DEPARTMENT OF
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COUNTY OF MAUI

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November 18, 2010

Katherine Kealoha, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Kealoha:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE PROPOSED KA LIMA O MAUI AFFORDABLE HOUSING PROJECT, TMK (2) 3-8-046:016, WAILUKU, MAUI, HAWAII

The County of Maui, Department of Housing and Human Concerns, the approving agency for the Draft Environmental Assessment (EA) for the subject project, has reviewed the Draft EA and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this project in the next available publication of the Office of Environmental Quality Control (OEQC) Environmental Notice.

We have enclosed a completed OEQC Publication form and Project Summary, a CD (PDF.file) and one (1) copy of the Draft EA. Additionally, the Draft EA has been transmitted to the Wailuku Public Library by copy of this letter.

Please feel free to contact Colleen Suyama, Munekiyo & Hiraga, Inc. at colleen@mhplanning.com or at (808) 244-2015, should you have any questions.

Sincerely,

Lori Tsuhako

LORI TSUHAKO, LSW, ACSW
Director of Housing and Human Concerns

Enclosures
cc: Chantal Ratte, Ka Lima O Maui
Colleen Suyama, Munekiyo & Hiraga, Inc.
Wailuku Public Library (w/copy of Draft EA only)
F:\DATA\KaLimaOMaui\AffHousing\DEAOEQC.transfromDHHC.doc

Draft Environmental Assessment

PROPOSED KA LIMA O MAUI AFFORDABLE HOUSING PROJECT AT TMK(2)3-8-046:016, WAILUKU, MAUI, HAWAII

Prepared for:

Ka Lima O Maui, Ltd.

Approving Agency:

County of Maui,
Department of Housing and
Human Concerns

November 2010

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CONTENTS

Executive Summary . . . . . Page i

I. PROJECT OVERVIEW . . . . . Page 1

A. PROJECT BACKGROUND, LOCATION AND LAND OWNERSHIP . . Page 1

B. EXISTING CONDITIONS . . . . . Page 2

C. PROPOSED ACTION . . . . . Page 2

D. PROJECT NEED . . . . . Page 6

E. REGULATORY CONTEXT . . . . . Page 6
1. Chapter 343, Hawaii Revised Statutes . . . . . Page 6
2. Section 201H-38, Hawaii Revised Statutes . . . . . Page 6

F. PROJECT COSTS AND SCHEDULE . . . . . Page 7

II. DESCRIPTION OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES . . . . . Page 8

A. PHYSICAL SETTING . . . . . Page 8
1. Surrounding Land Uses . . . . . Page 8
2. Climate . . . . . Page 9
3. Topography and Soils . . . . . Page 10
4. Flood and Tsunami Hazard . . . . . Page 10
5. Flora, Fauna and Avifauna . . . . . Page 14
6. Archaeological Resources . . . . . Page 15
7. Cultural Resources . . . . . Page 16
8. Air Quality . . . . . Page 23
9. Noise . . . . . Page 24
10. Visual Resources . . . . . Page 25
11. Outdoor Lighting . . . . . Page 25

B. SOCIO-ECONOMIC ENVIRONMENT . . . . . Page 26
1. Population . . . . . Page 26
2. Economy . . . . . Page 27
3. Housing . . . . . Page 28

C. PUBLIC SERVICES ..... Page 29
1. Recreational Facilities ..... Page 29
2. Police and Fire Protection ..... Page 30
3. Solid Waste ..... Page 30
4. Health Care ..... Page 32
5. Education ..... Page 32

D. INFRASTRUCTURE ..... Page 33
1. Roadways ..... Page 33
2. Wastewater ..... Page 37
3. Water ..... Page 38
4. Drainage ..... Page 39
5. Electrical, Telephone and CATV Systems ..... Page 40

E. CUMULATIVE AND SECONDARY IMPACTS ..... Page 41

III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES AND CONTROLS ..... Page 42

A. STATE LAND USE DISTRICTS ..... Page 42

B. MAUI COUNTY GENERAL PLAN ..... Page 42

C. WAILUKU-KAHULUI COMMUNITY PLAN ..... Page 48

D. COUNTY ZONING ..... Page 51

E. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES .. Page 51

IV. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED ..... Page 60

V. ALTERNATIVES TO THE PROPOSED ACTION ..... Page 61

A. PREFERRED ALTERNATIVE ..... Page 61

B. NO ACTION ALTERNATIVE ..... Page 61

C. DEFERRED ACTION ALTERNATIVE ..... Page 62

D. ALTERNATIVE LOCATIONS ..... Page 62

E. ALTERNATIVE DESIGN CONSIDERATIONS ..... Page 62

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES ..... Page 64

VII. SIGNIFICANCE CRITERIA ASSESSMENT ..... Page 65

VIII. LIST OF PERMITS AND APPROVALS ..... Page 71

IX. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS ..... Page 72

X. REFERENCES ..... Page i

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LIST OF FIGURES

Figure 1. Regional Location Map ..... Page 3
Figure 2. Site Location Map ..... Page 4
Figure 3. Site Plan and Site Section ..... Page 5
Figure 4. Soil Association Map ..... Page 11
Figure 5. Soil Classification Map ..... Page 12
Figure 6. Flood Insurance Rate Map ..... Page 13
Figure 7. State Land Use District Designations ..... Page 43
Figure 8. Community Plan Map ..... Page 50

LIST OF APPENDICES

Appendix A. Archaeological Assessment Survey, Prepared by Xamanek Researches, LLC
Appendix B. Traffic Impact Assessment Report, Prepared by Phillip Rowell
Appendix C. Preliminary Engineering Report, Prepared by Otomo Engineering, Inc.

Executive Summary

Project Name:	Proposed Ka Lima O Maui Affordable Housing Project
Type of Document:	Draft Environmental Assessment
Legal Authority:	Chapter 343, Hawaii Revised Statutes
Agency Determination:	Anticipated Finding of No Significant Impact (FONSI)
Applicable Environmental Assessment Review "trigger":	Use of County Lands and Funds
Location:	Island of Maui Wailuku, Maui TMK (2) 3-8-046:016
Landowner:	County of Maui 200 South High Street Wailuku, Hawaii 96793
Applicant:	Ka Lima O Maui, Ltd. 95 Mahalani Street Wailuku, Hawaii 96793 Contact: Chantal Ratte, Executive Director Phone No.: (808)244-5502
Approving Agency:	County of Maui Department of Housing and Human Concerns One Main Plaza 2200 Main Street, Suite 546 Wailuku, Hawaii 96793 Contact: Jo-Ann Ridao, Deputy Director Phone No.: (808)270-7805
Agent:	Munekiyo & Hiraga, Inc. 305 High Street, Suite 104 Wailuku, Hawaii 96793 Contact: Erin Mukai Phone No.: (808) 244-2015
Project Summary:	Ka Lima O Maui, Ltd. proposes to develop a 100 percent affordable housing project to meet the needs of the island's population of disabled and/or economically challenged

individuals on property identified as TMK (2)3-8-046:016 (Parcel 16) in Wailuku, Maui. Parcel 16 is approximately two (2) acres in size. Ingress and egress to the site will be provided through a driveway off of Mahalani Street. The proposed action involves the construction of 16 single-occupancy, one (1) bedroom apartments contained within two (2) separate residential buildings totaling 8,880 square feet (s.f.) (4,440 s.f. for each residential building). The project also includes the renovation of an existing 2,500 s.f. building used by Ka Lima O Maui's Medicaid Waiver Program, as well as the construction of a new building providing office space of approximately 3,600 s.f. and storage and garage space of approximately 3,600 s.f. Additionally, related improvements are proposed including utility, infrastructure, landscaping and parking.

Parcel 16 is located within the limits of the State Land Use "Urban" district. The Wailuku-Kahului Community Plan designates the subject property for "Public/Quasi-Public" use, while the underlying county zoning is "R-3, Residential".

The proposed action involves the use of County lands and funds. The use of County lands and funds are both triggers for Chapter 343, Hawaii Revised Statutes (HRS). As such, a Draft Environmental Assessment (EA) has been prepared pursuant to Chapter 343, HRS, and Chapter 200 of Title II, Hawaii Administrative Rules, Environmental Impact Statement Rules. This EA documents the project's technical characteristics and environmental impacts, and advances findings and conclusions relative to the significance of the project.

I. PROJECT OVERVIEW

I. PROJECT OVERVIEW

A. PROJECT BACKGROUND, LOCATION AND LAND OWNERSHIP

Ka Lima O Maui, Ltd. (Ka Lima O Maui), Applicant, is a community based vocational rehabilitation program that provides job training and employment opportunities for disabled and economically disadvantaged adults on Maui. Founded in 1955, Ka Lima O Maui is one of the oldest non-profit organizations, and the largest employer of the disabled on the island. Ka Lima O Maui is an independent 501(c)3 non-profit agency and is not a member of a national organization such as the United Way. The organization serves over 200 clients annually within the Maui community, 40 of which are employed by Ka Lima O Maui.

Ka Lima O Maui offers a variety of services to its clients ranging from education to employment, among others. The organization's largest department offers training and employment in grounds and custodial services. Ka Lima O Maui secures jobs for its clients and provides these services through contracts with the County of Maui, as well as other private businesses, such as HC&S, Hawaii Job Corps, The Maui News, and the YMCA. Additionally, Ka Lima O Maui also offers training for clients in acquiring the skills needed for community-based employment. Through funding by way of the State of Hawaii, Department of Vocational Rehabilitation Services, employement is the ultimate objective for this job placement and retention program designed for those with severe disabilities. Work experience programs teach basic skills and expose clients to the real demands and expectations of community-based employment. Long-term support and coaching is then provided to clients throughout their employment. Ka Lima O Maui's Medicaid Waiver Program is the organization's only non-vocational program. The Medicaid Waiver Program is designed to adapt to the individual needs of each client, and focuses on building independent living and social skills through activities such as gardening, yoga, cooking, recreational group outings to beach parks and related recreational sites, as well as cultural excursions.

Ka Lima O Maui (Applicant) proposes to develop a 100 percent affordable housing project to meet the needs of Maui's population of disabled and/or economically challenged individuals on property identified as TMK (2) 3-8-046:016 (Parcel 16) in Wailuku, Maui.

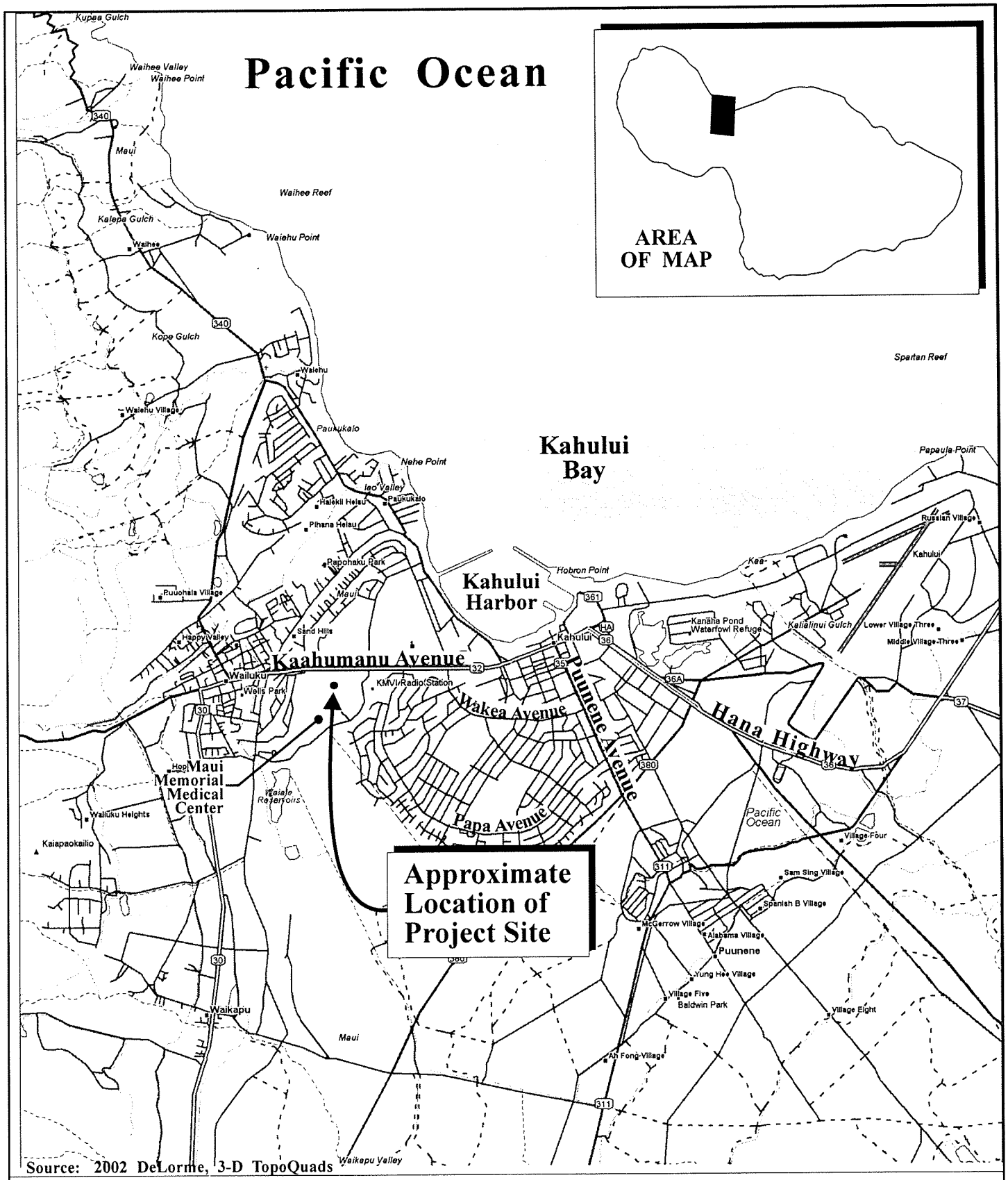
See **Figure 1** and **Figure 2**. Parcel 16 is approximately 2 acres in size and is owned by the County of Maui. The subject property is designated "Urban" by the State Land Use Commission, designated "Public/Quasi-Public" by the Wailuku-Kahului Community Plan, and zoned "R-3, Residential" by the County of Maui.

B. EXISTING CONDITIONS

The existing property is developed and is also located in an urbanized area of Wailuku. Ka Lima O Maui currently operates its Medicaid Waiver Program, which focuses on basic living skills, health, and personal assistance, in an existing structure on the subject parcel. Existing improvements on the site include the 2,500 square feet (s.f.) warehouse which houses the Medicaid Waiver Program, storage structure, as well as paved parking and a driveway. Access to the site is provided through a driveway off of Mahalani Street. The remaining portion of the project site is vacant, but was previously graded for the former Ka Lima O Maui nursery operation. Bordering the property, along the western perimeter of the site is the Maui Lani Kaiser Permanente Clinic. To the north of the project site is the County of Maui Police Department, to the east, is Maui Economic Opportunity and the Cameron Center and to the south is Maui Memorial Medical Center. Refer to **Figure 2**.

