20	6.3	1	-
unworked basalt flakes	TU #1	20-30	1.4	2	-
volcanic glass flakes	TU #1	20-30	8.3	4	10.2 x 6.5 x 3.5 to 20.2 x 16.0 x 11.6
unworked basalt flakes	TU #1	30-40	5.3	5	-
coral abrader	TU #1	30-40	1.2	1	6.7 x 12.8 x 7.2
coral file	TU #1	30-40	0.8	1	22.1 x 7.4 x 6.1
volcanic glass flakes	TU #1	30-40	5.1	10	7.1 x 5.5 x 2.5 to 15.9 x 12.1 x 6.2
incised bone	TU #1	30-40	0.6	1	13.9 x 6.9 x 1.6
coral	TU #1	30-40	26.3	1	-
volcanic glass flakes	TU #1	40-50	4.3	9	8.3 x 6.6 x 1.1 to 14.2 x 7.4 x 3.1
possible utilized basalt flakes	TU #1	40-50	0.4	2	17.0 x 9.5 x 3.0 to 20.5 x 8.8 x 2.5
bone pick	TU #1	40-50	0.2	1	27.7 x 4.4 x 3.7
pencil urchin file	TU #1	40-50	1.5	1	29.0 x 8.8 x 7.9
fish hook shank	ST #5	0-10	0.8	1	31.5 x 8.4 x 10.1

TABLE 3

Summary of Shovel Test Results at Site 3529

Depth in cmbs	Cypraea sp.	Conus sp.	Isognomon sp.	Nerita plicea	Planaxis labiosa	unidentified shell	Crustacean	Echinoderm	unidentified bone
ST 1 (0-10)	-	37.1	-	0.6	-	-	-	1.0	1.9
ST 2 (0-10)	0.5	5.9	0.1	-	-	-	-	2.8	-
ST 3 (0-10)	4.1	3.6	1.0	-	-	-	0.3	0.3	-
ST 3 (10-20)	-	-	-	-	-	-	-	-	-
ST 3 (20-30)	2.3	-	0.1	-	0.1	0.8	0.4	3.7	-
ST 4 (0-10)	14.2	-	0.1	0.1	-	3.1	-	1.2	-
ST 5 (0-10)	2.1	5.2	-	2.6	-	-	-	0.9	-
ST 6 (0-10)	0.8	0.9	0.3	-	-	-	-	-	-
ST 7 (0-10)	-	-	-	1.3	-	0.6	-	-	-
ST 8 (0-10)	-	1.2	-	-	-	-	-	-	-
ST 9 (0-10)	-	0.8	-	-	-	-	-	-	-
ST 10	sterile								
ST 11	sterile								
ST 12	sterile								
ST 13	sterile								
ST 14	sterile								
ST 15	sterile								
ST 16	sterile								
ST 17	sterile								
TOTAL	24.0	54.7	1.6	4.6	0.1	4.5	0.7	9.9	1.9

Weight in grams

TABLE 4

Radiocarbon dates from Kihei sites (Intermediate Zone)
(Beta Analytic, Inc.)

Site number	Location	Radiocarbon Date
50-50-10- 3193[2]	Lokelani Intermediate School (Waiohuli *ahupua'a*) Rock shelter	270 ± 120 RCYBP (AD 1560-1800)
50-50-10-3541[3]	Kama'ole Gulch Rock shelter (Kama'ole *ahupua'a*)	220 ± 60 RCYBP (calibrated results at 2 sigma- AD 1520-1570, 1630-1890 and 1910-1950)
50-50-10-2636[4]	Road "F" Corridor (Kama'ole *ahupua'a*) Open site (hearth remnant)	530 ± 80 RCYBP (calibrated results at 2 sigma- AD 1295-1495)
	Open site (scattered charcoal)	140 ± 60 RCYBP (calibrated results at 2 sigma- AD 1650-1950)

[2]Fredericksen, et. al, September 1993.
[3]Fredericksen, et. al., June 1994.
[4]Fredericksen, et. al., November, 1994.

APPENDIX A

Soil Profile Descriptions for TU #1, Site 3529

Layer I: Reddish brown (5 YR 4/3); sandy clay; slightly stony (common subangular pebbles and cobbles of basalt); apedal to very weakly developed subangular blocky structure; fine to medium texture; loose to soft, dry consistency; common live rootlets; contains small amounts of midden and some charcoal flecking (likely due to relatively recent brush fires); Layer I is c. 20 cm. thick in TU #1.

Layer II: Dark brown (7.5 YR 3/4); sandy clay; moderately stony (many subangular pebbles and cobbles of basalt); very weakly developed subangular blocky structure; fine to medium texture; soft, dry consistency; common live rootlets and dead woody roots present; contains common midden - especially in the lower 5 cm. of Layer II and small amounts of charcoal flecking. Layer II is c. 10 cm. thick in TU #1(i.e. c. 20 to 30 cmbs).

Layer III: Very dark grayish brown to dark brown (10 YR 3/2 to 3/3); sandy clay; moderately stony (many subangular pebbles and cobbles of basalt; weakly developed subangular blocky structure; fine to medium texture; soft, dry consistency; some live rootlets and dead woody roots present; contains quantities of midden, some artifacts, a few firecracked rocks, charcoal staining, and small amounts of charcoal flecking. Layer III is c. 20 cm. thick in TU #1 (i.e. c. 30 to 50 cmbs).

Layer IV: Dark yellowish brown (10 YR 3/4); sandy clay; moderately stony (many subangular pebbles and cobbles of basalt and decayed bedrock); weakly developed subangular blocky structure; fine texture; soft, dry consistency; few dead rootlets and dead woody roots present; contains small amounts of midden, appears to grade to sterile beyond excavation bottom. Layer IV is at least 10 cm. thick in TU #1 (i.e. c. 50 to 60 cmbs).

Soil Profile Descriptions for STs #2, and #4 to #17, Site 3529

Layer I: Reddish brown (5 YR 5/4) sandy clay; moderately stony (many subangular pebbles and cobbles of basalt and decayed bedrock); weakly developed subangular blocky structure; fine texture; soft to slightly hard,

dry consistency; common live rootlets and few dead woody roots present; contains charcoal staining from recent brush fires and, when present, small amounts of midden. Layer I is typically less than 15 cm. thick in tested areas.

Layer II: Dark yellowish brown (10 YR 4/6); sandy clay; very stony (abundant subangular pebbles and cobbles of decayed bedrock; weakly developed subangular blocky structure; fine texture; slightly hard, dry consistency; some live rootlets present; sterile in tested areas. Layer II subsoil was generally less than 10 cm. thick in tested areas.

BOTANICAL SURVEY

by

David Paul, B. A.

Introduction

A botanical survey was conducted by David Paul, B. A. (ethnobotanist and botanical consultant to Xamanek Researches) on May 21 and 22, 1994. The survey covered a 150 foot wide strip of land identified as Road "C" Corridor, running from South Kihei Road to Pi'ilani Highway, located on TMK: 3-9-2: por 109; and 2-2-02: por. 66 and 67 in Kihei, Maui, Hawai'i.

The purpose of this study is to describe the vegetation existing on the land and identify ecologically significant plants and biological communities which may be impacted by the project planned for the area. Careful consideration was taken in the search for rare and endangered species which are protected by law and might require mitigation.

Methods

The study was initiated by searching literature to point out any plant species which are listed as threatened or endangered by the U.S. Fish and Wildlife Service that might occur within the region. Those listed plants are protected by Federal and State law. Updated lists of threatened and endangered species were researched as prepared by the USFWS, Pacific Islands Office, Honolulu, HI. (March 28, 1994) and the plants geographical ranges were determined from the "Manual of the Flowering Plants of Hawai'i" (Wagner, et al. 1990).

The survey was executed by walking the perimeters of the proposed roadway, going up and down it's central area, and meandering through it. All species of vascular plants which were encountered, were recorded. The plant community was matched up with a general vegetation type, as provided by Gagne and Cuddihy (1990). Nomenclature for flowering plants follow Wagner, et al. (1990). Nomenclature for ferns and their allies follow Neal (1965).

Results

Vegetation Type- There are three distinct communities found along the survey area.

Disturbance communities are found along the dirt road on the lower *(makai)* side of the survey area, and at the top of the survey area which meets at the Pi'ilani Highway and Lipoa Road intersection, adjacent to and including a drainage ditch there *(mauka)*.

A "Coastal Wet Herbland" (Gagne & Cuddihy, 1990) community flanks both sides of the dirt road on the lower (makai) side of the survey area. This area also includes a U.S. Fish and Wildlife Service, "Wetland Sanctuary" which is divided by the dirt road on the proposed roadway.

A "Coastal Dry Forest" (Gagne & Cuddihy, 1990) community covers the majority of the survey area. This community begins immediately above *(mauka)* the disturbance and wetland communities on the lower *(makai)* side of the survey area.

The disturbance community is composed mostly of alien species, including khaki weed (Alternanthera pungens), *pakai kuku* (Amaranthus spinosus), cow pea (Macroptilium lathyroides), and spurges (Chamaesyce spp.). There were a number of coastal indigenous species found too, because of the saline conditions there, especially in the lower (makai) side of the survey area. These include *'ilie'e* (Plumbago zeylanica), *nena* (Heliotropium currassavicum), and *'ihi* (Portulaca lutea). Of interest is an alien species known as tansy mustard (Descurainia sophia) which was found in the disturbance community by the Pi'ilani Highway and Lipoa Road intersection. This plant has previously only been found at higher altitudes on Haleakala, Maui and along Saddle Road on the island of Hawai'i (Wagner, et al. 1990).