C. PROPOSED ACTION

Ka Lima O Maui proposes to develop a 100 percent affordable housing project to meet the needs of the island's population of disabled and/or economically challenged individuals on property identified as TMK (2)3-8-046:016 (Parcel 16) in Wailuku, Maui. Parcel 16 is approximately two (2) acres in size. Ingress and egress to the site will be provided through a driveway off of Mahalani Street. The proposed action involves the construction of 16 single-occupancy, one (1) bedroom apartments contained within two (2) separate residential buildings totaling 8,880 s.f. (4,440 s.f. for each residential building). One apartment will serve as the living quarters of a Ka Lima O Maui staff person to oversee the overall complex and provide assistance to the residents/clients as needed. The project also includes the renovation of an existing 2,500 s.f. building used by Ka Lima O Maui's Medicaid Waiver Program, as well as the construction of a new two (2) story building providing office space of approximately 3,600 s.f., and storage and garage space of approximately 3,600 s.f. Presently, Ka Lima O Maui's administrative office is located in the adjacent Cameron Center. Upon project completion, Ka Lima O Maui will relocate its office to the proposed new office building. Additionally, related improvements are proposed including utility, infrastructure, landscaping and parking. See **Figure 3**.



Source: 2002 DeLorme, 3-D TopoQuads

Figure 1

Proposed Ka Lima O Maui Affordable Housing Project

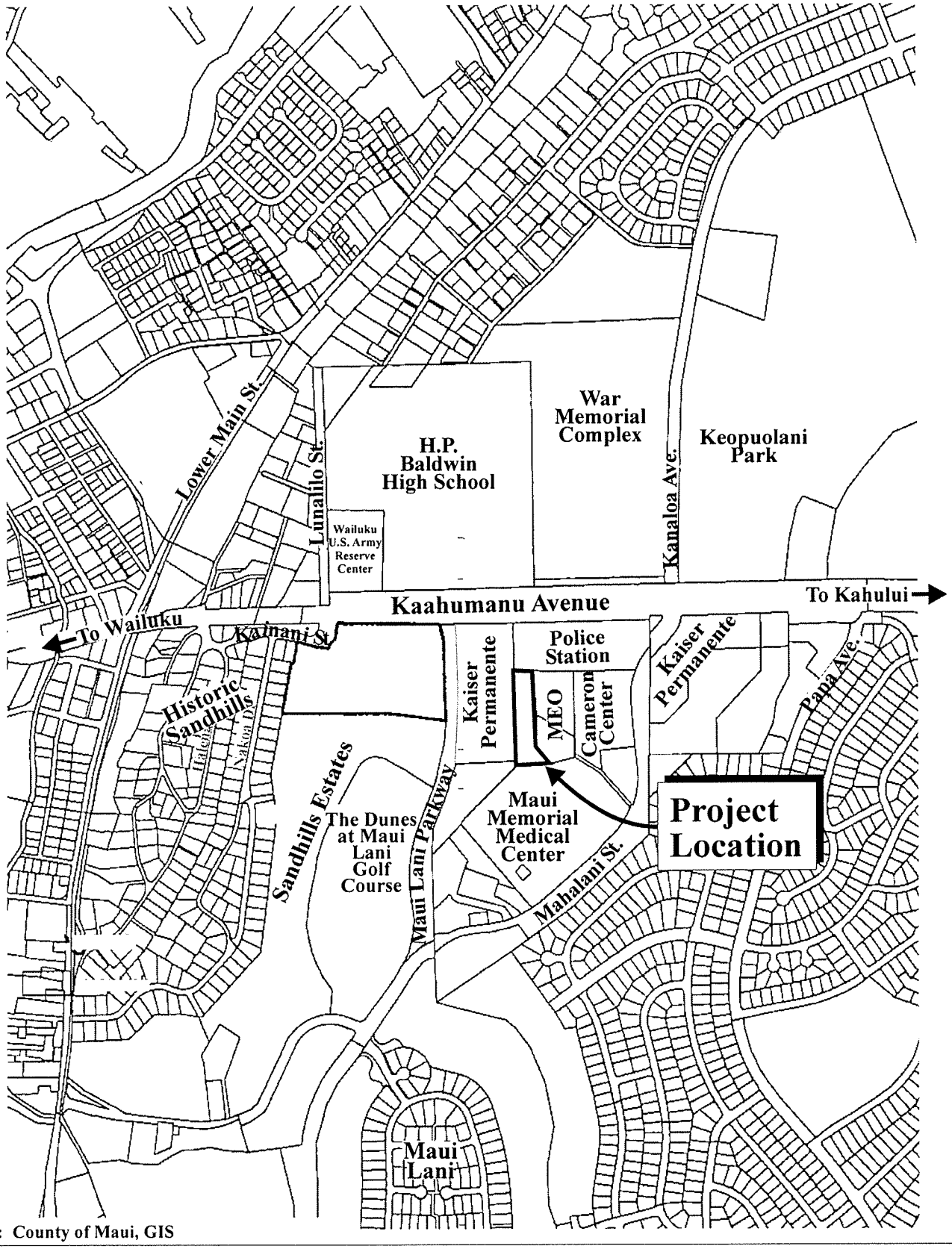
Regional Location Map

NOT TO SCALE

Prepared for: Ka Lima O Maui, Ltd.

MUNEKIYO & HIRAGA, INC.

KaLimaOMaui\AffHousing\regional



Source: County of Maui, GIS

Figure 2

Proposed Ka Lima O Maui Affordable Housing Project

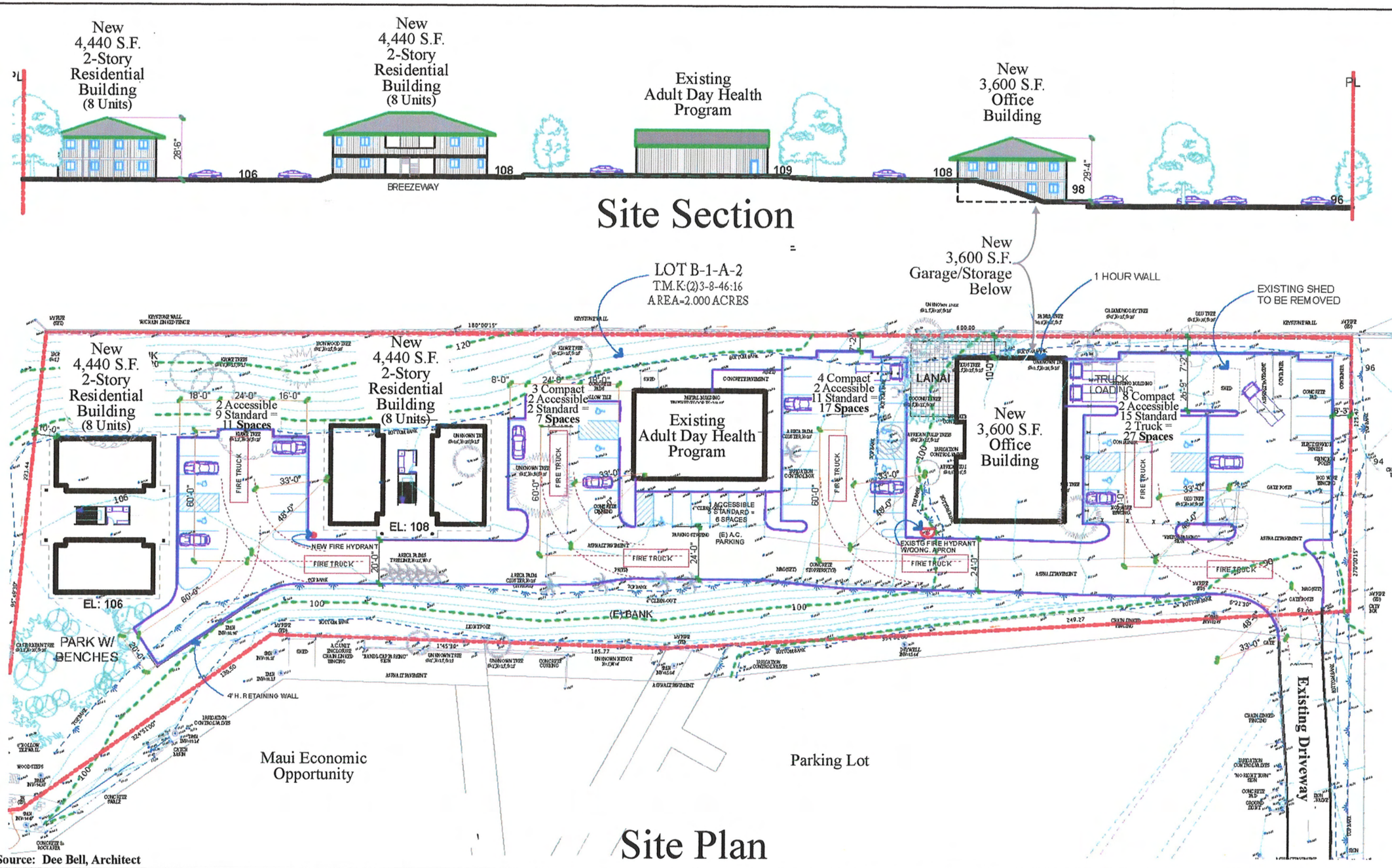
Site Location Map

NOT TO SCALE

Prepared for: Ka Lima O Maui, Ltd.

MUNEKIYO & HIRAGA, INC.

KaLimaOMaui\AffHousing\SiteLoca



Source: Dee Bell, Architect

Figure 3

Proposed Ka Lima O Maui Affordable Housing Project

Site Plan and Site Section

NOT TO SCALE

Prepared for: Ka Lima O Maui, Ltd.

MUNEKIYO & HIRAGA, INC.

KaLimaOMaui\AffHousing\Revised site plan

D. PROJECT NEED

Although the local economy has slowed significantly over the past several years, demand for affordable housing remains steady. A natural extension of Ka Lima O Maui's mission, "Enhancing Lives through Self-Reliance", the proposed project would provide affordable housing open to Ka Lima O Maui's clients as well as the public. The proposed project would benefit the organization and its clients as the future residents of the facility will have the added safety and security of staff interaction seven (7) days a week. Furthermore, the existing building on the project site which houses Ka Lima O Maui's Medicaid Waiver Program is in need of a renovation to provide a safer and more reliable structure that offers flexibility in use. In addition, the proposed office building is designed to meet the needs of the Applicant's varied agency employment programs. The organization's administration will occupy this proposed building and will provide the convenience to client-residents of being a short distance away from their homes.

E. REGULATORY CONTEXT

1. Chapter 343, Hawaii Revised Statutes

As previously noted, the proposed project will involve the use of County land and funds. As such, an Environmental Assessment (EA) is being prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and Chapter 200 of Title 11, Department of Health Administrative Rules, Environmental Impact Statement Rules. Accordingly, this document addresses the project's technical characteristics, environmental impacts and alternatives, and advances findings and conclusions relative to the significance of the proposed action.

The approving agency for the EA is the Department of Housing and Human Concerns.

2. Section 201H-38, Hawaii Revised Statutes

To facilitate project planning and implementation, Ka Lima O Maui seeks to process the project proposal under a Section 201H-38, HRS application. Applicable land use

entitlements and related development exemptions would be sought through the Section 201H-38, HRS application. Section 201H-38, HRS promotes the delivery of affordable housing by allowing the exemption of endorsed projects from:

The proposed project will be a 100 percent affordable housing project. As such, a Section 201H-38, HRS application will be filed with the Maui County Council to seek applicable land use entitlements and related development exemptions from County related code requirements, without compromising public health, safety, or welfare considerations. Proposed exemptions are presented in **Chapter 5** of this application.

F. PROJECT COSTS AND SCHEDULE

The estimated construction cost for the proposed improvements is approximately $4.5 million. Construction of the proposed improvements will commence upon the receipt of all necessary regulatory permits and approvals. Construction duration is estimated to be approximately two (2) years.

II. DESCRIPTION OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

II. DESCRIPTION OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

A. PHYSICAL SETTING

1. Surrounding Land Uses

a. Existing Conditions

The subject property is located within Wailuku. Wailuku serves as the seat of County and State governments, with several agencies headquartered in the civic center area between Kaohu Street and Main Street. Wailuku also serves as a center for professional services including medical, dental, legal and design professions. Kahului, on the other hand, is home to Kahului Harbor, the island's only deep water port, and the Kahului Airport, the second busiest airport in the State. With its proximity to the harbor and airport, the Kahului region has emerged as the focal point for heavy industrial, light industrial and commercial activities and services such as warehousing, baseyard operations, automotive sales and maintenance, and retailing for equipment and materials for suppliers. Kahului is considered Central Maui's commercial retailing center with the Queen Kaahumanu Center, Maui Mall, Maui Market Place and Kahului Shopping Center located within the region.

Maui Memorial Medical Center is located to the south of the project site. To the north of the site is the headquarters of the Maui Police Department. The proposed project site is also located adjacent to Maui Economic Opportunity (MEO), the Cameron Center, and the Kaiser Permanente Maui Lani Clinic, and covers an area of approximately two (2) acres. The existing 2,500 sq. ft. building, a storage structure, paved parking and driveway currently occupying the project site is being utilized by Ka Lima O Maui for its Medicaid Waiver Program.

b. Potential Impacts and Proposed Mitigation Measures

The proposed project is intended to provide affordably priced rental units to address the need of Ka Lima O Maui's clients who are economically disadvantaged. The housing, however, will not be restricted to the Applicant's clients, but will also be open to the public who financially qualify. The project site is located in Wailuku and is adjacent to the Kaiser Permanente Maui Lani Clinic, the County of Maui Police Station, the Cameron Center, MEO, and the Maui Memorial Medical Center. In addition, the project is in close proximity to various business and medical offices and recreational centers such as the War Memorial Complex, Keopuolani Park and the Dunes at Maui Lani golf course. Not far beyond these neighboring properties – to the west, east and south of the project site – is a vast expanse of residential properties including Sandhills, residences in the Maui Lani Project District and Kahului.

The development of residential uses at the project site is consistent with existing residential uses in the area, as well as compatible with surrounding public/quasi-public uses.

2. Climate

a. Existing Conditions

Like most areas of Hawaii, Maui's climate is relatively uniform year round. Characteristic of Hawaii's climate, the project site experiences mild and uniform temperatures year round, moderate humidity and a relatively consistent northeasterly tradewind. Variation in climate on the island is largely left to local terrain.

The climate of Maui County is defined by average temperatures that range from lows in the 60's to highs in the 80's (based on temperatures recorded at Kahului Airport). September is historically the warmest month, while February is the coolest. Rainfall at Kahului Airport in 2008 average approximately 9.55 inches (Maui County Databook 2009).

b. Potential Impacts and Mitigation Measures

The proposed project is not anticipated to adversely affect local climatic conditions in the area.

3. Topography and Soils

a. Existing Conditions

The site is located on Maui's central isthmus. Underlying the site and surrounding lands is soil belonging to the Pulehu-Ewa-Jaucas association which is characterized as having deep, nearly level to moderate slope, with well drained soils that have moderately fine to coarse texture. See **Figure 4**. The soil type specific to the project site is Puuone Sand (PZUE). See **Figure 5**. PZUE soils predominate in the Kahului region and are typified by a sandy surface layer underlain by cemented sand (Soil Conservation Service, 1972).

The project site is currently developed and lies within an urbanized area of Wailuku.

b. Potential Impacts and Mitigation Measures

The project site is currently developed and is also surrounded by developed properties. The existing topographic conditions at the project site will be minimally modified during the grading phase of work to meet design requirements.

The proposed project will not significantly alter existing topography and soil characteristics at or near the project site.