The wetland community is dominated by pickleweed (Batis maritima), Indian fleabane (Pluchea indica), and other species which are "Regional Indicator" species of wetland habitats (Reed, 1988). This area also includes indigenous species such as *'akulikuli* (Sesuvium portulacastrum), *pohuehue* (Ipomoea pes-caprae), and *nena* (Heliotropium currassavicum).

The dry forest community is dominated by buffelgrass (Cenchrus ciliaris), which is estimated to cover more than 90% of the ground in that community. There is a dwindling canopy of *kiawe* (Prosopis pallida) across this area which suffers from occasional brush fires and cutting for firewood. *Koa haole* (Leucaena leucocephala) and slender mimosa (Desmanthus virgatus) are found scattered across this community, as well as two indigenous species, which are *'ilima* (Sida fallax) and *'uhaloa* (Waltheria indica).

There were no ferns or fern allies found in the survey area at the time of the survey. The species found represent some of the species normally associated with the communities found there. The number of species may change over time due to succession and climatic differences.

Rare or Endangered Plants- No plants which are listed as threatened or endangered by the U.S. Fish and Wildlife Service were found on the property. All of the communities found in the survey area contained either alien or indigenous plant species. No plants which are specifically found in Hawai'i (endemic) were found at the time of the survey.

Ophioglossum concinnum is an endangered species of fern which is found in lowland sandy soils. An Ophioglossum species was found in 1989 in Kihei, Maui, growing abundantly in sandy soil at the base of buffelgrass tufts (Fredericksen, et al. 1990). On May 22, 1994, an extensive search was made through the buffelgrass in the survey area for Ophioglossum species. No Ophioglossum species or any other ferns were found in the survey area.

Discussion and Recommendation

Biological Resource Value of the Vegetation- For the purpose of this report, alien dominated plant communities are considered to have no biological resource value. Plants and communities that are considered to have value are, 1) rare and endangered native plant species, and 2) native plant dominated communities. Plant communities are especially valuble when they contain a variety of plant species found nowhere else.

No legally protected threatened or endangered species were found in the survey area. Endemic plant species which are specific to the State of Hawai'i were not found either. The existing plant communities are dominated by alien species. Native plants which are located in the survey area are indigenous and are commonly found in the State of Hawai'i, and elsewhere in the world.

Recommendations- No plant species which was observed on this study requires priority for legal protection or conservation. Therefore, the actions of the proposed project will not impact any plant species with significant biological resource value. However, the wetland community found at the lower *(makai)* side of the project area provides significant biological resource value for animal life. Although there were no plants found in the wetland community (within the survey area) which require legal protection, the habitat is utilized by rare bird species. The impact of the proposed roadway on this habitat should be considered before undertaking the project.

Species List

Key- Botanical Name - comprised of the Genus and species of a plant as depicted by Western binomial

nomenclature.
Common Name - comprised of Hawaiian or local common terms.

Status - *E = endemic, specific to the immediate area.

I = indigenous, specific to a geographical region.

*P = Polynesian, introduced to Hawai'i prior to 1778.

A = alien, introduced into historical Hawai'i.

* Note, there were no endemic or Polynesian plants found in the survey area.

The following list is comprised of the plant species which were found during the botanical survey conducted on the 21st and 22nd of May, 1994.

Botanical Name	Common Name	Status
Class MAGNOLIOPSIDA	Dicots	
AIZOACEAE	Carpetweed family	
Sesuvium portulacastrum	*'akulikuli*	I
AMARANTHACEAE	Amaranth family	
Alternanthera pungens	khaki weed	A
Amaranthus spinosus	*pakai kuku*	A
ANACARDIACEAE	Mango family	
Schinus terebinthifolius	Christmas berry	A
ASTERACEAE	Sunflower family	
Bidens pilosa	*ki nehe*	A
Pluchea fosbergii	-	A
Pluchea indica	Indian fleabane	A
Pluchea symphytifolia	sourbush	A
Sonchus oleraceus	*pualele*	A
Tridax procumbens	coat buttons	A
Verbesina encelioides	golden crown beard	A
Xanthium strumarium	*kikania*	A

BATACEAE	Saltwort family	
Batis maritima	pickleweed	A
BORAGINACEAE	Borage family	
Heliotropium currasavicum	*nena*	I
BRASSICACEAE	Cabbage family	
Descurainia sophia	tansy mustard	A
CHENOPODIACEAE	Goosefoot family	
Atriplex suberecta	saltbush	A
Chenopodium murale	*'aheahea*	A
CONVULVULACEAE	Morning Glory family	
Ipomoea pes-caprae	*pohuehue*	I
Ipomoea triloba	little bell	A
Merremia aegyptia	*koali kua hulu*	I
CUCURBITACEAE	Cucumber family	
Cucumis dipsaceus	teasel gourd	A
EUPHORBIACEAE	Poinsettia family	
Chamaesyce hirta	garden spurge	A
Chamaesyce hypericifolia	graceful spurge	A
Chamaesyce prostrata	prostrate spurge	A
Euphobia heterophylla	*kaliko*	A
Ricinus communis	castor bean	
AFABACEAE	Bean family	
Crotalaria pallida	smooth rattlepod	A
Desmanthus virgatus	slender mimosa	A

Desmodium tortuosum	Florida beggarweed	A
Indigofera suffruticosa	indigo	A
Leucaena leucocephala	*koa haole*	A
Macroptilium atropurpureum	wild bean	A
Macroptilium lathyroides	cow pea	A
Prosopis pallida	*kiawe*	A
MALVACEAE	Hibiscus family	
Abutilon grandifolium	false *'ilima*	A
Malva parviflora	cheese weed	A
Malvastrum coromandellianum	false mallow	A
Sida fallax	*'ilima*	I
Sida rhombifolia	false *'ilima*	A
NYCTAGINACEAE	Four-o'clock family	
Boerhavia coccinea	false *alena*	A
PLUMBAGINACEAE	Leadwort family	
Plumbago zeylanica	*'ilie'e*	I
PORTULACACEAE	Purselane family	
Portulaca lutea	*'ihi*	I
SOLANACEAE	Potato family	
Nicandra physalodes	apple of Peru	A
Nicotianna glauca	tree tobacco	A
Solanum americanum	*popolo*	I
STERCULIACEAE	Chocolate family	
Waltheria indica	*'uhaloa*	I
ZYGOPHYLLACEAE	Creosote bush family	
Tribulus terrestris	puncture vine	A
Class LILOPSIDA	Monocots	

CYPERACEAE	Sedge family	
Cyperus rotundus	nut sedge	A
POACEAE	Grass family	
Cenchrus ciliaris	buffelgrass	A
Chloris barbata	fingergrass	A
Cynodon dactylon	manienie	A
Eragrostis pectinacea	Carolina lovegrass	A
Panicum maximum	Guinea grass	A

References

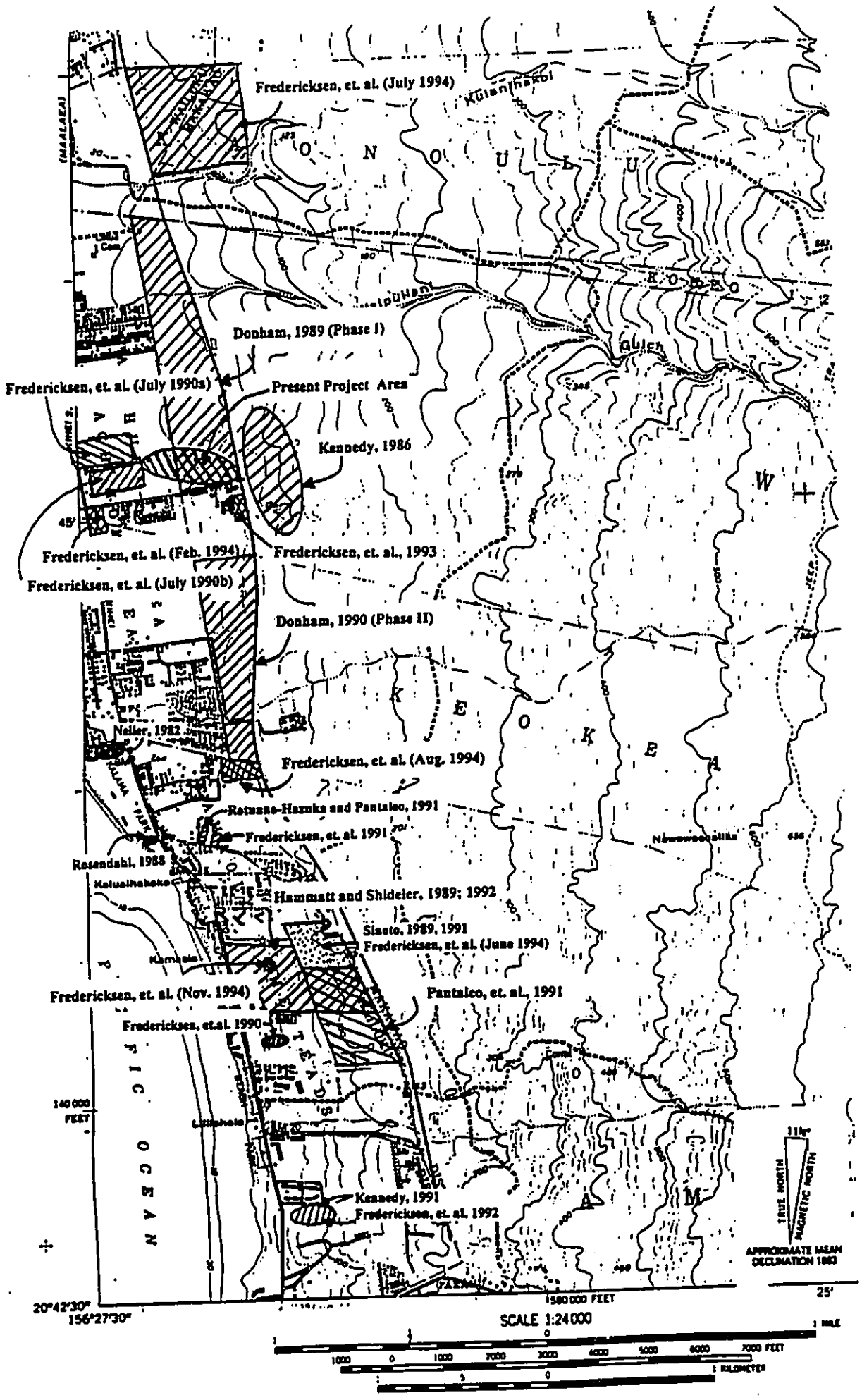
Gagne, W.C. & Cuddihy, L.W. 1990. "Vegetation". in Wagner, et al. Eds. "Manual of the Flowering Plants of Hawai'i". University of Hawaii Press. Honolulu, HI. pp.45-114.

Neal, M.C. 1965. "In Gardens of Hawai'i". Bishop Museum Press. Honolulu, HI. 924p.

Reed, P.B., Jr. 1988. "National List of Plant Species that Occur in Wetlands: Hawaii (Region H)". USFWS Biological Report 88(26.13). 88p.

U.S. Fish and Wildlife Service. 1994. "Hawaiian Islands Listed, Proposed or Candidate Species Under the U.S. Endangered Species Act. Updated: March 28, 1994". USFWS, Pacific Islands Office. H Honolulu, HI. 11p.

Wagner, W.L., Herbst, D.R. & Sohmer, S.H. 1990. "Manual of the Flowering Plants of Hawai'i". University of Hawaii Press. Honolulu, HI. 2 vol. 1853p.



Map 4 - Map showing locations of other archaeological work in general vicinity of current inventory survey.

Photo 1: General view of proposed Road "C" Corridor towards Longs Drug and Azeka's II developments. View to the west or *makai*. Note wetlands habitat in background.

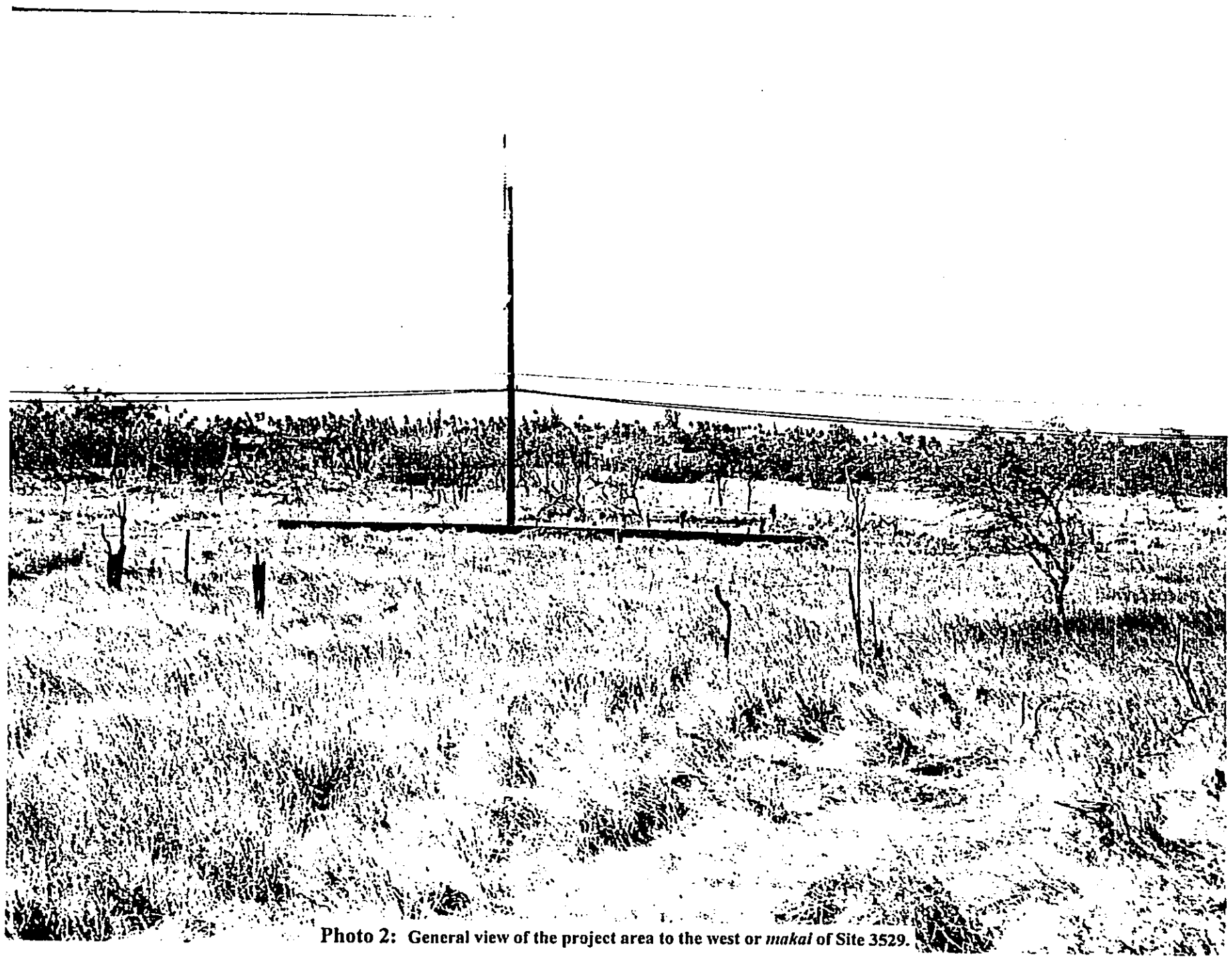


Photo 2: General view of the project area to the west or *makai* of Site 3529.

Photo 3: General view of the project area to the southeast of Site 3529. Note Silversword Golf Course and Kihei Elementary and Lokelani Intermediate School in background.

Photo 4: General view of Site 3529 rock shelter including location of Test Unit #1. View to the southeast.

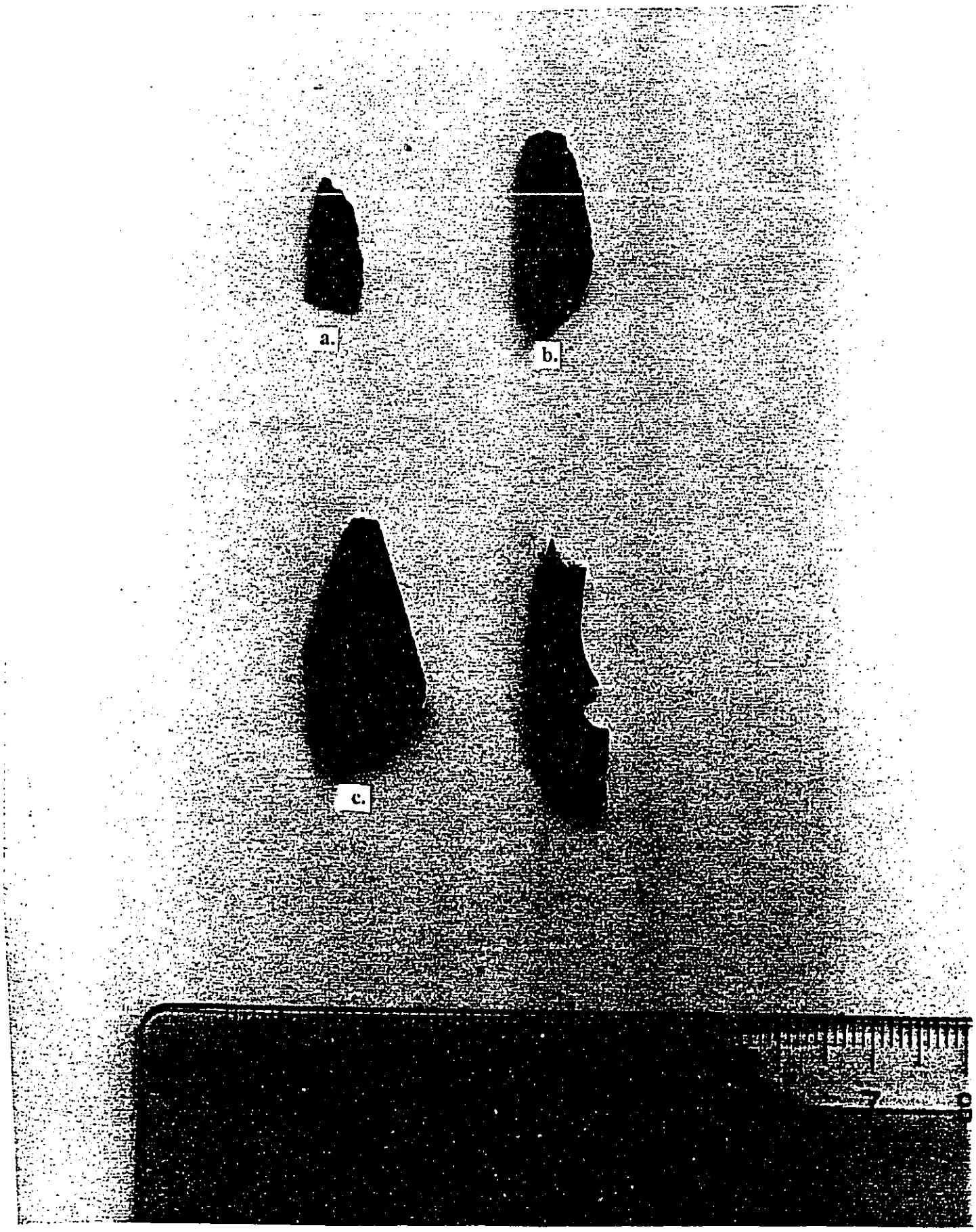


Photo 5: Indigenous artifacts located in Test Unit #1 - 30 to 40 cmbs (a. Incised bone, b. Coral file and c. Coral abrader) and in Shovel Test #5 - 0 to 10 cmbs (Bone fish hook shank)