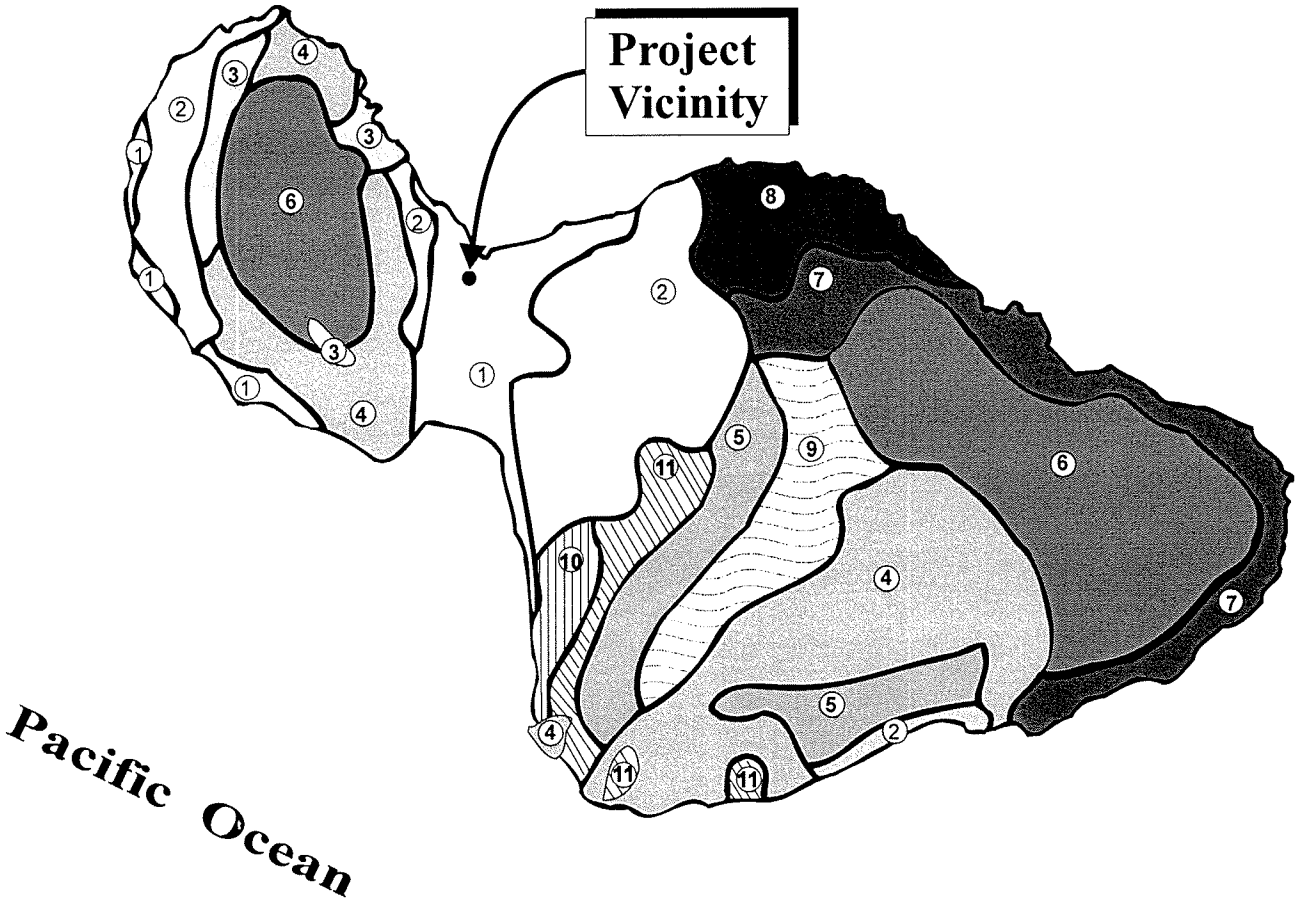
4. Flood and Tsunami Hazard

a. Existing Conditions

The Flood Insurance Rate Map (FIRM) for this region indicates that the project site is located in Zone X, areas determined to be outside the 0.2 percent annual chance flood plain of minimal flooding. See **Figure 6**. In

LEGEND

- (1) Pulehu-Ewa-Jaucas association
- (2) Waiakoa-Keahua-Molokai association
- (3) Honolua-Olelo association
- (4) Rock land-Rough mountainous land association
- (5) Puu Pa-Kula-Pane association
- (6) Hydrandepts-Tropaquods association
- (7) Hana-Makaalae-Kailua association
- (8) Pauwela-Haiku association
- (9) Laumaia-Kaipoipoi-Olinda association
- (10) Keawakapu-Makena association
- (11) Kamaole-Oanapuka association



Source: USDA Soil Conservation Service

Figure 4

Proposed Ka Lima O Maui Affordable Housing Project

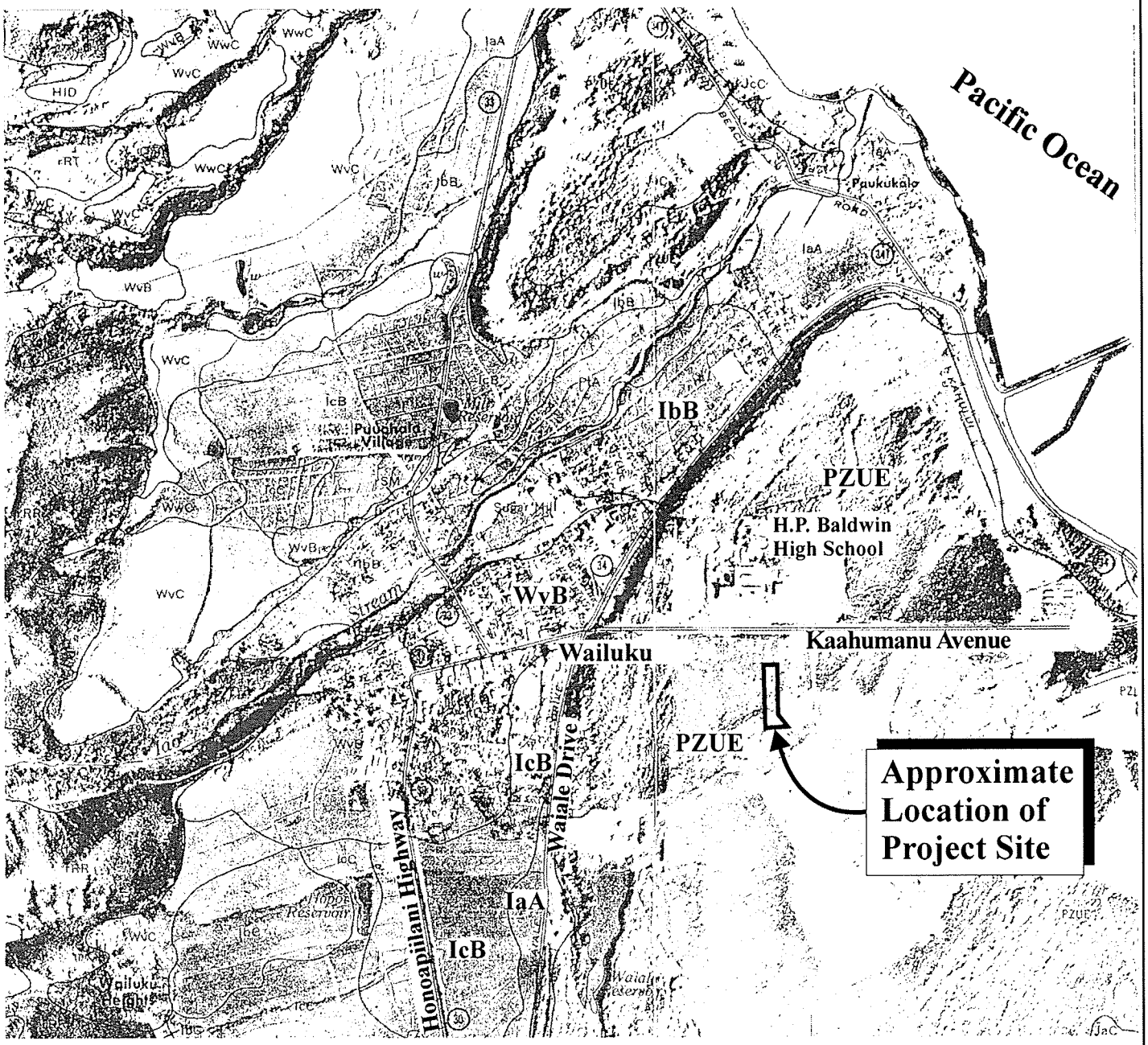
Soil Association Map

NOT TO SCALE

Prepared for: Ka Lima O Maui, Ltd.

MUNEKIYO & HIRAGA, INC.

KaLimaOMaui/AffHousing/Soils



Source: USDA Soil Conservation Service

Figure 5

Proposed Ka Lima O Maui Affordable Housing Project

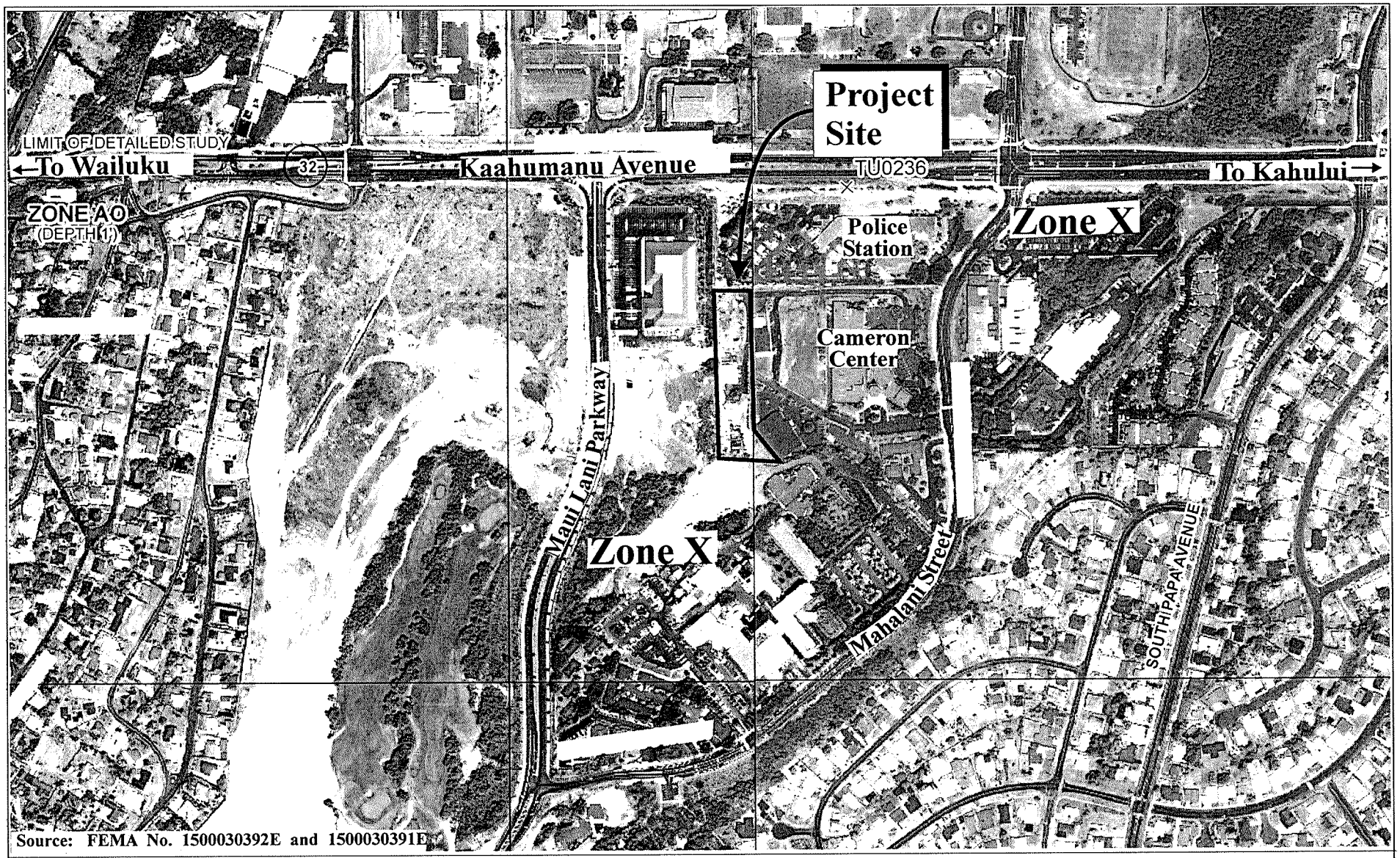
Soil Classification Map

NOT TO SCALE

Prepared for: Ka Lima O Maui, Ltd.

MUNEKIYO & HIRAGA, INC.

KaLimaOMaui/AffHousing/soil classification



Source: FEMA No. 1500030392E and 1500030391E

Figure 6

Proposed Ka Lima O Maui Affordable Housing Project

Flood Insurance Rate Map

NOT TO SCALE

Prepared for: Ka Lima O Maui, Ltd.

MUNEKIYO & HIRAGA, INC.

KaLimaOMaui\AffHousing\FIRM

addition, the subject property is located beyond the reaches of the tsunami inundation zone.

b. Potential Impacts and Mitigation Measures

The project site is not a shoreline property, nor is it situated near streams, wetland areas or other areas which may pose flooding concerns. The subject property is located within Zone X, determined to be outside the 0.2 percent annual chance flood plain and located beyond the reaches of the tsunami inundation zone. Accordingly, adverse conditions associated with flooding does not occur at the property.

5. Flora, Fauna and Avifauna

a. Existing Conditions

The subject property is a developed property located in an urbanized area of Wailuku. There are no known rare, threatened, or endangered species of plants within the project site.

Fauna and avifauna are also characteristic of urban areas. Fauna typically found in the vicinity include mongoose, rats, dogs and cats. Avifauna include the Common Mynah, Spotted Dove, Barred Dove, Japanese White-Eye Cardinal, Red-Crested Cardinal, and House Sparrow. There are no identified rare, threatened or endangered species of fauna or avifauna found at the project site.

b. Potential Impacts and Mitigation Measures

There are no known significant habitats or rare, endangered or threatened species of flora, fauna, and avifauna located within the project site. Furthermore, it is noted that lighting design of the site will specify the shielding of all lights and directional down lighting so that there will be no upward illumination from the poles. This measure is intended to mitigate impacts to sea birds, such as Newell's Shearwater and the endangered Hawaiian petrel who are attracted to lights. It is noted, however, that the project site is located approximately 4,777 ft. (0.9 mi.) from the shoreline.

There are no streams or wetlands located within the project site. Further, the project site will be landscaped to provide a complex which will aesthetically complement the surrounding area. The proposed action is not anticipated to have an adverse impact upon these environmental features.

6. Archaeological Resources

a. Existing Conditions

An Archaeological Assessment Survey (AAS) of the project site was conducted by Xamanek Researches LLC in May, 2010. See **Appendix "A"**. The survey consisted of an 80 percent surface survey of the subject area and subsurface testing of 16 Backhoe Test trenches (BTs). The area underlying the developed features at the project site, including the Medicaid Waiver Program building, an asphalt parking lot and driveway, and storage sheds, were not examined or tested in the survey.

The survey notes that an area of 18 meters by 17 meters immediately outside the northeast corner of the project site contains a human burial feature, identified as SIHP 50-50-04-4728. This area is intended to be a permanent burial preservation site and is enclosed by a chain link fence. Currently, there are no surface features which visually mark the presence of the burial site. The site was first identified by Archaeological Services Hawaii (ASH) during construction of a past expansion project for the nearby Cameron Center.

b. Potential Impacts and Mitigation Measures

No significant archaeological features were identified during the surface and subsurface testing of the project site. Furthermore, no historic properties were identified within the project site during the assessment survey. The survey indicates that this is most likely due to the extensive land modifications that have occurred in the area in recent years. It is also noted that sand dune deposits have been identified throughout the project site.

No adverse impacts to archaeological resources as a result of project implementation are anticipated. In addition, no impacts to the nearby burial site identified as SIHP 50-50-04-4728 are anticipated for the proposed project. Precautionary archaeological monitoring is recommended during any

ground altering activities on the subject property. Should the discovery of significant cultural materials and/or burials occur during construction, all work in the immediate area of the find will cease and the State Historic Preservation Division (SHPD) will be notified to discuss mitigation measures, in accordance with Chapter 6E, Hawaii Revised Statutes.

7. Cultural Resources

a. Cultural Context

Pre-Contact Period

The project site is located in the *ahupua`a* of Wailuku. The *ahupua`a* of Wailuku is a large land unit that encompasses land near Kahului Bay from Paukukalo to Kapukaulua. The *ahupua`a* includes Iao Valley and the northern half of the Kahului isthmus. This *ahupua`a* is located in, and encompasses approximately half the land area of the Wailuku District. According to the archaeological inventory survey report, Wailuku is noted as being the place where chiefs were buried and wars were fought. The environmental conditions in the lower Iao Valley were ideal for agricultural practices vital to support a large population. Combined with access to Kahului Harbor, these conditions made Wailuku a key location for a political and religious center.

The core area of Wailuku was comprised by Iao Valley and the two related dune formations to the north and south of the stream. This was the central place of religious and political power on Maui, which culminated during the time of High Chief Pi`ilani (c. 1600 AD). During the late pre-contact period, warfare intensified as the chiefs from Maui, Oahu and Hawaii competed for political and military supremacy.

For the duration of King Kahekili (1765 -1790), Wailuku once more became the place of intense warfare. In the mid-1770's, Kalanihale, the royal residence of Kahekili, was marched upon by a Big Island chief named Kalani`opu`u and his *alapa* (warriors). News of his coming preceded him, and Kahekili hid his warriors in the sand dunes above Halekii *heiau* to surprise the invading troops. A battle followed whereby the army of Kalani`opu`u was pushed to the sea and defeated.

By 1786, Kahekili controlled the islands of Maui, Molokai, Lanai, and Oahu. However, in 1790, Kahekili's control over the islands came to a close with the battle of Kepaniwai when King Kamehameha I defeated the ruler.

Early Post-Contact Period

Significant changes to the landscape of Hawaii ensued after the arrival of missionaries and other foreigners in the late 1700s and early 1800s.

Further, the establishment of the sugar industry in the 19th century catalyzed a dramatic transition in Wailuku. The first sugar cane crops grown in the *ahupua`a* were harvested and processed in 1828. Kamehameha III, with the assistance of two Chinese technicians, established a water-powered mill in Wailuku: Hungtai Sugar Works. The Wailuku Sugar Mill was established later in 1862.

Raising cattle also became an established commercial activity on the southern and eastern side of the Iao Valley dunes.

Post-1850s Period

According to the Archaeological Assessment Survey Report, following the Great Mahele of 1848, much of the *ahupua`a* of Wailuku was designated as Crown Land, to be used in support of the royal "state and dignity".

The boost of the sugar industry came in 1876 with the introduction of The Reciprocity Treaty that increased the price of sugar. The construction of ditches in the 1880s by Claus Spreckels tapped into the water resources from the mountains to irrigate fields for sugar cane production. These endeavors contributed to the foundation of the Hawaiian Commercial and Sugar Company in 1882.

The construction of the railroad in the late 1870s and its continuation for approximately two (2) decades facilitated mobility across towns, as well as contributed to the growth of various commercial activities and residential areas.

The introduction of the automobile in the 1950s greatly increased the ease of travel across the island. Residents residing in Wailuku were able to make daily commutes to other areas of the island, especially into nearby Kahului, an expanding town offering two (2) major ports of entry, the Kahului Harbor and Kahului Airport, as well as newly completed shopping centers and other social facilities.

b. Potential Impacts and Mitigation Measures

Cultural impact considerations were assessed based on primary source interviews conducted with individuals familiar with the project site and its historical context. In this regard, interviews with Hannah Kamai, Darby Gill and Jamie Woodburn were conducted. These interviews are summarized below.

(1) Hannah Kamai

Hannah Kamai is currently retired and lives at home in Paukukalo with her family, a home that she's lived in for 45 years. She was born and raised on Maui, in Waihee, on land that her family owned. Her father was half-Hawaiian, half-Irish and her mother was full Hawaiian. Ms. Kamai currently enjoys traveling and visiting family and friends on the neighbor islands. Ms. Kamai has been involved with Ka Lima O Maui for over 30 years. She began working there in 1965, about ten (10) years after the agency's inception.

Back then, the agency's offices were located in Kahului, at the site of the present-day Hawaiian Canoe Club hale. Ms. Kamai began working as a utility person, but later worked with Ka Lima O Maui clients in the janitorial services. She helped clients to prepare for and find janitorial jobs in various sectors of the community, enabling them to be financially independent and self-reliant.

When Ms. Kamai began working there, Ka Lima O Maui's proposed project site was mostly vacant, but contained a greenhouse that was utilized by their clients for fund-raising purposes. This greenhouse site was converted later into offices for the agency's Medicaid Waiver Program. Ms. Kamai recalls that the Maui Lani area was largely

undeveloped, with most of the landscape covered by kiawe. In the vicinity of the area was the Maui Memorial Medical Center, a Board of Health Building (now the Mental Health Association), a few homes provided for individuals with disabilities, and the Pacific Radio Group offices and radio tower. Ms. Kamai also recalls a landfill that was located on several acres west of the project site that has since been relocated to the Central Maui Landfill.

Because the area was filled with kiawe trees, Ms. Kamai doesn't recall of any sites of cultural importance, or any cultural practices carried out in the Maui Lani area. She explained that the land there was vacant except for kiawe trees, and that no one resided in the area. Since the Maui Lani area is now highly developed, Ms. Kamai acknowledged that she is unaware of any remaining cultural practices that occur in the vicinity of the project site. However, she voiced her concerns over the possibility of historic remains in the sandy areas of Maui Lani, as ancient Hawaiians often chose these places as their burial sites.

Ms. Kamai strongly supports the implementation of the Ka Lima O Maui housing project as it provides housing for the disabled and enables them to live independently. Due to her past involvement with Ka Lima O Maui, assisting the disabled to become more self-reliant, Ms. Kamai looks forward to the project's completion.

(2) <u>Darby Gill</u>

Darby Gill is the Executive Director for A Keiki's Dream, a non-profit organization on Maui that provides support services to children in crisis. He also established Funday, a once-a-year celebration on Maui that brings together people with disabilities. In his spare time, Mr. Gill is an avid practitioner of the sport of joggling, a form of running which involves the simultaneous juggling of balls. He can often be seen joggling down Kaahumanu Avenue and around the community.

Mr. Gill is originally from Massachusetts. He decided to move to Hawaii in 1978 after a positive experience running the Honolulu marathon. Soon after moving to Maui, Mr. Gill opened several offices to provide support services for people with disabilities. After establishing Funday, Mr. Gill created A Keiki's Dream, which functioned as a branch-off program. It was during this time that Mr. Gill was hired by Ka Lima O Maui to run their nursery program. He explained that the nursery program specialized in horticulture therapy, a process which utilizes horticultural activities to improve an individual's overall well-being. The nursery program ended in early 2000, due to a lack of funding, and the Medicaid Waver building was built in its place (presently located on the project site). Mr. Gill was involved with Ka Lima O Maui and their nursery program for about twenty-four (24) years, from 1982 to 2006.

Mr. Gill described the vicinity of the project site in the early 1980's as overrun with kiawe. He explained that the project site itself comprised only about one (1) acre of land, with half an acre allocated for the greenhouse structure, and half an acre for growing fields. A different access road was used to enter the project site, about 20 yards south of the present access road. A drainage gulch also ran through the property. At that time the subject area was not yet graded, so most of the terrain was level. Mr. Gill described the subsequent grubbing and grading of the project site occurring as three (3) development phases. Construction of the original greenhouse enacted the first phase of development for the subject property. The second phase of development saw additional grading and grubbing of the subject area and the construction of a new plant nursery. After the nursery program ended in 2000, a third phase of development was enacted that involved demolition of the greenhouse and construction of the Medicaid Waver Program building which presently stands on the project site.

Mr. Gill didn't recall of any cultural practices occurring in the vicinity of the project site. He described the area as vacant except for kiawe and sand. He remembered that there were man-made pathways leading through the kiawe from Baldwin High School. There was

also a dirt road which veered in from Kaahumanu Avenue, east of the project site. Mr. Gill also recalled there were a few homeless people who resided in the area. He remembered an incident which occurred many years ago, in which a criminal on-the-run managed to evade police by running through the kiawe surrounding the project site. Mr. Gill also remembered that a human skull was found on the subject property during one of the phases of development. This event occurred approximately in the year 1980, about 10 years before the establishment of the State Historic Preservation Division (SHPD). As SHPD had not yet been established at this time, authorities from the Bishop Museum were contacted to examine the find. Written documentation regarding Bishop Museum's review was not received by Mr. Gill.

Mr. Gill is supportive of the project, as long as it serves the best interests of Ka Lima O Maui's clients. He believes that the location of the project is beneficial, as it is within the vicinity of numerous social services and public facilities. Mr. Gill explained that many of Ka Lima O Maui's clients currently live in care homes or with families. By providing these clients with affordable housing, it enables them to live independently in quality living environments.

(3) <u>Jamie Woodburn</u>

Jamie Woodburn is a long-time resident of Kula and is retired. He currently is involved with consulting work, lobbying, and real estate. Mr. Woodburn is a former Executive Director for Ka Lima O Maui.

Mr. Woodburn came to Hawaii in 1968 after attending the University of Maine. After receiving his master's degree in educational psychology at the University of Hawaii, Manoa, Mr. Woodburn moved to Maui. Shortly thereafter he began working for the Ka Lima O Maui program, first as a part-time worker, and later as a full-time staff member who oversaw their welfare recipient program. He went on to become Executive Director for Ka Lima O Maui in 1984 and oversaw program development, fundraising, and various other projects.

Mr. Woodburn explained that when he began working for Ka Lima O Maui in the 1970's, the vicinity of the project site was overrun with scrub vegetation, kiawe, and sand dunes. He described the area as a "no mans land" which was void of residents or cultural practices. Maui Memorial Hospital was one of the few buildings in the area, and Mr. Woodburn recalled a drainage gulch which led from the hospital into the project site. Prior to the construction of a new greenhouse that was completed in approximately the year 1980, the drainage gulch and the remainder of the project site were graded and grubbed. During the grading and grubbing of the drainage gulch, a human skull was discovered. As the State Historic Preservation Division was not established until 1990, authorities from the Bishop Museum were contacted. Written documentation regarding Bishop Museum review was not provided to Mr. Woodburn. Mr. Woodburn also recalled that there were a few man-made trails in the area which led from Baldwin High School to the hospital.

On the project site itself, Mr. Woodburn recalls that the land was first used by Ka Lima O Maui to grow plumeria trees and coconut stalks for commercial cultivation purposes. In the early 1980's a greenhouse nursery was built on the project site, and clients were educated there on cultivation production. Using plants and flowers grown in the nursery, Ka Lima O Maui was able to generate funding through the sale of its agricultural products. The commercialized nursery program was discontinued sometime around the year 2000. At present, a building which houses Ka Lima O Maui's Medicaid Waiver Program stands in its place.

Mr. Woodburn is aware of the existing burial site which abuts the project driveway on an adjacent parcel. He believes it was discovered upon grading of the area. He has no further problems or concerns with the project. Mr. Woodburn supports the project as it addresses the island's current need to provide affordable housing for disabled and/or economically challenged individuals. He also supports the current location of the project site as it is conveniently located near appropriate support services and medical facilities.

The interviews with Hannah Kamai, Darby Gill and Jamie Woodburn did not reveal any current cultural activities, including gathering, access, or other customary activities occurring on the subject property. The project site has been previously disturbed with the development of the existing building used by Ka Lima O Maui for its Waiver Program. However, since the property is located within an area with previous cultural finds, an Archaeological Assessment Survey (AAS) was prepared. The results of the AAS confirmed that the project site and surrounding areas have been previously disturbed. The proposed project is not anticipated to adversely impact cultural practices, beliefs and features.

Notwithstanding, should there be unanticipated finds of archaeological significance, including human burials, appropriate protocols will be implemented in accordance with procedures established by the State Historic Preservation Division and the Maui/Lanai Islands Burial Council. In addition, the Office of Hawaiian Affairs (OHA) will also be contacted.

8. Air Quality

a. Existing Conditions

The Wailuku-Kahului region is not exposed to adverse air quality conditions. Point sources, such as the Maui Electric Power Plant and Hawaiian Commercial and Sugar Company's Puunene Mill and non-point sources such as automobile emissions, are not significant to generate high concentrations of pollutants. The relatively high quality of air can also be attributed to the region's constant exposure to winds which quickly disperse concentrations of emissions. This rapid dispersion is evident during burning of sugar cane in fields located southeast of the Kahului residential core.

b. Potential Impacts and Mitigation Measures

Localized air quality impacts from construction equipment and vehicles may occur during construction of the proposed project. As such, potential air quality impacts during construction will be mitigated by complying with the provisions of the State Department of Health Administrative Rules, Title 11, Chapter 60, Air Pollution. Measures which may be taken to reduce air quality impacts include water spraying and sprinkling of loose or exposed soil, erecting dust screens, and re-vegetating or paving exposed areas as soon as practicable. Exhaust emissions from construction vehicles are anticipated to have a negligible impact on regional air quality as the emissions would be relatively small and readily dissipated.

No significant long-term air quality impacts are anticipated as a result of the proposed project.

9. Noise

a. Existing Conditions

Existing background noise levels are primarily attributable to traffic noise along Kaahumanu Avenue. Intermittent noise in the vicinity of the project site may be generated by activity originating from neighboring urbanized properties.

b. Potential Impacts and Mitigation Measures

During construction of the proposed project, construction noise will be unavoidable. Operation of construction equipment, such as backhoes, trucks, and generators, will raise ambient noise levels in the vicinity of the project site. Construction noise impacts will be mitigated through compliance with the provisions of the State of Hawaii DOH Administrative Rules, Title 11, Chapter 46, "Community Noise Control." These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in the Chapter 46 rules. In complying with Chapter 46, the contractor will be responsible for minimizing noise by properly maintaining noise mufflers and by utilizing other noise-attenuating equipment. Construction will be limited to normal daylight hours.

After construction, noise associated with project implementation is not anticipated to be significant.

10. Visual Resources

a. Existing Conditions

Scenic resources to the west of the project site include the Iao Valley and the West Maui Mountains. Looking east, Haleakala is visible. To the north, lies Kahului Harbor and the Pacific Ocean. The project site is located in an urbanized area and is surrounded by developed properties, including Maui Memorial Medical Center, MEO, the Cameron Center, the Maui Police Department, and Kaiser Permanente Maui Lani Clinic.

The project site is not part of a significant view corridor. The property is located at the rear of existing buildings which currently block views from public streets. Furthermore, the property is at a lower elevation than its neighboring properties, to the west and south.

b. Potential Impacts and Mitigation Measures

The subject property is not part of a scenic corridor and will not affect views from inland vantage points. The maximum building height is anticipated to be approximately 30 feet, which is compatible with adjacent public/quasi-public structures. Further, the subject property is at a lower elevation than Kaahumanu Avenue and separated by the Police Department property. On the west side, the Kaiser Maui Lani Clinic property is significantly higher than the subject property with a retaining wall along the property boundary. Accordingly, the proposed project is not anticipated to have an adverse impact upon the visual character of the surrounding area.