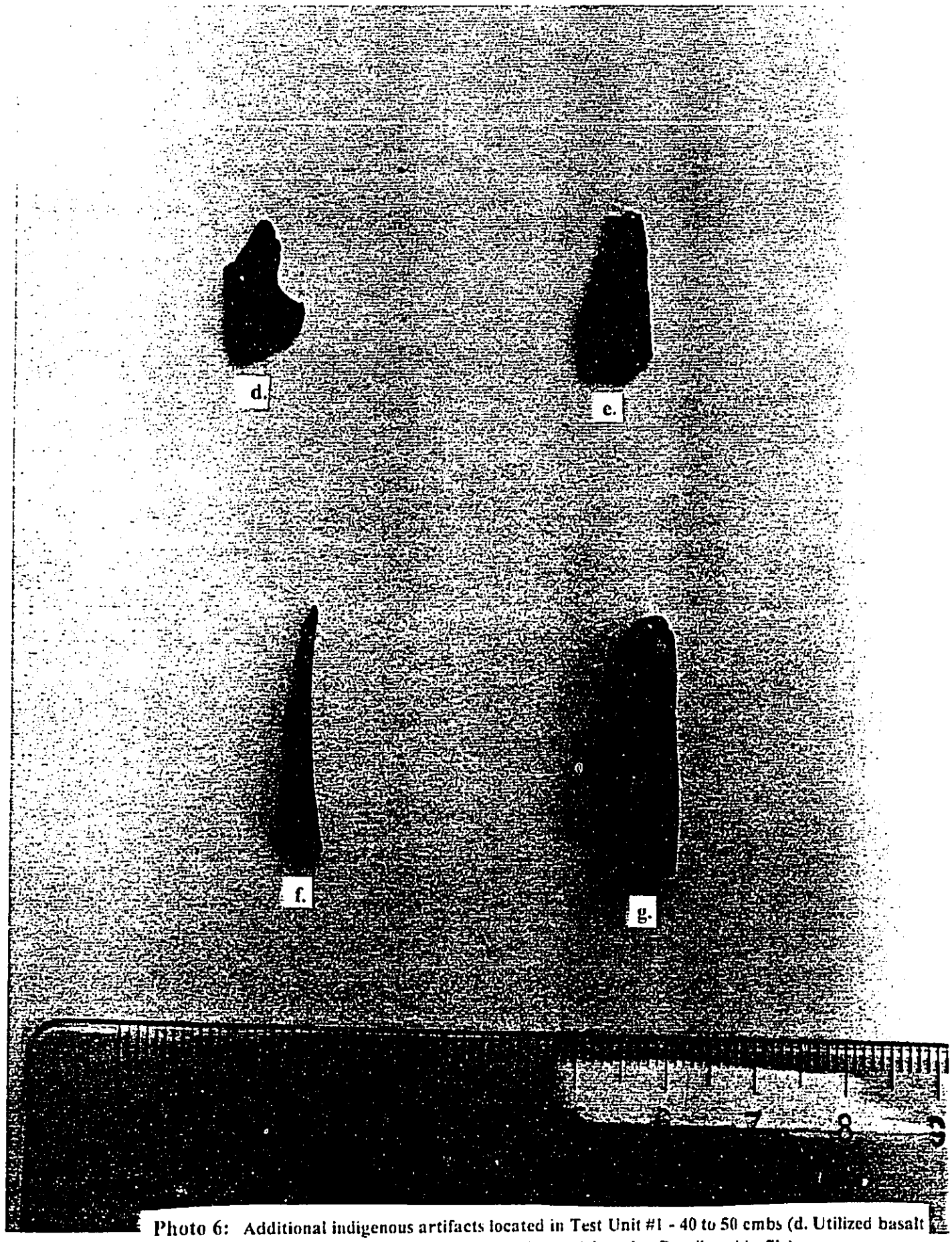


Photo 6: Additional indigenous artifacts located in Test Unit #1 - 40 to 50 cmbs (d. Utilized basalt flake, e. Utilized basalt flake, f. Fish bone pick and g. Pencil urchin file).

E

Letter of Authorization

PIILANI VILLAGE
A Baldwin • Malama Community

The Planned Neighborhood in Kihei

June 3, 1997

Mr. David Goode
Deputy Director
Dept. of Public Works and Waste Management
County of Maui
250 South High Street
Wailuku, Hawaii 96793

SUBJECT: Environmental Assessment and
Applications for Special Management Area Use Permit and
Project District Phase II Approval

Dear Mr. Goode:

We hereby authorize the County of Maui, to prepare and file an Environmental Assessment and process applications for: 1) a Special Management Area Use Permit and 2) for Project District Phase II Approval, for the proposed county park at the north-west corner of Piilani Highway and Lipoa Street in Kihei, which property is currently owned by Baldwin * Malama (TMK: 2-2-2:66,67). These applications shall be processed at no cost to Baldwin * Malama. This authorization shall not be deemed to be an agreement by Baldwin * Malama to dedicate or otherwise convey any of its property to the County of Maui, it being understood that the terms and conditions of any conveyance must be set forth in a separate agreement between the parties.

Very truly yours,

BALDWIN * MALAMA
By Malama Development Corp.
Its General Partner

Robert G. Diffley
President

RGD:ch

c: Dennis Reid (Wiliki Management Co.)
bc: David Hulse (PBR Hawaii)

915 Fort Street, Suite 702
Honolulu, HI 96813
Phone (808) 539-7175
Fax (808) 539-7176

F

Agency/Public Comments and Responses

COMMENT LETTER HISTORY REGARDING DRAFT ENVIRONMENTAL ASSESSMENT FOR KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX DRAFT ENVIRONMENTAL ASSESSMENT

Checklist of Responses, Effective: July 30, 1997

	AGENCY	DEA MAIL DATE	COMMENTS DATE	RESPONSE DATE
	STATE			
1	Office of Environmental Quality Control	6/23/97	6/25/97	7/25/97
2	Dept. of Accounting and General Svcs.	6/23/97		
3	Dept. of Agriculture	6/23/97		
4	Dept. of Business, Econ. Dev. and Tourism	6/23/97	7/1/97	7/25/97
5	Dept. of Business, Econ. Dev. and Tourism (Energy Office	6/23/97		
6	Dept. of Business, Econ. Dev. & Tourism (Land Use Comn	6/23/97	6/30/97	7/25/97
7	Dept. of Transportation	6/23/97		
8	Dept. of Education	6/23/97	7/15/97	7/28/97
9	Dept. of Hawaiian Home Lands	6/23/97		
10	Dept. of Health (Environmental)	6/23/97		
11	Dept. of Land & Natural Resources (Preservation)	6/23/97		
12	Dept. of Land & Natural Resources	6/23/97		
13	State Planning Office	6/23/97		
14	State Dept. of Public Works	6/23/97	7/11/97	7/25/97
15	Dept. of Transportation	6/23/97		
16	Office of Hawaiian Affairs	6/23/97	7/8/97	7/25/97
17	State Dept. of Defense - Civil Defense	6/23/97	7/14/97	7/25/97
18	University of Hawaii - Environmental Center	6/23/97		
19	University of Hawaii - Water Resources	6/23/97		
	FEDERAL			
20	US Army Corps of Engineers	6/23/97	7/10/97	7/25/97
21	Dept. of Agriculture	6/23/97	7/14/97	7/25/97
21	Department of the Interior (National Park Service)	6/23/97		
23	Dept. of the Interior Fish and Wildlife	6/23/97		
24	National Marine Fisheries Service	6/23/97		
25	Department of Transportation (FAA)	6/23/97	7/2/97	7/28/97
26	Federal Emergency Management Agency	6/23/97		
	ELECTED OFFICIALS			
27	Linda Lingle	6/23/97		
	NON-GOVERNMENTAL AGENCIES/INDIVIDUALS			
28	Mr. Greg Kauwe		7/14/97	7/28/97
29	Ms. Debra Sutton		7/15/97	7/25/97
30	Ms. Rochelle Fletcher		7/10/97	7/30/97
31	Mr. Mychael Patrick			7/30/97
32	Kihei Public Library	6/23/97		
33	GTE Hawaiian Telephone	6/23/97		
34	American Lung Association	6/23/97		
35	Maui Electric Company	6/23/97		
	COUNTY OF MAUI			
36	Police Department	6/23/97	7/21/97	7/25/97
37	Board of Water Supply	6/23/97		
38	Dept. of Parks and Recreation	6/23/97	7/11/97	7/24/97
39	Dept. of Public Works	6/23/97		
40	Planning Department	6/23/97	7/22/97	7/25/97
41	Economic Development Agency	6/23/97		

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
FACSIMILE (808) 586-4186

GARY GILL
DIRECTOR

PBR HAWAII
RECEIVED
JUN 27 1997
Project
Project No.

June 25, 1997

Henry Oliva
Department of Parks & Recreation
1580-C Kaahumanu Avenue
Wailuku HI 96793

Attn: David Goode

Dear Mr. Oliva:

RE: Draft Environmental Assessment (EA) for Kihei Community Center and Swimming Pool Complex

Please notify interested community groups, the nearest neighbors or neighboring landowners of the proposed project and document all contacts. In the final EA include copies of any correspondence with citizen groups or state and county agencies.

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

Sincerely,

Gary Gill
Director

c: David Hulse

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

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

Dear Mr. Gill:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments on June 30, 1997, regarding the above-mentioned subject.