11. Outdoor Lighting

a. Existing Conditions

Existing lighting fixtures in the project vicinity include street lights illuminating Kaahumanu Avenue, Maui Lani Parkway, as well as Mahalani Street. Nearby developed properties, including Kaiser Permanente Maui Lani Clinic and St. Francis Dialysis Center along Maui Lani Parkway, as well as

properties along Mahalani Street, including the County of Maui Police Station, Cameron Center, and Maui Memorial Medical Center, also utilize parking lot and exterior building light fixtures.

b. Potential Impacts and Mitigation Measures

Lighting for the proposed parking lot will be designed to balance the need to minimize light spillage and pollution with security and safety requirements. In addition, lighting design will specify the shielding of all lights and directional down lighting so that there will be no upward illumination from the poles. Similar design principles will be used for exterior lighting of the buildings, with the intent of minimizing unnecessary light spillage while allowing for an adequate level of security lighting for residents.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Population

a. Existing Conditions

The population in the County of Maui has exhibited relatively steady growth over the last decade. The resident population of Maui County in 1990 was estimated at 100,504. The year 2000 population was estimated at 128,241, which is a 28 percent increase over 1990 (DBEDT, Hawaii Census 2000). The resident population for the year 2010 is projected to be 151,300 (Maui County Planning Department, June 2006). The estimated 1990 population of the Wailuku-Kahului region was 32,816. The region's population shows an increase to 41,503 in the year 2000 (Maui County Planning Department, June 2006). By the year 2010, population is anticipated to increase to 51,312 (Maui County Planning Department, June 2006).

b. Potential Impacts and Mitigation Measures

The proposed project will provide housing for 16 Maui County residents. Given the size and scope of the proposed action, impact on population is expected to be minimal. The proposed project is not considered a direct population generator from a long-term perspective. Instead, the project is anticipated to accommodate demands for affordable housing by existing disabled and/or economically challenged individuals on Maui. Any increase

in population in the Wailuku-Kahului Community Plan region should be within expected growth parameters defined by migration and birth/death rates. Significant adverse impacts to population are not anticipated as a result of the project.

2. Economy

a. Existing Conditions

The Wailuku-Kahului region encompasses a broad range of commercial, service, and governmental activities. The Kahului Harbor, a deep sea port, and Kahului Airport, both located in the Wailuku-Kahului region, provide vital links to off-island economies and links through which virtually all imports and exports pass. The County government and major private companies are located in the Wailuku-Kahului region. The region supported an estimated 34,500 jobs as of 2002, representing approximately 44 percent of the total jobs on Maui (Maui County Planning Department, June 2006).

In June 2010, the unemployment rate for Maui Island was 8.4 percent. This represents a decrease from the June 2009, 9.1 percent unemployment rate by 0.6 percent (Hawaii Workforce Informer, 2010). In addition, the region is surrounded by significant agricultural acreages primarily in sugar cane cultivation. The vast expanse of agricultural land, managed by Hawaiian Commercial & Sugar (HC&S), is considered a key component of the local economy.

b. Potential Impacts and Mitigation Measures

On a short-term basis, the proposed action is anticipated to have a positive effect during the construction phase of development as expenditures for construction and related support services are made through local suppliers and through the employment of local labor.

From a long-term perspective, project residents will require services related to household maintenance, and goods and services which are expected to further support local business owners.

The project will provide much needed affordable housing for Maui's community in need.

Furthermore, a part of the project involves the construction of approximately 3,600 s.f. of office space. The proposed office is designed to meet the needs of Ka Lima O Maui's varied agency employment programs. This office will not only assist those residents of the facility, but will also assist Maui County residents who are economically disadvantaged and in need of support. As previously noted, Ka Lima O Maui provides job training and employment opportunities for eligible clients. This, in turn, will have a direct positive impact upon the agency's clients receiving assistance. The project will also have a positive effect upon those businesses who utilize Ka Lima O Maui's services and employ the organization's clients.

3. Housing

a. Existing Conditions

The average household size in the Wailuku-Kahului area in the year 2000 was 3.17 compared to an island wide average of 2.90. The average household size in the Wailuku-Kahului area is projected to decrease to an average of 2.98 and 2.91, respectively by the year 2010 and 2015. The percentage of single-occupant households of all owner-occupied households in 2000 was 16.3 percent (Maui County Planning Department, 2006).

In 2000, Maui County's housing supply totaled 56,377 units of which 23 percent, or 13,113 units, were located in the Wailuku-Kahului Community Plan region. This accounts for the largest percentage of housing units on the island. In the year 2000, there was a demand for 13,528 housing units in the Wailuku-Kahului region. As the number of households increases, so will the demand for housing. In the year 2010, the number of households in the Wailuku-Kahului region is estimated to be 17,229. By the year 2020, the number of households will increase to 21,383; housing demand is projected to grow up to 23,774 units (Maui Planning Department, June 2006).

b. Potential Impacts and Proposed Mitigation Measures

As noted previously, there is a demand for affordable housing of varying product types to meet the needs of Maui County. The proposed action will address this need through the provision of rental housing intended for individuals earning 50 percent of the median annual income. There is a significant need for rental housing for low income earning Maui residents.

It is noted that some housing units provided by the project may be set aside for Ka Lima O Maui's clients, many of whom are economically disadvantaged. After priority is given to Ka Lima O Maui's clients, the units will be made available to adults with disability and lastly, adults who are economically disadvantaged.

C. PUBLIC SERVICES

1. Recreational Facilities

a. Existing Conditions

The Wailuku-Kahului region encompasses a full range of recreational opportunities, including shoreline and boating activities at the Kahului Harbor and adjoining beach parks, and individual and organized athletic activities offered at numerous County parks. The War Memorial Complex, for example, located along Kaahumanu Avenue, includes a gymnasium, swimming pool, tennis courts, youth baseball fields, football and soccer practice areas, the War Memorial Stadium and baseball stadium. Also found in the Wailuku-Kahului area are the Velma McWayne Santos Community Center, Kahului Community Center, Kanaha Beach Park, and Keopuolani Park. Within the Maui Lani Project District is the Dunes at Maui Lani, a daily fee golf course and driving range open to the public.

b. Potential Impacts and Mitigation Measures

The proposed project will provide 16 single-occupancy, one bedroom apartments to Maui residents. The proposed project will not place significant new demands on recreational activities in the project area.

The project will be processed as a Section 201H-38, HRS project. An exemption from Section 18.16.320 of the Maui County Code, relating to Parks and Playgrounds will be requested. This request would exempt the project from the provision of land and/or in-lieu fees for parks and playgrounds.

2. Police and Fire Protection

a. Existing Conditions

Police protection for the Wailuku region is provided by the County Police Department headquartered at the Wailuku Station, located adjacent to the project site. The region is served by the Department's Central Maui patrol.

Fire prevention, suppression, and protection services for the Wailuku region is provided by the County Department of Fire and Public Safety's Wailuku Station, which is located less than a mile west of the subject site.

b. Potential Impacts and Mitigation Measures

The location of the proposed project within the existing Wailuku-Kahului urban core, does not extend service area limits for emergency services. Police and fire protection services are not expected to be adversely impacted by the proposed project. The proposed project will not adversely affect the service capabilities for emergency services.

3. Solid Waste

a. Existing Conditions

Single-family residential solid waste collection service is provided by the County of Maui on a weekly basis. Residential solid waste collected by County crews are disposed at the County's Central Maui Landfill, located four (4) miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies.

b. Potential Impacts and Mitigation Measures

As may be required, a solid waste management plan will be developed in coordination with the Solid Waste Division of the County Department of Environmental Management (DEM) for the disposal of clearing and grubbing material during construction. The plan will incorporate strategies for effective construction waste management to reduce, reuse, and recycle solid waste materials. Such strategies involve the use of efficient design to promote waste reduction, salvaging of material to be used by other businesses or local organizations, and by separating recyclable and non-recyclable materials for proper recycling and disposal. All materials deemed unfit for reuse or recycling will be disposed at an approved construction waste disposal site.

Construction waste disposal/recycling/reuse options that may be considered by the applicant for project implementation include:

- Recycling of cardboard, metal, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation
- Designating specific area(s) on the construction site for segregated or commingled collection of recyclable materials
- Tracking of recycling efforts
- Donating unused materials to charitable organizations
- Salvaging materials and incorporating materials into building design
- Reducing the use of finite raw materials by replacing them with rapidly renewable materials

Upon project completion, solid waste collection for the project will be provided by a private refuse collection company and disposed of at the Central Maui Landfill. The anticipated solid waste generated by the project is not expected to adversely impact the County solid waste capacity of the Central Maui Landfill. In addition, the proposed project proposes to implement a recycling program to reduce the amount of solid waste collected for disposal at the Central Maui Landfill.

4. Health Care

a. Existing Conditions

Maui Memorial Medical Center, the only major medical facility on the island, services the Wailuku-Kahului region. Acute, general and emergency care services are provided by the approximately 201-bed facility. The Kaiser Permanente Medical Care facility, St. Francis Dialysis Center, located adjacent to the project site, provides additional private health care services in the Central Maui area. In addition, numerous privately operated medical/dental clinics and offices are located in the area to serve the region's residents.

b. Potential Impacts and Mitigation Measures

The proposed project is not anticipated to increase the service demands placed upon emergency health care services.

5. Education

a. Existing Conditions

The Wailuku-Kahului region is served by the State Department of Education's public school system, as well as several privately operated schools accommodating elementary, intermediate and high school students. Department of Education facilities in the Kahului area include Pomaikai, Lihikai and Kahului Schools (Grades K to 5), Maui Waena Intermediate School (Grades 6 to 8), and Maui High School (Grades 9 to 12). Existing facilities in the Wailuku area include Wailuku Elementary School (Grades K to 5), Iao Intermediate School (Grades 6 to 8), and Baldwin High School (Grades 9 to 12). University of Hawaii-Maui College, a branch of the University of Hawaii, serves as the island's principal institution of higher education. Baldwin High School (Grades 9 to 12) is located north of the project site, beyond Kaahumanu Avenue. In addition, there are several private schools in the Wailuku-Kahului area.

b. Potential Impacts and Mitigation Measures

The project plans reflect single occupancy dwelling units for adults. With the exception of one (1) unit to house a Ka Lima O Maui staff person, children will not live in the complex. The proposed project is not anticipated to adversely affect enrollments or locations of educational facilities.

D. INFRASTRUCTURE

1. Roadways

a. Existing Conditions

Roadway Network: The Wailuku-Kahului region is served by a roadway network which includes arterial, collector and local roads. Existing roadways in the vicinity of the project site include Kaahumanu Avenue to the north, Maui Lani Parkway to the west, and Mahalani Street to the east. See **Appendix "B"**.

Kaahumanu Avenue is the principal linkage between Wailuku and Kahului. Kaahumanu Avenue is a four-lane, divided roadway with a raised median. Exclusive left-turn lanes are provided in the median of Kaahumanu Avenue and right-turn acceleration and deceleration lanes are provided at selected access locations. The posted speed limit for Kaahumanu Avenue in the vicinity of the project site is 45 miles per hour (mph) .

Maui Lani Parkway is a four-lane, divided roadway completed between Kaahumanu Avenue and Waiinu Road. This existing segment is an initial phase of a roadway that will, in the future, extend to Kuihelani Highway providing an alternative route to Kaahumanu Avenue. The existing configuration provides an alternative path to the High Street/Main Street route through Wailuku Town for vehicles traveling between areas located south of Wailuku and areas to the east of Wailuku. Maui Lani Parkway also serves as an alternative access to Mahalani Street. It is anticipated that Maui Lani Parkway will be dedicated to the County of Maui in the future.

Mahalani Street is a four-lane, two (2) way roadway with a posted speed limit of 20 mph that provides access to the project site. It intersects with

Kaahumanu Avenue at a signalized intersection, located roughly north of the project site.

b. Potential Impacts and Mitigation Measures

A Traffic Impact Assessment Report (TIAR) was prepared for the proposed project by Philip Rowell and Associates in February 2010. Refer to **Appendix "B".**

The TIAR analyzes the traffic impacts and related characteristics of the proposed project. Traffic impacts are assessed using the Level of Service (LOS) ratings as determined by the Highway Capacity Manual – HCM 2000 methodology. LOS is a qualitative measurement "A" through "F" in which LOS A represents ideal or free-flowing traffic operating conditions and LOS F represents unacceptable or potentially congested traffic operating conditions. The LOS for the analyzed intersections was then determined for both the AM and PM peak periods.

The following intersections were analyzed as part of the study:

- Kaahumanu Avenue at Mahalani Street and Kanaloa Avenue
- Mahalani Street at Project Driveway

Peak hour traffic analyses were based on traffic counts and projections for a morning peak hour of 7:15 a.m. to 8:15 a.m. and an afternoon peak hour of 4:15 p.m. to 5:15 p.m. for the Kaahumanu Avenue/Mahalani Street intersection and 3:30 p.m. to 4:30 p.m. for the Mahalani Street/Project Drive intersection.

The traffic study examined existing traffic conditions in the area and estimated future background traffic conditions with and without the project. The horizon year of 2012 was used as a reference point from which to analyze future traffic conditions. The 2012 background traffic projections were calculated by expanding existing traffic volumes by the appropriate growth rates and then superimposing traffic generated by related projects.

The LOS analysis of the intersections was performed for background and background plus project conditions. The results of the LOS analysis for 2012 conditions are summarized below:

Kaahumanu Avenue at Mahalani Street – Overall, the intersection will operate at LOS D, with and without project generated traffic during the morning and afternoon peak hours.

1. The Kaahumanu Avenue eastbound left, thru, and right movements through the intersection will operate at LOS E, D, and C, respectively, with and without project generated traffic during the morning peak hour. During the afternoon peak hour, the eastbound left, thru, and right movements through the intersection will operate at LOS F, D, and C, respectively, with and without project generated traffic.

2. The Kaahumanu Avenue westbound left, thru, and right movements through the intersection will operate at LOS E, D, and A, respectively, with and without project generated traffic during the morning peak hour. During the afternoon peak hour, the westbound left, thru, and right movements through the intersection will operate at LOS F, D, and A respectively, with and without project generated traffic.

3. The Mahalani Street northbound left, thru, and right movements through the intersection will operate at LOS D, E, and A respectively, with and without project generated traffic during the morning peak hour. During the afternoon peak hour, the northbound left, thru, and right movements through the intersection will operate at LOS E, F, and A respectively, with and without project generated traffic.

4. The Mahalani Street southbound left, thru, and right movements through the intersection will operate at LOS E, E, and A, respectively, with and without project generated traffic during the morning peak hour. In the afternoon peak hour, the southbound left, thru, and right movements through the intersection will operate at LOS F, F, and A, respectively, with and without project generated traffic.

Overall, the change in delay as a result of project generated impact is estimated to be less than one percent.

Mahalani Street at Project Driveway

1. The eastbound left movements from the Project Driveway will operate at LOS C with and without project generated traffic, during both peak periods. The change in delay for the morning peak period is estimated to be 1.5 seconds per vehicle. The change in delay for the afternoon peak period is estimated to be 1.2 seconds per vehicle.

2. The eastbound right movements from the Project Drive will operate at LOS A with and without project generated traffic, during both peak periods.

3. The northbound left and thru movements through Mahalani Street will operate at LOS A with and without project generated traffic, during both peak periods.

Traffic Assessment Summary

The proposed project will generate an estimated 14 trips during the morning peak hour and 22 trips during the afternoon peak hour. The horizon year of 2012 was used as a reference point from which to analyze future traffic conditions. The following provides a summary of the LOS analysis for 2012.

The intersection of Kaahumanu Avenue and Mahalani Street will operate at an overall LOS D during both peak hours, with and without project generated traffic. LOS D is typically considered acceptable for peak hour conditions in urban areas. Since the overall intersection will operate at LOS D and the overall change in delay is one percent or less, no mitigation is recommended.

All movements at the Mahalani Street and Project Driveway intersection will operate at an overall LOS C or better during both peak hours, with and without project generated traffic. Because there is no change in the LOS as a result of project generated traffic, no mitigation is recommended for the project.

It is noted that the applicant is seeking an exemption to Chapter 14.76, MCC, to exempt the affordable component of the project from traffic impact fees. Given the affordable nature of the project, an exemption from regional roadway improvements is also being sought.

2. Wastewater

a. Existing Conditions

Domestic wastewater generated in the Wailuku-Kahului region is conveyed to the County's Wailuku-Kahului Wastewater Reclamation Facility (WWRF) located one-half mile south of Kahului Harbor. The design capacity of the facility is 7.9 million gallons per day (MGD). As of March 2010, the average daily flow into the WWRF is approximately 4.9 MGD. The facility serves the Kahului, Wailuku, Paia, Kuau and Spreckelsville areas.

Wastewater generated from the existing Medicaid Waiver facility on the subject property is conveyed into an 8-inch sewerline which traverses outside and runs parallel to the property's eastern boundary. This wastewater in turn is transported to the WWRF in Kahului. See **Appendix "C"**.

b. Potential Impacts and Mitigation Measures

The proposed project will utilize the existing 8-inch sewerline located along the eastern boundary of the site. The anticipated average daily flow of wastewater from the project is approximately 4,900 gallons per day. This wastewater will continue to be transported to the WWRF in Kahului. According to the County of Maui, Wastewater Reclamation Division, the WWRF has total allocation, including projects already permitted, of 6.95 MGD. The remaining capacity is sufficient to accommodate the additional wastewater generated from the project at this time. As a result, no adverse impacts to regional wastewater facilities are anticipated as a result of project implementation. Refer to **Appendix "C"**.

3. Water

a. Existing Conditions

Domestic water for the Wailuku-Kahului region is provided by the Department of Water Supply's Central Maui System. The Central Maui System water sources are located on the windward slope of the West Maui Mountains. The major source of water for this system is the Iao Aquifer. Approximately 75 percent of the water to supply the Central Maui System is withdrawn from the Iao Aquifer which is located in the vicinity of the Iao Stream and Waiehu Stream. The remaining 25 percent is withdrawn from Waihee Aquifer to the northwest. The sustainable yield of the Iao Aquifer is 20 MGD. Domestic water and fire protection for the project area are from the 3.0 million gallon Mokuhau tank and wells in Happy Valley.

The project site is serviced by an existing 12-inch waterline on Mahalani Street which provides domestic water and fire protection for the property. The project site currently utilizes a 1-1/2-inch water meter and detention meter, located along Mahalani Street, and an 8-inch fireline with one fire hydrant for fire protection on the property. Refer to **Appendix "C"**.

b. Potential Impacts and Mitigation Measures

The proposed project is not anticipated to adversely impact existing water systems.

The proposed project will require approximately 11,358 gallons of water per day to meet domestic demands and will utilize the existing 1-1/2-inch water meter on the property. Additional fire hydrants will be installed on the property, as needed to address fire code requirements of the County of Maui, Fire Department. No adverse impacts to the County water system are anticipated as a result of the proposed project. Refer to **Appendix "C"**.

A Section 201H-38, HRS application will be filed with the Maui County Council requesting an exemption from Chapter 14.12 pertaining to the County's water availability policy.

4. Drainage

a. Existing Conditions

At present, an existing Medicaid Waiver building is located on the subject property. The elevation of the project site ranges from approximately 129 feet above mean sea level (amsl) at the southwest corner to 89 feet amsl at the northeast corner. The ground slopes down from the western property line, lies flat along the Medicaid Waiver building area, and slopes down toward the eastern property line, with an average slope of 15.4 percent for the property. The estimated flow for a 50-year, 1-hour storm from the project site is 4.74 cfs, with a generated storage volume of 2,561 cubic feet. Currently, there are no drainage facilities on the site and onsite runoff sheet flows across the property in a west to east direction, eventually draining into adjacent properties. An existing catch basin is located along the offsite access roadway, approximately 190 feet to the west of the project site, and captures some of the runoff from the subject property. Refer to **Appendix "C"**.

b. Potential Impacts and Mitigation Measures

No adverse impacts to downstream environments or to natural drainage patterns surrounding the project site are anticipated as a result of project implementation.

Using a 50-year, 1-hour storm, it is estimated that the proposed development will produce approximately 7.80 cfs of runoff, a net increase of 3.06 cfs over the existing conditions. The storage volume of the project site will also increase by 716 cubic feet to a total storage volume of 3,277 cubic feet.

New grated inlet catch basins will be installed within the project site to collect a portion of the surface runoff from the paved parking lot and landscape areas and convey it into onsite subsurface drainage systems. Overflows from the subsurface drainage system will be released on the lower end of the project site and continue to flow down the access roadway, following existing conditions. The remainder of the onsite surface runoff will continue to sheet flow along its existing drainage pattern.

The proposed drainage improvements will be designed to accommodate any changes in surface runoff at the project sites. The improvements will accommodate the increased post development runoff and will be designed, at a minimum, with an additional 20 percent capacity. Drainage design criteria to minimize alterations will be in accordance with the drainage standards for the County of Maui. Refer to **Appendix "C"**.

As may be required, a National Pollutant Discharge Elimination System (NPDES) permit for discharge of stormwater associated with construction activities will be obtained and the requirements of the approved NPDES permit and Best Management Practices (BMPs) plan would be adhered to during construction. At a minimum silt fences, diversion berms and dust screens will be included in the BMP plan. Monitoring of the BMPs during construction will be the responsibility of the selected contractor.

5. Electrical, Telephone and CATV Systems

a. Existing Conditions

Electrical, telephone and CATV service is provided via overhead lines along Kaahumanu Avenue, to the north and Mahalani Street to the east of the project site. Electrical, telephone and CATV facilities along Maui Lani Parkway have been undergrounded. Services are provided by Maui Electric Company, Ltd., Hawaiian Telcom and Oceanic Time Warner Cable. An existing control panel is located along the northern property line which provides service to the existing facilities.

b. Potential Impacts and Mitigation Measures

The project site will be served by the existing underground electrical, telephone and CATV distribution systems servicing the project site. The electric and telephone upgrades will be installed in accordance with utility company rules and regulations.

No adverse impacts to electrical, telephone and CATV systems are anticipated as a result of project implementation.

E. CUMULATIVE AND SECONDARY IMPACTS

Cumulative impacts are defined as the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

The proposed project is not part of a larger action, nor would it occur within the context of such actions. It is noted, however, that the County of Maui's ongoing General Plan update process will involve the formulation of a Maui Island Plan (MIP) which would delineate urban and rural growth boundaries. The subject property is included in the urban growth boundary of the draft MIP. The overall time frame for the General Plan covers a planning horizon up to the year 2030.

In the General Plan context, future regional growth opportunity in surrounding lands in the Wailuku-Kahului region is envisioned.

Secondary impacts are those which have the potential to occur later in time or farther in distance, but are still reasonably foreseeable. They can be viewed as actions of others that are taken because of the presence of the project. Secondary impacts from highway projects, for example, can occur because they can induce development by removing one of the impediments to growth-transportation access. The provision of affordable housing in Central Maui will ensure the adequacy of needed affordable housing over the long term. Specifically, the proposed affordable housing will provide housing for special needs and/or very low income persons which is in limited supply.

The project is not anticipated to have a significant adverse impact on the physical environment. Necessary infrastructure systems and services can be reasonably provided to serve the project. Consequently, the proposed action is not anticipated to result in significant adverse secondary impacts.

III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES AND CONTROLS

III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES AND CONTROLS

A. STATE LAND USE DISTRICTS

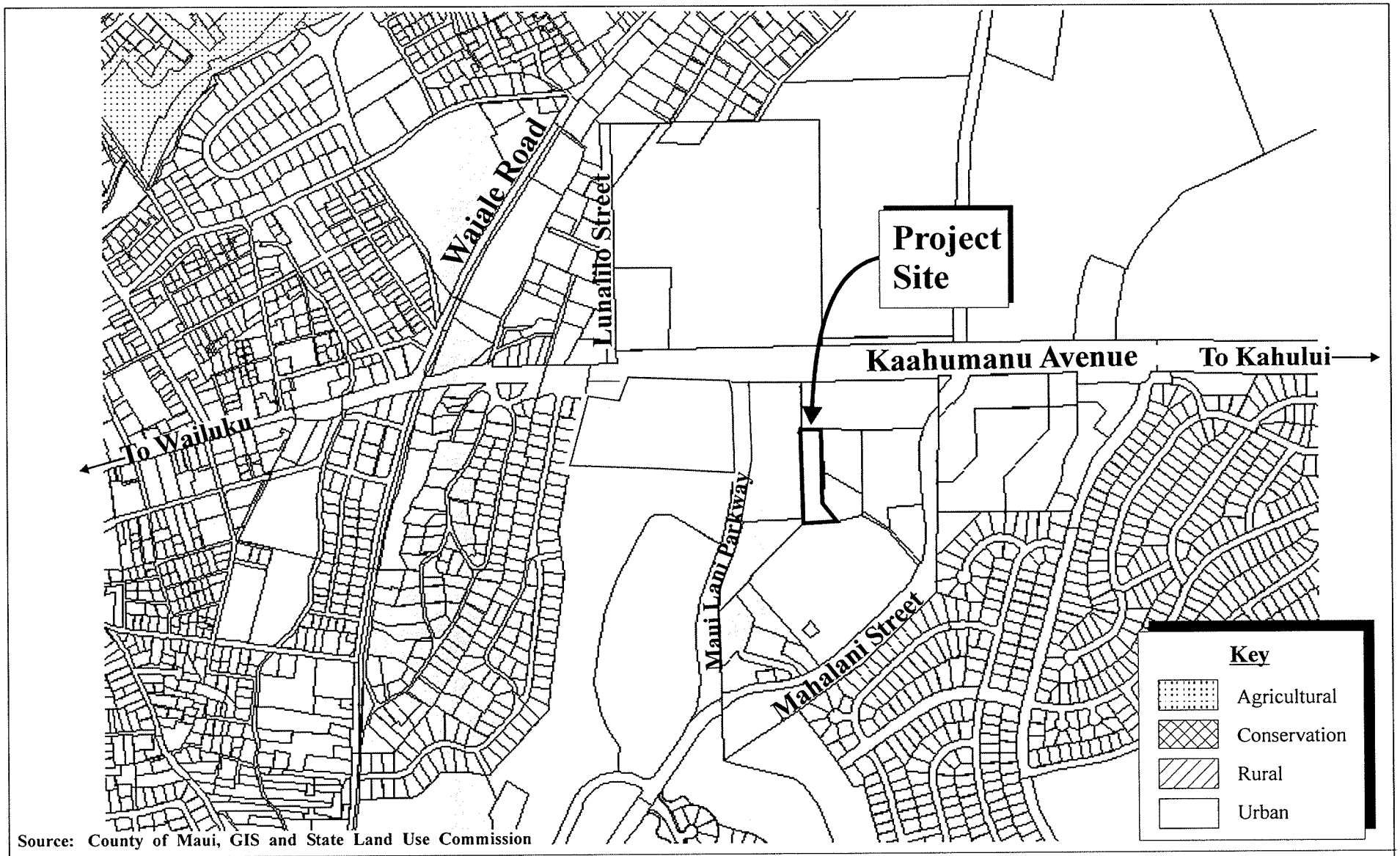
Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes the four (4) major land use districts in which all lands in the State are placed. These districts are designated "Urban", "Rural", "Agricultural", and "Conservation". The subject property is located within the "Urban" district. See **Figure 7**. The proposed use of the property is consistent with "Urban" district provisions.

B. MAUI COUNTY GENERAL PLAN

As indicated by the Maui County Charter, the purpose of the general plan shall be to:

> *... indicate desired population and physical development patterns for each island and region within the county; shall address the unique problems and needs of each island and region; shall explain opportunities and the social, economic, and environmental consequences related to potential developments; and shall set forth the desired sequence, patterns and characteristics of future developments. The general plan shall identify objectives to be achieved, and priorities, policies, and implementing actions to be pursued with respect to population density; land use maps, land use regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design, and other matters related to development.*

Chapter 2.80B of the Maui County Code, relating to the General Plan and Community Plans, implements the foregoing Charter provision through enabling legislation which calls for a Countywide Policy Plan and a Maui Island Plan. The Countywide Policy Plan was adopted as Ordinance No. 3732 on March 24, 2010. The Maui Island Plan is currently in the process of review and formulation by the Maui County Council.



Source: County of Maui, GIS and State Land Use Commission

Figure 7

Proposed Ka Lima O Maui Affordable Housing Project

State Land Use District Designations

NOT TO SCALE

Prepared for: Ka Lima O Maui, Ltd.

MUNEKIYO & HIRAGA, INC.

KaLimaOMaui\AffHousing\slud

With regard to the Countywide Policy Plan, Section 2.80B.030 of the Maui County Code states the following.

> *The countywide policy plan shall provide broad policies and objectives which portray the desired direction of the County's future. The countywide policy plan shall include:*
>
> *1. A vision for the County;*
> *2. A statement of core themes or principles for the County; and*
> *3. A list of countywide objectives and policies for population, land use, the environment, the economy, and housing.*

Core principles set forth in the Countywide Policy Plan are listed as follows:

1. Excellence in the stewardship of the natural environment and cultural resources;
2. Compassion for and understanding of others;
3. Respect for diversity;
4. Engagement and empowerment of Maui County residents;
5. Honor for all cultural traditions and histories;
6. Consideration of the contributions of past generations as well as the needs of future generations;
7. Commitment to self-sufficiency;
8. Wisdom and balance in decision making;
9. Thoughtful, island appropriate innovation; and
10. Nurturance of the health and well-being of our families and our communities.

Congruent with these core principles, the Countywide Policy Plan identifies goals objectives, policies and implementing actions for pertinent functional planning categories, which are identified as follows:

1. Natural environment

2. Local cultures and traditions

3. Education

4. Social and healthcare services

5. Housing opportunities for residents

6. Local economy

7. Parks and public facilities

8. Transportation options

9. Physical infrastructure

10. Sustainable land use and growth management

11. Good governance

With respect to the proposed Ka Lima O Maui Affordable Housing Project, the following goals, objectives, policies and implementing actions are illustrative of the project's compliance with the Countywide Policy Plan.

Strengthen Social and Healthcare Services

Goal: Health and social services in Maui County will fully and comprehensively serve all segments of the population.

Objective:

1. In cooperation with the Federal and State governments and nonprofit agencies, broaden access to social and healthcare services and expand options to improve the overall wellness of the people of Maui County.

Policies:

a. Work with other levels of government and the nonprofit sector to expand services to address hunger, homelessness, and poverty.

* * *

f. Encourage equal access to social and healthcare services through both technological and traditional means.

Objective:

2. Encourage the Federal and State governments and the private sector to improve the quality and delivery of social and healthcare services.