In accordance with the County of Maui's Special Management Area and Project District permit processing requirements, the applicant will notify all landowners within 500 feet of the proposed project. In addition, a thorough public review process will be implemented to inform the public of the proposed action. All correspondence with citizen groups or state and county agencies will be included in the Final Environmental Assessment.

Sincerely,

HENRY OLIVA
Director

DR:HO:lc

s:\letters\heccrgill

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

BENJAMIN J. CAYETANO
GOVERNOR
SELRF. MAYA
DIRECTOR
BRADLEY J. MOSSMAN
DEPUTY DIRECTOR
RICK EGGED
DIRECTOR, OFFICE OF PLANNING

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

Ref. No. P-6777

July 1, 1997

Mr. Henry Oliva
Department of Parks and Recreation
County of Maui
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793

Dear Mr. Oliva:

Subject: Draft Environmental Assessment for the Kihei Community Center and Swimming Pool Complex, Makawao, Maui

We have reviewed the draft environmental assessment for the proposed project and do not have any comments to offer at this time relative to our plans and programs.

If there are any questions, please contact Howard Fujimoto of our Coastal Zone Management Program at 587-2898.

Sincerely,

Mary Lou Kobayashi for
Rick Egged
Director
Office of Planning

cc: Sato and Associates, Inc.
PBR Hawaii
Office of Environmental Quality Control
Planning Department, County of Maui

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Mr. Rick Egged, Director
Office of Planning
P. O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Egged:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of July 1, 1997, regarding the above-mentioned subject and for participation in the environmental review process.

Sincerely,

HENRY OLIVA
Director

BENJAMIN J. CAYETANO
GOVERNOR

ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
PO Box 2359
Honolulu, HI 96804-2359
Telephone 808-587-3822
Fax: 808-587-3827

PBR HAWAII
RECEIVED
JUL 2 1997
Project
Project No.

June 30, 1997

Mr. Henry Oliva
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793

Dear Mr. Oliva:

Subject: Draft Environmental Assessment (DEA) for the Kihei Community Center and Swimming Pool Complex, Kihei, Maui, TMK 2-2-02: por. 66 and por. 67

We have reviewed the DEA for the subject project and confirm that the project site, as represented on Figure 3, is located within the State Land Use Urban District.

For your information, the project site constitutes a portion of the area reclassified in LUC Docket No. A82-536/Haleakala Ranch Company. Said docket reclassified approximately 189.7 acres of land from the Agricultural District to the Urban District for a planned residential project to include single-family and multi-family residential units, a commercial center, a park, and areas for a landscape buffer and open space.

We have no further comments to offer at this time. We appreciate the opportunity to comment on the subject DEA.

Should you have any questions, please feel free to call me or Bert Saruwatari of our office at 587-3822.

Sincerely,

ESTHER UEDA
Executive Officer

EU:th

cc: Loren Lau
David Hulse
OEQC

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Ms. Ester Ueda, Executive Officer
Land Use Commission
P. O. Box 2359
Honolulu, Hawaii 96804

Dear Ms. Ueda:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of June 30, 1997, regarding the above-mentioned subject and for participation in the environmental review process.

Sincerely,

HENRY OLIVA
Director

s:\wp\eoeduda(lc)

BENJAMIN J. CAYETANO
GOVERNOR

HERMAN M. AIZAWA, Ph.D.
SUPERINTENDENT

FACILITIES BRANCH
JUL 23 2 18 PM '97

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

FACILITIES COPY
JUL 2 8 1997
Project No.
ant 7/22/97

July 15, 1997

Mr. Henry Oliva
Department of Parks and Recreation
County of Maui
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793

Dear Mr. Oliva:

Subject: Kihei Community Center/Swimming Pool Complex Draft EA

The Department of Education has reviewed the subject Draft EA and has the following comments:

1. We agree that the proposed facilities can increase recreational opportunities for students at Kihei Elementary, Lokelani Intermediate, and Kamalii Elementary Schools. We would like to be able to use the complex for swimming instruction through agreement with the Department of Parks and Recreation.

2. The proposed project and the proposed Road "C"/North-South Collector Road project will significantly affect access to Kihei Elementary and Lokelani Intermediate Schools. Although these are separate projects, it would be helpful if the Final EA could include in its analysis the major improvements to be made in the vicinity of the proposed complex as part of the Road "C" project.

For example, it is our understanding that there will be a new entrance off Lipoa Street into Kihei Elementary School. However, the recommended traffic plan shown in Figure 9 (Page 25) of Appendix B does not reflect this new entrance. The extent to which this school entrance will affect the complex's overall traffic pattern should be discussed..

3. We do not agree that students will access the proposed complex by crossing Lipoa Street at Drive A as stated in the Traffic Impact Analysis Report (Appendix B).

   Crossing at this point would require a new gate into the school property and would result in students crossing Lipoa Street at mid-block at a distance of approximately 275 feet from where vehicles exit Piilani Highway. Rather, the preferred crossing point would be at the North-South Collector Road/Lipoa Street intersection.

   Therefore, the traffic signal warrant analysis should be re-evaluated to consider the effect of the students crossing at this intersection rather than at Drive A. In the interest of safety, it is our recommendation that a signal be installed.

Thank you for the opportunity to comment. If you have any questions, please call Mr. Sanford Beppu at 733-4862.

Sincerely,

Herman M. Aizawa, Ph.D.
Superintendent

HMA:hyo

cc: A. Suga, OBS
R. Murakami, MDO
Principals, Kihei, Lokelani, & Kamalii
Sato and Associates, Inc.
PBR HAWAII ✓
OEQC

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 28, 1997

Dr. Herman Aizawa, Ph.D.
Superintendent
State Department of Education
P. O. Box 2360
Honolulu, Hawaii 96804

Dear Dr. Aizawa:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of July 15, 1997, regarding the above-mentioned subject. We offer the following response to each of your numbered comments.

1. We concur that the proposed facilities are needed and that students will be able to utilize the complex for swimming instruction through agreement with the Department of Parks and Recreation.

2. The Road "C" project is located approximately 500 feet north of the project site. Presently, this facility is planned to be comprised of two 12-foot travel lanes within a 60-foot right-of-way. Near the approach to the proposed North-South Collector Road, there is a right turn lane, a through lane, and a left turn lane. Between the North-South Collector Road and Piilani Highway, the right-of-way width for Road "C" ranges from 80 to 92 feet. Near the intersection with Piilani Highway, Road "C" contains a left turn land and a right turn lane. Please see Figure 1 attached copied from the *"Draft Environmental Assessment Road "C" and North-South Collector Road Segment."*

   The new entrance off Lipoa Street into Kihei Elementary School is not part of this project, but will be installed by the County of Maui as part of the planned improvements to Lipoa Street. Based on the relatively low number of trips to be generated by the proposed project, the traffic patterns associated with the school entrance will not significantly affect the complex's overall traffic pattern.

3. The location of the mid-block crossing referenced in your comments has been reevaluated by the traffic consultant and will be tentatively planned for relocation to the future North-South Collector Road/Lipoa Street intersection as recommended in your comments. This intersection will likely be signalized in the future as warranted and will be designed to facilitate pedestrian crossings as recommended by your comments.

Thank you once again for participating in the environmental review process.

Sincerely,

HENRY OLIVA
Director

Attachment

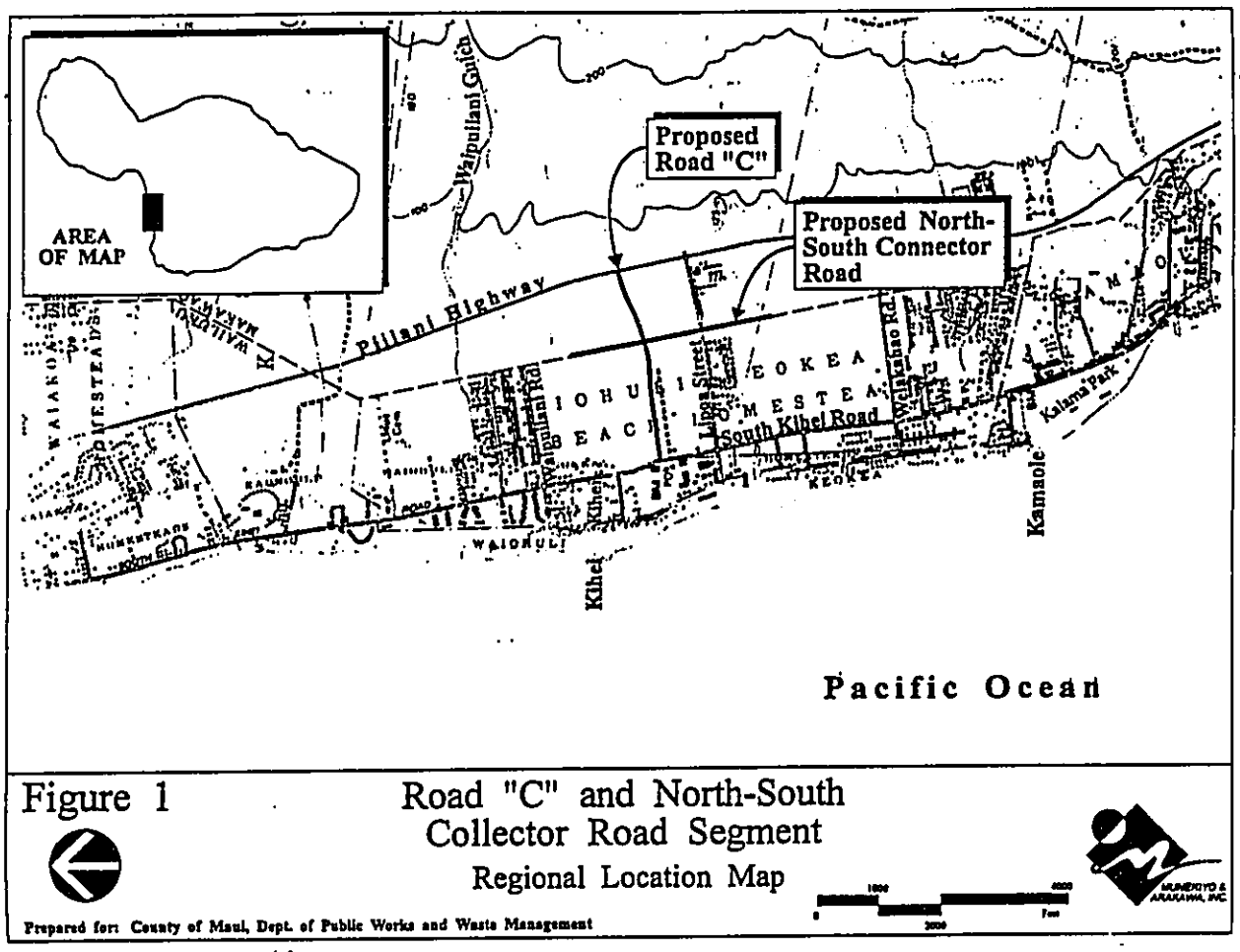


Figure 1

Road "C" and North-South
Collector Road Segment
Regional Location Map

Prepared for: County of Maui, Dept. of Public Works and Waste Management

JUL 11 1997

County of Maui
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793

Attention: Mr. Henry Oliva

Gentlemen:

Subject: Kihei Community Center and Swimming
Pool Complex, Makawao, Maui
TMK 2-2-2:66(por) and 67(por)
Draft Environmental Assessment

Thank you for the opportunity to review the subject document.
We have no comments to offer.

If there are any questions, please have your staff contact
Mr. Ronald Ching of the Planning Branch at 586-0490

Sincerely,

GORDON MATSUOKA
State Public Works Engineer

RC:jy
c: Sato & Associates, Inc.
/PBR Hawaii
OEQC

s:\ehkihalocmatsuoka(1c)

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Mr. Gordon Matsuoka
State Public Works Engineer
Department of Accounting and General Services
Public Works Division
P. O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Matsuoka:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of July 11, 1997, regarding the above-mentioned subject and for participation in the environmental review process.

Sincerely,

HENRY OLIVA
Director

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

July 08, 1997

Mr. David Hulse
PBR Hawaii
1001 Bishop Street,
Pacific Tower, Suite 650
Honolulu, HI 96813-3429

Subject: Draft Environmental Assessment (DEA) for the Kihei Community-Center and Swimming Pool Complex, Island of Maui.

Dear Mr. Hulse:

Thank you for the opportunity to review the Draft Environmental Assessment (DEA) for the Kihei Community Center and Swimming Pool Complex, Island of Maui. The County of Maui proposes to construct a local community center and a swimming pool complex on nine acres of idle land owned by Malama*Baldwin.

The Office of Hawaiian Affairs (OHA) has no objections at this time to the proposed development. The proposed community center and related facilities apparently bear no significant long-term adverse impacts upon nearby urban areas nor increase water usage and wastewater disposal. No unique or endangered species live in the area and no evidences of historic sites are found. Furthermore, the development will neither significantly affect nearby scenic resources nor air quality.

Please contact Lynn Lee, Acting Officer of the Land and Natural Resources Division, or Luis A. Manrique, should you have any questions on this matter.

Sincerely yours,

Sesnita Moepono
Acting Administrator

LM:lm
cc Trustee Clayton Hee, Board Chair
Trustee Abraham Aiona, Board Vice-Chair
Trustee Rowena Akana, Land & Sovereignty Chair
Trustee Haunani Apoliona
Trustee Billie Beamer
Trustee Frenchy DeSoto
Trustee Moses Keale
Trustee Colette Machado
Trustee Hannah Springer
CAC, Island of Maui
Randal Ogata

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Ms. Sesnita Moepono
Acting Administrator
Office of Hawaiian Affairs
711 Kapi'olani Boulevard, Suite 500
Honolulu, Hawaii 96813

Dear Ms. Moepono:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of July 8, 1997, regarding the above-mentioned subject.

We concur that the proposed project will not significantly increase water usage and wastewater disposal, impact unique or endangered species, and no evidence of historic sites were found. Scenic resources and air quality will also not be significantly impacted.

Once again, thank you for participating in the environmental review process.

Sincerely,

HENRY OLIVA
Director

[illegible]

BENJAMIN J. CAYETANO
GOVERNOR

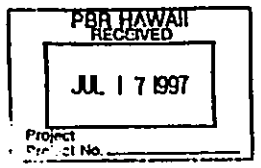
MAJOR GENERAL EDWARD V. RICHARDSON
DIRECTOR OF CIVIL DEFENSE

ROY C. PRICE, SR.
VICE DIRECTOR OF CIVIL DEFENSE

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

PHONE NO. [illegible]
FAX NO. [illegible]

July 14, 1997



Mr. Henry Oliva
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96753

Dear Mr. Oliva:

KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX;
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

State Civil Defense (SCD) appreciates this opportunity to comment on the County of Maui, Department of Parks and Recreation, DEA for the Kihei Community Center and Swimming Pool Complex, located in Kihei, Island of Maui, Hawaii; Tax Map Key (TMK): 2-2-02:por. 66 and por. 67.

State Civil Defense (SCD) does not have any negative comments specifically directed at this Environmental Impact Statement (EIS) and must point out the importance of this facility if it could serve a secondary function and be designed as a public shelter for natural and man-made disasters. SCD also requests that the developer purchase and install one 121 Dbc solar powered outdoor warning siren and siren support infrastructure to alert residents of an impending or actual event that threatens the area. These sirens must be compatible with the existing statewide civil defense siren system. The siren to be installed must be operational before the opening of this complex. This siren requires a minimum 250-feet radius buffer zone in which there are no residential structures. The siren location is annotated in red on the attached Exhibit C, Site Map.

The potential use and handling of <u>any hazardous materials</u> (i.e., pool chlorine) associated with this project before, during and after construction, as well as during operation, should be addressed in this assessment.

The Uniform Building Code will not completely mitigate the potential impact of destructive winds of tropical cyclones on structures. The Uniform Building Code will not require that the building's envelope (i.e., glazing, doors, etc.) be designed to resist destruction by flying debris.

It is recommended that the paragraph on "<u>Impacts and Mitigation Measures</u>" be revised, taking into consideration the above statement.

Just as parks, schools, fire hydrants, underground/overhead utilities, sidewalks and streets are planned as integral parts of planned developments,

an emergency warning and alerting system must be planned by the developer for the safety and well-being of the residents of this project.

Our SCD planners and technicians are available to discuss this further if there is a requirement. Please have your staff call Mr. Norman Ogasawara of my staff at 733-4300.

Sincerely,

ROY C. PRICE, SR.
Vice Director of Civil Defense

Attachment

NO:jnt
bc: Mr. George Burnett
Mr. Larry Kanda
State Radio Shop
Maui Civil Defense Agency

Sato and Associates, Inc.
2046 South King Street
Honolulu, Hawaii 96826
Attn: Loren Lau

Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

✓*PBR HAWAII*
Pacific Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813
Attn: David Hulse

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Mr. Roy Price, Sr.
Vice Director of Civil Defense
State of Hawaii
Civil Defense Office
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Dear Mr. Price:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of July 14, 1997, regarding the above-mentioned subject. We offer the following response to each of issues raised by your comments.

The proposed facility is being designed as a community center and not as a public shelter in accordance with the County of Maui design criteria established for the project. A community center with public shelter capabilities could require significant modifications to the project as presently envisioned.

All chemicals associated with pool operations will be separated from areas accessible to the public in accordance with all applicable federal, state, and local building codes. Similarly, the Uniform Building Code will be followed to resist destruction by flying debris, although we concur that the Code may not be adequate to mitigate all damage from flying debris during periods of strong winds.

Your recommendation that a 121 Dbc solar powered outdoor warning siren and support infrastructure be included in the project will be considered during the design process. However, at the present time, the funds for the siren have not been allocated for the project.

Thank you for participating in the environmental review process.

Sincerely,

HENRY OLIVA
Director

DR:HO:lc
s:\letters\eaicorps\ea

DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FORT SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

July 10, 1997

Planning and Operations Division

PBR HAWAII
RECEIVED
JUL 11 1997
Project
Project No.

Mr. Henry Oliva
County of Maui
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, Maui 96793

Dear Mr. Oliva:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) for the Kihei Community Center and Swimming Pool Complex, Makawao, Maui (TMK 2-2-2: por. 66 and 67). The following comments are provided in accordance with Corps of Engineers authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

a. Based on the information provided, the project will not involve wetlands or waters of the U.S.; therefore, a DA permit will not be required (970000240).

b. The flood hazard information provided on page 19 of the DEA is correct.

Sincerely,

Paul Mizue, P.E.
Acting Chief, Planning
and Operations Division

Copy Furnished:

Mr. David Hulse
PBR Hawaii
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Mr. Paul Mizue, P.E.
Department of the Army
Pacific Ocean Division
Corps of Engineers
Fort Shafter, Hawaii 96858-5440

Dear Mr. Mizue:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of July 10, 1997, regarding the above-mentioned subject.

We concur that the proposed project will not involve wetlands or water of the U.S. and that a DA permit will not be required. We also acknowledge that the flood hazard information provided on page 19 of the DEA is correct.

Once again, thank you for participating in the environmental review process.