Policies:

a. Strengthen partnerships with government, nonprofit, and private organizations to provide funding and to improve counseling and other assistance to address substance abuse, domestic violence, and other pressing social challenges.

* * *

e. Support improved social, healthcare, and governmental services for special needs populations.

Expand Housing Opportunities for Residents

Goal: Quality, island-appropriate housing will be available to all residents.

Objective:

1. Reduce the affordable housing deficit for residents.

Policies:

a. Ensure that an adequate and permanent supply of affordable housing, both new and existing units, is made available for purchase or rental to our resident and/or workforce population, with special emphasis on providing housing for low- to moderate-income families, and ensure that all affordable housing remains affordable in perpetuity.

* * *

c. Seek innovative methods to secure land for the development of low- and moderate-income housing.

* * *

e. Provide for a range of senior-citizen and special needs housing choices on each island that affordably facilitates a continuum of care and services.

* * *

k. Ensure residents are given priority to obtain affordable housing units developed in their communities, consistent with all applicable regulations.

Objective:

2. Increase the mix of housing types in towns and neighborhoods to promote sustainable land use planning, expand consumer choice, and protect the County's rural and smalltown character.

Policy:

d. Promote infill housing in urban areas at scales that capitalize on existing infrastructure, lower development costs, and are consistent with existing or desired patterns of development.

Objective:

3. Increase and maintain the affordable housing inventory.

Policies:

a. Recognize housing at a basic human need, and work to fulfill that need.

* * *

c. Improve communication, collaboration, and coordination among housing providers and social-service organizations.

* * *

e. Develop public-private and nonprofit partnerships that facilitate the construction of quality affordable housing.

f. Streamline the review process for high-quality, affordable housing developments that implement the goals, objectives, and policies of the General Plan.

* * *

h. Encourage long-term residential use of existing and future housing to meet residential needs.

Strengthen the Local Economy

Goal: Maui County's economy will be diverse, sustainable, and supportive of community values.

Objective:

1. Promote an economic climate that will encourage diversification of the County's economic base and a sustainable rate of economic growth.

Policies:

a. Support economic decisions that create long-term benefits.

* * *

c. Invest in infrastructure, facilities, and programs that foster economic diversification.

* * *

f. Encourage work environments that are safe, rewarding, and fulfilling to employees.

In summary, the Ka Lima O Maui affordable housing project, is consistent with the themes and principles of the Countywide Policy Plan.

C. WAILUKU-KAHULUI COMMUNITY PLAN

The subject parcel is located in the Wailuku-Kahului Community Plan region which is one (1) of nine (9) Community Plan regions established in the County of Maui. Planning for each region is guided by the respective Community Plans, which are designed to implement the

Maui County General Plan. Each Community Plan contains recommendations and standards which guide the sequencing, patterns and characteristics of future development in the region.

The Wailuku-Kahului Community Plan was adopted by the County of Maui through Ordinance No. 3061 which took effect on May 30, 2002.

Land use guidelines are set forth by the Wailuku-Kahului Community Plan Land Use Map. As shown in **Figure 8**, the lands underlying the subject property have been designated as "Public-Quasi Public". The Section 201H-38, HRS request for the project will include an exemption from the requirements of processing an application for a Community Plan Amendment.

The proposed project is in conformance with the following, more general, goals, objectives, and policies of the Wailuku-Kahului Community Plan.

HOUSING

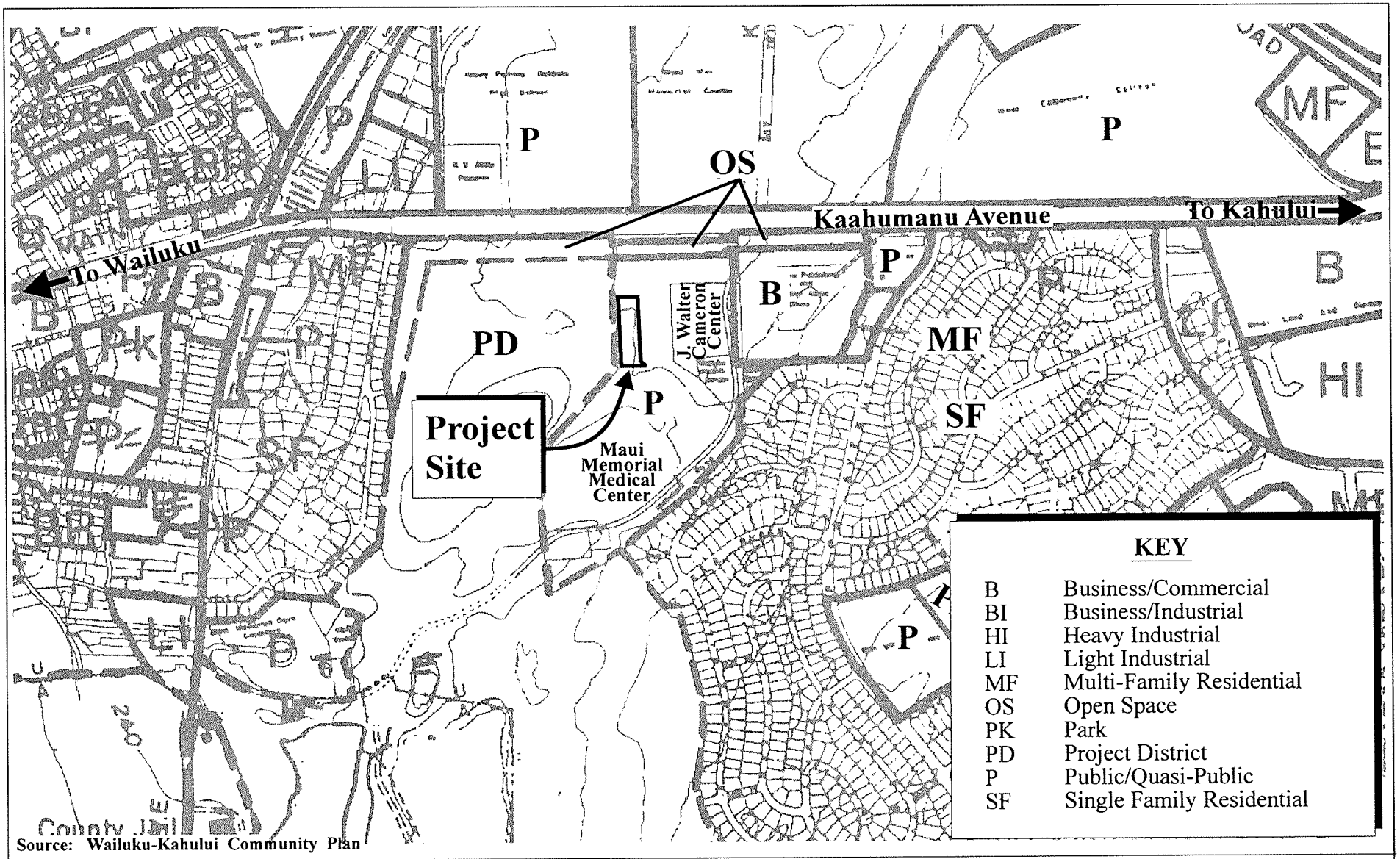
Goal:

A sufficient supply and choice of attractive, sanitary, and affordable housing accommodations for the broad cross section of residents, including the elderly.

Objectives and Policies:

Provide sufficient land areas for new residential growth which relax constraints on the housing market and afford variety in type, price, and location of units. Opportunities for the provision of housing are presently constrained by a lack of expansion areas. This condition should be relieved by a choice of housing in a variety of locations, both rural and urban in character.

The proposed Ka Lima O Maui Affordable Housing Project will provide quality affordable housing for disabled and/or economically disadvantaged residents of Maui in a convenient, centralized location in Wailuku. The project is consistent with the objectives, policies and implementing actions of the Wailuku-Kahului Community Plan.



Source: Wailuku-Kahului Community Plan

Figure 8

Proposed Ka Lima O Maui Affordable Housing Project

Community Plan Map

NOT TO SCALE

Prepared for: Ka Lima O Maui, Ltd.

MUNEKIYO & HIRAGA, INC.

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D. COUNTY ZONING

The subject property is designated "R-3, Residential" by Maui County zoning. While the current zoning does not allow for the proposed offices and multi-family residential use, a 201H-38, HRS application will be filed with the Maui County Council. Included in the 201H-38 application is a request to exempt the project from the County's Title 19 standards processes which will enable full project implementation.

E. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES

Pursuant to Chapter 205A, Hawaii Revised Statutes, projects are evaluated with respect to Coastal Zone Management (CZM) objectives, policies and guidelines. It is noted that while the subject property is not located within the County of Maui's Special Management Area, the project's relationship to applicable coastal zone management considerations have been reviewed and assessed.

(1) Recreational Resources

Objective:

Provide coastal recreational opportunities accessible to the public.

Policies:

(A) Improve coordination and funding of coastal recreational planning and management; and

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

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

(ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

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

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

(v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

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

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

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

Response: The proposed project is not located near the shoreline and is not anticipated to adversely impact existing coastal or inland recreational resources. The proposed project will not affect existing public access to the shoreline.

(2) Historic Resources

Objective:

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

Policies:

(A) Identify and analyze significant archeological resources;

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

(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: As stated previously, an archaeological assessment survey report (by Xamanek Researches, LLC.), was produced to identify and issue recommendations regarding historic, cultural and archaeological resources. The report found no significant archaeological features or historic properties within the project site and concluded that no adverse impacts to archaeological resources as a result of project implementation are anticipated. Refer to **Appendix "A"**. Should human remains be inadvertently discovered during land-based, ground–altering activities, work will promptly cease in the immediate area of the find, and the find will be further protected from damage. The State Historic Preservation Division (SHPD), the Office of Hawaiian Affairs (OHA), and the Maui/Lanai Islands Burial Council will be notified immediately and procedures for the treatment of inadvertently discovered human remains will be followed pursuant to Chapter 6E, HRS.

(3) Scenic and Open Space Resources

Objective:

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

Policies:

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

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

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

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

Response: The subject property is located within Maui's central isthmus and within an urbanized area of Maui. The urban forms established by the proposed project plan will be buffered with landscaping, as well as surrounded by existing structures on

neighboring developed properties. There are no significant view corridors which will be affected by the proposed project.

(4) Coastal Ecosystems

Objective:

Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(A) Improve the technical basis for natural resource management;

(B) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

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

(D) Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.

Response: The proposed project is not anticipated to adversely impact coastal ecosystems. Runoff will be mitigated through onsite drainage improvements. Drainage improvements will be designed in accordance with applicable regulatory standards to ensure that there is no adverse effect on downstream properties.

In addition, Best Management Practices (BMPs) will be implemented during the construction of the project to minimize disruption of coastal water ecosystems. At a minimum silt fences, diversion berms and dust screens will be included in the BMP plan. Monitoring of the BMPs during construction will be the responsibility of the selected contractor. The completion of the proposed project is not expected to adversely impact coastal ecosystems.

(5) Economic Uses

Objective:

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

Policies:

(A) Concentrate coastal dependent development in appropriate areas;

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

(C) 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:

(i) Use of presently designated locations is not feasible;

(ii) Adverse environmental effects are minimized; and

(iii) The development is important to the State's economy.

Response: In addition to the 16 residential units, the proposed action is designed to provide office space for Ka Lima O Maui. Ka Lima O Maui is one of the oldest non-profit businesses and the largest employer of the disabled on the island. It is anticipated that the proposed project will assist in the promotion of economic sustainability within the County of Maui for those individuals who are disabled and/or economically disadvantaged. The proposed project is in keeping with objectives and policies relating to economic uses.

(6) Coastal Hazards

Objective:

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

Policies:

(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;

(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;

(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program;

(D) Prevent coastal flooding from inland projects; and

(E) Develop a coastal point and nonpoint source pollution control program.

Response: According to the Flood Insurance Rate Map for the area, the project site is located within "Zone X", areas determined outside of the 0.2 percent annual flood plain. No significant adverse drainage impacts to downstream properties are anticipated as a result of project implementation. It is also noted that the proposed project will be designed in accordance with the Drainage Standards of the County of Maui to ensure that the project will not adversely affect downstream and adjoining properties from the effects of flooding and erosion.

(7) Managing Development

Objective:

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

Policies:

(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

(B) Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and

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

Response: In compliance with the requirements of Chapter 343, Hawaii Revised Statutes, this Environmental Assessment has been prepared to facilitate public understanding and involvement with the proposed project. All aspects of the development will be conducted in accordance with applicable Federal, State, and County standards. Opportunities for review of the proposed action are also offered through the regulatory review process for the Section 201H-38, HRS application.

(8) Public Participation

Objective:

Stimulate public awareness, education, and participation in coastal management.

Policies:

(A) Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;

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

(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: Opportunities for agency and public review of the proposed action are provided through the notification, review and comment processes of the EA requirements of Chapter 343, HRS, as well as through the review process for the Section 201H-38, HRS application for the project. Early consultation letters were mailed to the adjacent property owners. No comments were received from these owners.

(9) Beach Protection

Objective:

Protect beaches for public use and recreation.

Policies:

(A) Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;

(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Response: The proposed project will not involve construction in the vicinity of shoreline areas. It is noted that during grading activities associated with the proposed project, appropriate BMPs will be utilized to ensure that the downstream coastal environment is not adversely impacted. The proposed project is not anticipated to have an adverse effect on local beach environments.

(10) Marine Resources

Objective:

Implement the State's ocean resources management plan.

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(B) Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(C) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;

(D) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

(E) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information

necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

(F) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Response: The proposed project is not located adjacent to any beach or shoreline. The proposed project is not anticipated to have adverse effects upon marine and coastal resources in the project vicinity.

In addition to the foregoing objectives and policies, SMA permit review criteria pursuant to Act 224 (2005) provides that:

> No Special Management Area Use Permit or Special Management Area Minor Permit shall be granted for structures that allow artificial light from floodlights, uplights, or spotlights used for decorative or aesthetic purposes when the light:
>
> (1) Directly illuminates the shoreline and ocean waters; or
> (2) Is directed to travel across property boundaries toward the shoreline and ocean waters.

As previously noted, the proposed project is not located within the Special Management Area. Nevertheless the proposed project's lighting design will specify the shielding of all lights and directional down lighting. Lighting design parameters should mitigate light pollution and prevent lighting from traveling across property boundaries.

IV. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

IV. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed Ka Lima O Maui Affordable Housing Project will result in some construction-related impacts as described in Chapter II, Description of the Existing Conditions, Potential Impacts and Mitigation Measures. 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. However, these impacts are anticipated to be temporary and will be mitigated through the use of appropriate BMPs. Implementation of the proposed project is not anticipated to create significant long-term adverse environmental effects.

V. ALTERNATIVES TO THE PROPOSED ACTION

V. ALTERNATIVES TO THE PROPOSED ACTION

A. PREFERRED ALTERNATIVE

The proposed development of a 100 percent affordable housing project involving the construction of 16 single-occupancy, one bedroom apartments, together with the proposed office and storage spaces, and Medicaid Waiver Program was deemed an appropriate use for the property given the surrounding public/quasi-public land uses. This project will provide housing for Maui's population of disabled and/or economically challenged individuals in a location that is available, underused, and in proximity to similar land uses. As the housing is focused towards disabled and/or economically challenged individuals, it will be in the interests of the residents to live in an area with programs and services which cater specifically to their needs. Residents will have ready access to services offered at the neighboring MEO, Cameron Center, Maui Memorial Medical Center, Kaiser Permanente Maui Lani Clinic, as well as recreational centers, such as War Memorial Gym and Keopuolani Park.