Sincerely,

HENRY OLIVA
Director

s:\letters\oliv\mizue(kc)

United States
Department of
Agriculture

Natural
Resources
Conservation
Service

P.O. Box 50004
Honolulu, HI
96850

USDA

Our People...Our Islands...In Harmony

July 14, 1997

PBR HAWAII
RECEIVED
JUL 15 1997
Project
Project No.

Mr. Henry Oliva
Department of Parks and Recreation
1590-C Kaahuamanu Avenue
Wailuku, Hawaii 96793

Dear Mr. Oliva:

Subject: Draft Environmental Assessment (DEA) - Kihei Community Center and Swimming Pool Complex, Makawao, Maui

We have reviewed the above mentioned document and have no comments to offer at this time.

We thank you for the opportunity to review this document.

Sincerely,

KENNETH M. KANESHIRO
State Conservationist

cc:
Mr. Loren Lau, Sato and Associates, Inc., 2046 S. King Street, Honolulu, HI 96826
Mr. David Hulse, PBR Hawaii, Pacific Tower, Suite 650, 1001 Bishop Street, Honolulu, HI 96813
Mr. Gary Gill, Director, Office of Environmental Quality Control, 235 S. Beretania St., Room 702, Honolulu, HI 96813

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Mr. Kenneth M. Kaneshiro
State Conservationist
United States Department of Agriculture
Natural Resources Conservation Service
P. O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Kaneshiro:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of July 14, 1997, regarding the above-mentioned subject and for participation in the environmental review process.

Sincerely,

HENRY OLIVA
Director

s:\wf\khelcz\kaneshiro(k)

U.S. Department
of Transportation
Federal Aviation
Administration

Western-Pacific Region
Box 50109
Honolulu, HI 96850-4983

PBR HAWAII
RECEIVED
JUL 9 1997
Project
Project No.

July 2, 1997

Mr. Henry Oliva
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793

Dear Mr. Oliva:

Your letter of June 23, 1997, forwarded for review the Draft Environmental Assessment for the County of Maui, Department of Parks and Recreation proposal to construct the Kihei Community Center and Swimming Pool Complex at Kihei, Maui, Hawaii.

The Federal Aviation Administration has no objections or comments on the proposed project.

We appreciate this opportunity to review your proposal. Please contact me at 541-1236, if there are any questions.

Sincerely,

Darice B. N. Young
Realty Contracting Officer, AHNL-54B

cc: Sato and Associates, Inc.
2046 South King Street
Honolulu, Hawaii 96826
Attn: Loren Lau

PBR Hawaii
Pacific Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813
Attn: David Hulse

Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 28, 1997

Ms. Darice B. N. Young
Realty Contracting Officer, AHNL-54B
Federal Aviation Administration
Western-Pacific Region
Box 50109
Honolulu, Hawaii 96850

Dear Ms. Young:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of July 2, 1997, regarding the above-mentioned subject and for participation in the environmental review process.

Sincerely,

HENRY OLIVA
Director

s:\ahl\halcc\young(ct)

July 14, 1997

97 JL 14 P4:30

To whom it may concern,

Enclosed is information related to the Environmental Impact Statement concerning the proposed Kihei community center on Lipoa St.

Sincerely,

Greg. Kauwe

Greg Kauwe
65 Kupalaiki Loop
Kihei, HI 96753

JULY 13, 1997

TO DATE NOTHING HAS BEEN DONE TO ADDRESS POTENTIAL FLOODING TO THE KIHEI KAUHALE NANI SUBDIVISION.

Greg Kauwe

97 JL 14 P4:31

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 28, 1997

Mr. Greg Kauwe
65 Kupalaiki Loop
Kihei, Hawaii 96753

Dear Mr. Kauwe:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your July 14, 1997, comments and attachments of correspondence regarding the above-mentioned subject.

We concur that drainage in the area is a concern and that the proposed design of the Kihei Community Center and Swimming Pool Complex must incorporate appropriate improvements to mitigate existing and future drainage impacts.

A major improvement will be the joint use of a proposed play field to also serve as a detention basin during intense storms. This facility will hold surface water on the property to permit controlled discharge down slope, permit silt to settle on the property within the detention basin, and to permit additional recharge of ground water.

Your concerns have also been transmitted to the Department of Public Works (DPW) for their review and appropriate action. During the DPW review of the grading and construction plans, the DPW will make sure that all applicable State and County regulations regarding drainage improvements and erosion control will be implemented.

Thank you once again for participating in the environmental review process.

Sincerely,

HENRY OLIVA
Director

DR:HO:lc

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Ms. Debra Sutton
425 Kaulana Street
Kahului, Hawaii 96732

Dear Ms. Sutton:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your support and comments of July 15, 1997, regarding the above-mentioned subject and for participation in the environmental review process.

Sincerely,

HENRY OLIVA
Director

Public comment sought on plan Kihei center, poo[l]

WAILUKU — Public comment is being sought on a draft environmental assessment, document that describes the planned Kihei community center and swimming pool complex.

To be constructed on 9 acres at Lipoa Street across from Kihei School, the $7 million project will feature meeting rooms, swimming pools and a soccer field.

The community center will include a main hall with large meeting room, kitchen facilities, restrooms and a public address system.

Two other buildings will contain medium-sized meeting rooms, a kitchen, county Parks and Recreation Department office space, restrooms and a maintenance/storage area.

Also planned is a courtyard containing a barbecue, patio and dining area.

All meeting rooms will have air conditioning and be in compliance with federal law requiring structures to be handicap-accessible.

The swimming pool area will consist of a 25-yard-by-50-meter pool, a 25-yard-by-25-meter warmup/teaching pool, a 20-by-30-foot kiddie ...

purpose building.

The main pool build... vide lockers, showers, rest... fice space and a public ad... tem for the pools.

The complex will inc... field with a maintena... and restrooms. The fiel... signed as a backup drainage area and for overflow parki...

There will be two par... each designed to cou... for pavement area, light... scaping. A main park... have about 225 stalls, a ... and drop-off area. A second... provide about 50 stalls.

A draft environment... is issued on projects bel... no significant environm... The county's consultan... ject is PBR Hawaii of Hon...

The public comment d... July 23. Written comme... sent either to the cou... partment at 1580-C ... Ave., Wailuku, 96793, ... fice of Environmental Qu... trol at 235 S. Beretania St... fice Tower, Suite 702...

871-6736

I've lived here 12 yrs. and have been saddened by progress (we make Maui up for tourist, will no longer be suitable for the tourist) But I am in support of this change. I was a cab driver at the Kahului Air 11 YRS. "People said if this keep up, we'll go to another)

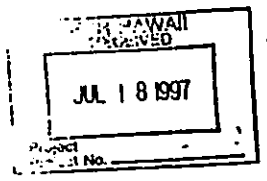
Debra Sutton
425 Kaulana St
Kahului, Hi
96732

HONOLULU P&D CTR x 2 x07/15/97

Environmental Quality Control
235 Beretania St.
State Office Tower -702
Honolulu, Hawaii
96813

CORRECTION

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



Public comment sought on plan Kihei center, poc

WAILUKU — Public comment is being sought on a draft environmental assessment, document that describes the planned Kihei community center and swimming pool complex.

To be constructed on 9 acres at Lipoa Street across from Kihei School, the $7 million project will feature meeting rooms, swimming pools and a soccer field.

The community center will include a main hall with large meeting room, kitchen facilities, restrooms and a public address system.

Two other buildings will contain medium-sized meeting rooms, a kitchen, county Parks and Recreation Department office space, restroom and a maintenance/storage area.

Also planned is a courtyard containing a barbecue, patio and dining area.

All meeting rooms will have air conditioning and be in compliance with federal law requiring structures to be handicap-accessible.

The swimming pool area will consist of a 25-yard-by-50-meter pool, a 25-yard-by-25-meter warm-water training pool, a 20-by-30-foot kiddie pool, a 20-by-30-foot [illegible]

purpose building.

The main pool build[illegible]
wide lockers, showers, reception space and a public address system for the pools.

The complex will include a playing field with a maintenance and restrooms. The field is sloped as a berm to drainage areas and for overflow parking.

There will be two parking lots designed to contain [illegible] for pavement area, lighting and signage. A main parking lot will have about 225 stalls, a loading and drop-off area. A second lot will provide about 50 stalls.

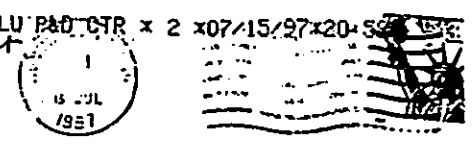
A draft environmental assessment is issued on projects believed to have no significant environmental impacts.

The county's consultant on the project is PBR Hawaii of Honolulu.

The public comment deadline is July 23. Written comments should be sent either to the county Department at 1580-C Kaahumanu Ave., Wailuku 96793, or to the Office of Environmental Quality Control at 235 S. Beretania St. 702, State Office Tower, Suite 702, Honolulu 96813.

I've lived here 12 yrs. 671-6736
and have been saddened by progress (we make mainly up for tourist will no longer be suitable for the tourist) But I am in support of this change. I was a Cab driver at the Kahului Air 11 yrs. "People said if this keep up, we'll go to another)

Debra Sutton
425 Kaulana St
Kahului, Hi
96732



Environmental Quality Control
235 Beretania St.
State Office Tower -702
Honolulu, Hawaii
96813

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Ms. Debra Sutton
425 Kaulana Street
Kahului, Hawaii 96732

Dear Ms. Sutton:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your support and comments of July 15, 1997, regarding the above-mentioned subject and for participation in the environmental review process.

Sincerely,

HENRY OLIVA
Director

July 10, 1997

To Whom it May Concern,

My name is Rochelle Fletcher and I am writing for support of a community pool in Kihei.

In 1987 while performing my job at the Lahiana Post Office, I injured my back lifting a heavy sack. My physical therapist recommended that I should swim to help strengthen the muscles in my back. I have tired to use the community pool in Lahaina but most of the time my schedule does not permit. As a 10-year resident of Kihei, a community pool would be an asset for me and my health.

My family and I own a home close to the Youth Center. I cannot stress enough the positive influence this center created for my son, Jacob Abeytia. He loved to play basketball at the center with the other boys. He went on to be a star basketball player for Lokelani Intermediate School and Baldwin High School. He was an All Star Player for three years and Player of the Year in 1997. He was named a top player from the State of Hawaii in USA Today in 1996. I only mention this as I am a firm believer in providing our youth with beneficial ways to spend their free time. A community pool and park could be an advantage to the youth of Kihei.

Kihei has grown to a sizable community since I first moved here. I conclude that using available funds to build a pool and park for Kihei community is justifiable. Lahaina, Kahului, Wailuku, and Up Country enjoy the benefits of their community pools. Please allow us that pleasure for our adults but especially our youth.

Thank you,

Rochelle Fletcher

Rochelle Fletcher
44 Kuilima Pl.
Kihei, HI 96753

RECEIVED
97 JUL 14 P3:51
OFC. OF ENVIRONMENTAL QUALITY CONTROL

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director
(808) 243-7230
FAX (808) 243-7934

July 30, 1997

Ms. Rochelle Fletcher
44 Kuilima Place
Kihei, Hawaii 96753

Dear Ms. Fletcher:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your support and comments of July 10, 1997, regarding the above-referenced subject and for participating in the environmental review process.

Your letter was forwarded from the Office of Environmental Quality Control after the deadline and was not included in the Special Management Area Permit and Phase II Project District Development Application Submittal. However, we were able to include your letter in the Final Environmental Assessment prior to distribution and we will forward your comments to the Planning Department during their review of the Special Management Area Permit and Phase II Project District Development Application submittal.

Sincerely,

HENRY OLIVA
Director

OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 S BERETANIA ST
STATE OFFICE TOWER SUITE 702
HONOLULU HI 96813

I am writing in support of the recreation and aquatic complex proposed for the Kihei area.

I think that it is important for us South Maui residents to have a complex of this nature. The installation of the pools in Lahaina and Makawao have benefited those respective residents.

The Kihei complex would give children a safe place to play and swim. Adults would be able to do lap swimming in a clean environment. My family is a family of four and we all spent many hours at the Lahaina Aquatic Center before we moved to the Kihei area. In fact, I still do lap swimming at the Lahaina facility during my lunch hour.

Additionally, the proposed location would be greatly beautified by this project. South Maui is growing rapidly and more parks and places are needed for its residents to enjoy.

Please proceed with this project and many thanks for your time and consideration.

Very truly yours,

Mychael Patrick

RECEIVED
97 JUL 22 A8:31
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

Mychael Patrick 264 Oe Street Kihei HI 96753
Phone/FAX: 808-875-9256

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 30, 1997

Mr. Michael Patrick
264 Oe Street
Kihei, Hawaii 96753

Dear Mr. Patrick:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your support and comments regarding the above-referenced subject and for participating in the environmental review process.

Your letter was forwarded from the Office of Environmental Quality Control after the deadline and was not included in the Special Management Area Permit and Phase II Project District Development Application Submittal. However, we were able to include your letter in the Final Environmental Assessment prior to distribution and we will forward your comments to the Planning Department during their review of the Special Management Area Permit and Phase II Project District Development Application submittal.

Sincerely,

HENRY OLIVA
Director

s:\ltrs\hocr\patrick(dc)

LINDA CROCKETT LINGLE
MAYOR

OUR REFERENCE

YOUR REFERENCE

POLICE DEPARTMENT
COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

HOWARD H. TAGOMORI
CHIEF OF POLICE

THOMAS PHILLIPS
DEPUTY CHIEF OF POLICE

July 21, 1997

PBR HAWAII
RECEIVED
JUL 23 1997
Project
Project No.

MEMORANDUM

TO : HENRY OLIVA, PARKS DIRECTOR

FROM : HOWARD H. TAGOMORI, CHIEF OF POLICE

SUBJECT : KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX

✓ No recommendation or special condition is necessary or desired.

— Refer to attachment(s).

Assistant Chief Charles Hall
for: HOWARD H. TAGOMORI
Chief of Police

xc: Sato and Associates, Inc.
PBR Hawaii
Office of Environmental Quality Control

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Mr. Howard H. Tagomori
Chief of Police
Maui Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

Dear Mr. Tagomori:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of July 21, 1997, regarding the above-mentioned subject and for participation in the environmental review process.

Sincerely,

HENRY OLIVA
Director

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7931

July 11, 1997

PBR HAWAII
RECEIVED
JUL 15 1997
Project
Project No.

Mr. David Hulse, Associate
PBR Hawaii
Pacific Tower
1001 Bishop Street, Suite 650
Honolulu, HI 96813

Dear Mr. Hulse:

SUBJECT: KIHEI COMMUNITY CENTER AND POOL COMPLEX

The County of Maui, Department of Parks and Recreation, is not the approving/accepting agency for the Kihei Community Center and Pool Complex. The approving/accepting agency is the County of Maui, Planning Commission c/o David Blane, Director, Department of Planning, 250 S. High Street, Wailuku, Maui, Hawaii 96793.

Please notify the Office of Environmental Quality so that this change is reflected.

Sincerely,

HENRY OLIVA
Director

Attachment

s:\wp\hoec\hulse(lc)

PBR HAWAII
LAND PLANNING
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL STUDIES

July 24, 1997

Mr. Henry Oliva, Director
Department of Parks and Recreation
County of Maui
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793

SUBJECT: COMMENTS REGARDING THE KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Oliva:

Thank you for your comments of July 11, 1997 regarding the Kihei Community Center and Swimming Pool Complex Draft Environmental Assessment.

As indicated by your comments, we will revise the OEQC Bulletin Notice to reflect that the County of Maui Planning Commission will be the accepting agency for the Final Environmental Assessment.

Sincerely,

PBR HAWAII

David Hulse, AICP
Associate

Wm. Frank Brandt • Thomas S. Witten • R. Stan Duncan • Russell Y. J. Chung

HONOLULU OFFICE
1001 BISHOP STREET, PACIFIC TOWER, SUITE 650, HONOLULU, HAWAII 96813-3429
TELEPHONE (808) 521-5631 FAX: (808) 523-1402 E-MAIL pbrhi@pbrhawaii.com

WAILUKU OFFICE
2145 KAOHU STREET, WAILUKU, HAWAII 96793-2704
TELEPHONE: (808) 242-2878 FAX: (808) 242-2902

HILO OFFICE
101 AUPUNI STREET, HILO LAGOON CENTER, SUITE 310, HILO, HAWAII 96720-4276
TELEPHONE: (808) 961-3333 FAX: (808) 961-8086

LINDA CROCKETT LINGLE
Mayor

DAVID W. BLANE
Director

USA M. MUYEN
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING
250 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

PBR HAWAII
RECEIVED
JUL 24 1997
Project
Project No.

July 22, 1997

MEMO TO: Henry Oliva, Director of the Department of Parks and Recreation

FROM: for David W. Blane, Director of Planning

SUBJECT: Draft Environmental Assessment for the Kihei Community Center and Swimming Pool Complex at TMK: 2-2-2: Portion of 66 and Portion of 67, Kihei, Island of Maui, Hawaii

The Maui Planning Department has reviewed the Draft Environmental Assessment for the above-referenced project and has the following comments at this time:

1. Page 39, Chapter 5.0, "Significance Criteria", (13) "Requires substantial energy consumption." The project description states that separate pool heating/cooling systems and air-conditioned buildings will be provided. Heating/cooling systems for pools are not typical attributes for public or private pools and most buildings are not totally air-conditioned in Hawaii. There should be a brief description on how energy will be conserved for this project.

2. Page 48, Chapter 7.0, "List of All Approvals and Permits Required." The words "Project District Phase III" should be inserted after "Special Management Area Permit" and before "Subdivision Approval." The responsible agency is the Department of Planning. Within a project district, Phase III approval is required prior to final approvals of subdivision and grading/building permit applications.

If you have any further questions, please contact Julie Higa, Staff Planner, of this office at 243-7814.

DMB:JMH:ghk
c: Loren Lau, Sato and Associates, Inc.
David Hulse, PBR Hawaii, Inc.
Gary Gill, Office of Environmental Quality Control
Clayton Yoshida, AICP, Planning Program Administrator
David Goode, Deputy Director of Public Works and Waste Management
Julie Higa, Staff Planner
Project File
General File
S:\ALL\JULIE\KIHEICOM\KIHEIDFT.EA

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

July 25, 1997

Mr. David Blane, Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Blane:

SUBJECT: KIHEI COMMUNITY CENTER AND SWIMMING POOL COMPLEX
DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your comments of July 22, 1997, regarding the above-mentioned subject. We offer the following response to each of your numbered comments.

1. The proposed project will incorporate the latest technology in heating/cooling systems for both the pool and main building. In addition, the building architecture has taken maximum advantage of the following design features to increase energy efficiency:

   - windows are well shaded by roof overhangs
   - outdoor ventilation will be utilized when appropriate
   - timers may be used for room air conditioning controls
   - a skylight with high efficiency glazing will minimize heat gain and allow the use of natural lighting
   - CMU block walls will limit heat transfer and provide insulation
   - extensive landscaping will shade building and hard surfaces to provide additional natural cooling

2. Page 48, Chapter 7.0 will be revised to reflect that the project must also receive project District Phase III approvals in the manner described in your comments. We concur that Phase III approval is required prior to final approvals of subdivision and grading/building permit applications.

Thank you once again for participating in the environmental review process.

Sincerely,

HENRY OLIVA
Director

DR:HO:lc