Furthermore, the site has been leased by Ka Lima O Maui since 1982, and has been used by the organization to operate its Medicaid Waiver Program since 2002. Ka Lima's current lease with the County of Maui will expire in 2059. Currently, the Applicant's business office is located in the adjacent Cameron Center. Upon project completion, Ka Lima O Maui will relocate its business office to the proposed 3,600 s.f. office on the subject property. The proposed project site offers the convenience to client-residents of living just a short distance away from the organization's administrative function.

B. NO ACTION ALTERNATIVE

The "no action" alternative calls for retaining the project site in its current underutilized condition. If the "no action" alternative were implemented, the project site would continue to be used as a site for Ka Lima O Maui's Medicaid Waiver Program, which is in need of renovation, and a small equipment shed, used for storing landscaping and custodial equipment.

The "no action" alternative would not meet the housing needs of Maui's population of disabled and/or economically challenged individuals. Furthermore, this alternative would not provide Ka Lima O Maui the opportunity to improve its services to meet the needs of the organization's varied agency employment programs. Such services are in significant need given the current economic climate of our island and state.

C. DEFERRED ACTION ALTERNATIVE

A "deferred action" alternative would have similar consequences as the "no action" alternative in that the proposed project would be delayed and would not be immediately realized. This alternative would not respond to meet the housing needs of Maui's population of disabled and/or economically challenged individuals. Nor would this alternative meet the needs of Ka Lima O Maui to improve its services.

D. ALTERNATIVE LOCATIONS

Vacant land behind the Maui News' offices (located across the Mahalani Street from the project site) was briefly considered as a possible project site location in the preliminary stages of project development, however, due to the lot's small size, the project site's present location was deemed more suitable.

Furthermore, the current project site is under lease to the Applicant from the County of Maui until 2059. There are no other sites readily available to the organization for project development. To ensure timely implementation of the project, Ka Lima O Maui has determined that utilizing the subject property offers the preferred site option in lieu of seeking alternative land acquisition opportunities.

E. ALTERNATIVE DESIGN CONSIDERATIONS

In its current form, the project design designates the placement of residential living areas at the rear, with administrative offices near the front entrance of the property. An alternative to this design was considered, involving the placement of administrative offices in the rear of the complex and moving the residential living areas to the front. However, from a functional standpoint, the current spatial layout offers Ka Lima O Maui administration personnel and affiliated workers the opportunity to better monitor the health and overall well-being of the residents, as well as offer increased social interaction between all members of the housing

complex. Such interactions between the residents and workers provide benefits to the disabled and/or economically challenged individuals living there, as they may not receive such specialized attention within other typical housing developments focused towards the general public. Therefore, the proposed design was considered to be the most appropriate alternative given the needs of the project's intended occupants.

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed action will not entail a substantial commitment of public services or resources. Development of the proposed project will involve a commitment of energy, labor, fiscal, and material resources. The use of these resources, when weighed against the expected benefit to be derived from the project, is not considered an adverse commitment.

VII. SIGNIFICANCE CRITERIA ASSESSMENT

VII. SIGNIFICANCE CRITERIA ASSESSMENT

The "Significance Criteria", Section 12 of the Administrative Rules, Title 11, Chapter 200, "Environmental Impact Statement Rules", were reviewed and analyzed to determine whether the proposed project will have significant impacts to the environment. The following criteria and preliminary analysis are provided.

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

   Temporary environmental effects associated with the construction of a new housing development will occur. However, these effects will be limited in scope as there are no known rare, threatened, or endangered species of flora, fauna, avifauna, or important habitats located within the project site. Furthermore, the project construction will be implemented within an area that has already been developed. An archaeological monitoring plan will also be implemented to identify, protect, and preserve historic resources discovered during ground altering activities. Should archaeological features, cultural artifacts, or human burials be located during construction activities, work in the immediate area of the find shall be promptly halted and the find protected from further disturbance. The State Historic Preservation Division (SHPD), the Office of Hawaiian Affairs (OHA), and the Maui/Lanai Islands Burial Council will be immediately contacted to determine the significance of the find and appropriate mitigative measures implemented.

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

   The proposed action and the commitment of land resources will not curtail the range of beneficial uses of the environment. The proposed use of the property for affordable housing, office/storage space, and continuation of the Medicaid Waiver Program is compatible with its surrounding developed properties. The proposed project is not anticipated to impact beneficial uses 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 State's Environmental Policy and Guidelines are set forth in Chapter 344, Hawaii Revised Statutes. The proposed action is consistent with the policies and guidelines of Chapter 344, HRS.

4. **Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.**

The proposed action will have a beneficial effect on the local economy during construction. In the long term, the proposed project will provide 100 percent affordable housing to meet the needs of the island's population of disabled and/or economically challenged individuals, providing positive effects to the social welfare of the Maui community. Furthermore, Ka Lima O Maui's services include job training and employment opportunities which are also beneficial to the community.

5. **Substantially affects public health.**

No adverse impact to public health, safety, or welfare is anticipated as a result of the proposed action. The proposed 201H-38, HRS exemptions will not compromise public health, safety or welfare.

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

The proposed project is anticipated to provide housing for 16 Maui residents, as well as provide office and storage spaces, and upgrades to the Medicaid Waiver Program facility. Given the size and scope of the proposed project, significant adverse impacts to population are not anticipated.

From a land use standpoint, the proposed project is keeping with the objectives, policies, and implementing actions of the Wailuku-Kahului Community Plan. The project does not anticipate any adverse impacts to public facilities as a result of implementation.

Adverse impacts to roadways, water and wastewater capacities and facilities are not anticipated as a result of project implementation.

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

During construction of the project, appropriate BMPs will be utilized to ensure that potential adverse environmental effects are mitigated. No substantial degradation of environmental quality is anticipated as a result of project implementation.

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

The proposed action does not represent a commitment to larger actions. In addition, the proposed action is not expected to result in cumulative impacts that would adversely affect the environment.

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

The subject property is a developed property located in an urbanized area of Wailuku. There are no known or identified rare, threatened, or endangered species of flora, fauna or avifauna, or their habitats in the vicinity of the project site. Given the scale and location of the proposed project, no rare, threatened or endangered species, habitats or natural environments are anticipated to be adversely affected.

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

Localized air quality impacts from construction equipment and vehicles may occur during construction of the proposed project. As such, potential air quality impacts during construction will be mitigated through applicable compliance with the provisions of the State Department of Health Administrative Rules, Title 11, Chapter 60, Fugitive Dust. Measures will be taken to minimize air quality impacts such as water spraying of loose or exposed soil, erecting dust screens, and re-vegetating or paving exposed areas as soon as practicable.

Noise impact will occur primarily from construction equipment. Equipment mufflers or other noise attenuating equipment, as well as proper equipment and vehicle maintenance, will be used during construction activities. Construction noise impact will be mitigated through applicable compliance with the provisions of the State of Hawaii, Department of Health Administrative Rules Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in Chapter 46 rules.

With proposed mitigation measures, the project is not anticipated to have adverse significant impacts on air quality or noise levels.

As the project site is not located along the shoreline, or near a stream or wetland, water quality is not expected to be affected in the short term or long term.

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

The project is not located within and would not affect environmentally sensitive areas. The Flood Insurance Rate Map (FIRM) for this region indicates that the project is located in Zone X, areas determined to be outside of the 0.2 percent annual chance floodplain of minimal flooding. In addition, the subject property is located beyond the reaches of the tsunami inundation zones. The project is not a shoreline property, nor is it situated near streams, wetland areas or other areas which may pose flooding concerns. There are no geologically hazardous lands, estuaries, or coastal waters within or adjacent to the project site.

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

The project site is not identified as a scenic vista or viewplane. It is not anticipated that the proposed project will affect scenic corridors and coastal scenic and open space resources.

13. Requires substantial energy consumption.

The proposed project will involve the short-term commitment of fuel for equipment, vehicles, and machinery during construction activities. However, this use is not anticipated to result in a substantial consumption of energy resources. In the long term, the project will create additional demand for electricity. However, this demand is not deemed substantial or excessive within the context of the region's overall energy consumption.

In summary, the site is situated in a convenient and central location in Wailuku. Necessary public facilities and services are in near proximity, or can be reasonably provided to serve the project. The proposed residential development, related office and storage spaces, and upgrades to the Medicaid Waiver Program Facility are not anticipated to have a significant adverse impact on the surrounding

environment. In this context, a Finding of No Significant Impact (FONSI) is anticipated for the proposed action.

VIII. LIST OF PERMITS AND APPROVALS

VIII. LIST OF PERMITS AND APPROVALS

The following permits and approvals will be required prior to the implementation of the proposed project.

State of Hawaii

1. Department of Health, Noise Permit (as applicable)

2. National Pollutant Discharge Elimination System (NPDES) Permit, as may be required

County of Maui

1. Section 201H-38 Approval by the Maui County Council

2. Construction Permits

IX. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

IX. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during the preparation of the Draft Environmental Assessment. Agency comments received during the early consultation phase, as well as responses to substantive comments, are included in this section. In addition, comments received after the early consultation comment period deadline and letters responding to substantive comments are contained in this section as well.

1. Larry Yamamoto, State Conservationist
   U.S. Department of Agriculture
   Natural Resources Conservation Service
   P.O. Box 50004
   Honolulu, Hawaii 96850-0001

2. Ranae Ganske-Cerizo, Soil Conservationist
   Natural Resources Conservation Service
   U.S. Department of Agriculture
   77 Hookele Street, Suite 202
   Kahului, Hawaii 96732

3. George Young
   Chief, Regulatory Branch
   U.S. Department of the Army
   U.S. Army Engineer District, Honolulu
   Regulatory Branch
   Building 230
   Fort Shafter, Hawaii 96858-5440

4. Gordon Furutani, Field Office Director
   U.S. Department of Housing and Urban Development
   500 Ala Moana Boulevard, Suite 3A
   Honolulu, Hawaii 96813-4918

5. Patrick Leonard
   Field Supervisor
   U. S. Fish and Wildlife Service
   300 Ala Moana Blvd., Rm. 3-122
   Box 50088
   Honolulu, Hawaii 96813

6. Russ K. Saito, State Comptroller
   Department of Accounting and General Services
   1151 Punchbowl Street, #426
   Honolulu, Hawaii 96813

7. Sandra Lee Kunimoto, Chair
   Department of Agriculture
   1428 South King Street
   Honolulu, Hawaii 96814-2512

8. Karen Seddon
   Executive Director
   Hawaii Housing Finance and Development Corporation
   677 Queen Street
   Honolulu, Hawaii 96813

9. Theodore E. Liu, Director
State of Hawaii
Department of Business, Economic Development & Tourism
P.O. Box 2359
Honolulu, Hawaii 96804

10. Patricia Hamamoto, Superintendent
State of Hawaii
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

11. Heidi Meeker
Planning Section
Office of Business Services
Department of Education
c/o Kalani High School
4680 Kalanianaole Highway, #T-B1A
Honolulu, Hawaii 96821

cc: Bruce Anderson, Complex Area Superintendent (Central/Upcountry Maui)

12. Kaulana Park, Chairman
Department of Hawaiian Home Lands
P. O. Box 1879
Honolulu, Hawaii 96805

13. Chiyome Fukino, M.D., Director
State of Hawaii
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawaii 96814

14. Alec Wong, P.E., Chief
Clean Water Branch
State of Hawaii
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawaii 96814

15. Patti Kitkowski
Acting District Environmental Health Program Chief
State of Hawaii
Department of Health
54 High Street
Wailuku, Hawaii 96793

16. Laura Thielen, Chairperson
State of Hawaii
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

17. Dr. Puaalaokalani Aiu, Administrator
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawaii 96707

18. Hinano Rodrigues
Department of Land and Natural Resources
State Historic Preservation Division
130 Mahalani Street
Wailuku, Hawaii 96793

19. Brennon Morioka, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

cc: Fred Cajigal

20. Katherine Kealoha, Director
Office Of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, Hawaii 96813

21. Clyde Nāmu`o, Administrator
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

22. Abbey Seth Mayer, Director
State of Hawaii
Office of Planning
P.O. Box 2359
Honolulu, Hawaii 96804

23. Dan Davidson, Executive Officer
State of Hawaii
State Land Use Commission
P.O. Box 2359
Honolulu, Hawaii 96804

24. Deidre Tegarden, Director
County of Maui
Office of Economic Development
2200 Main Street, Suite 305
Wailuku, Hawaii 96793

25. Jeffrey A. Murray, Chief
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawaii 96732

26. Lori Tsuhako, Director
County of Maui
Department of Housing and Human Concerns
One Main Plaza
2200 Main Street, Suite 546
Wailuku, Hawaii 96793

27. Tamara Horcajo, Director
County of Maui
Department of Parks and Recreation
700 Halia Nakoa Street, Unit 2
Wailuku, Hawaii 96793

28. Jeffrey Hunt, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

29. Gary Yabuta, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

30. Milton Arakawa, Director
County of Maui
Department of Public Works
200 South High Street
Wailuku, Hawaii 96793

31. Cheryl Okuma, Director
County of Maui
Department of Environmental Management
2200 Main Street, Suite 100
Wailuku, Hawaii 96793

32. Donald Medeiros, Director
County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawaii 96793

33. Jeffrey Eng, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

34. Danny Mateo, Council Chair
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

35. Michael J. Molina, Council Vice Chair
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

36. Councilmember Gladys Baisa
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

37. Councilmember Jo Anne Johnson
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

38. Councilmember Sol Kaho`ohalahala
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

39. Councilmember Bill Medeiros
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

40. Councilmember Wayne Nishiki
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

41. Councilmember Joseph Pontanilla
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

42. Councilmember Mike Victorino
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

43. **Hawaiian Telcom**
60 South Church Street
Wailuku, Hawaii 96793

44. Greg Kauhi, Manager, Custormer Operations
Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96733

45. Sandy Baz, Executive Director
Maui Economic Opportunity
99 Mahalani Street
Wailuku, Hawaii 96793

46. Wesley P. Lo, Chief Executive Officer
Maui Memorial Medical Center
221 Mahalani Street
Wailuku, Hawaii 96793

47. **Kaiser Permanente**
80 Mahalani Street
Wailuku, Hawaii 96793

48. Cesar Gaxiola, Executive Director
Cameron Center
95 Mahalani Street
Wailuku, Hawaii 96793

49. **Maui Community Mental Health Center**
121 Mahalani Street
Wailuku, Hawaii 96793

50. Joe Bradley
Maui News
100 Mahalani Street
Wailuku, Hawaii 96793

DEC 2 2 2009

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2010-TA-0075

DEC 1 8 2009

Ms. Erin Mukai
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Subject: Technical Assistance for Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-0046:016, Wailuku, Maui, Hawaii

Dear Ms. Mukai:

The U.S. Fish and Wildlife Service has reviewed your November 24, 2009, request for technical assistance regarding the proposed construction and use of an affordable housing development of a two-acre area within TMK (2)3-8-0046:016 in Wailuku, Maui. The project entails the construction of sixteen single-occupancy, one-bedroom apartments within two separate residential buildings totaling 6,000 square feet. The project also involves the construction and use of a 3,600-square-foot storage and garage space and renovation of an existing building.

Based on the information you provided and pertinent information in our files, the threatened Newell's shearwater (*Puffinus auricularis newelli*) and the endangered Hawaiian petrel (*Pterodroma sandwichensis*) (collectively referred to as seabirds) have been observed in the vicinity of the proposed project. Seabirds may traverse the project area at night during the breeding season (February 1 through December 15).

In Hawaii, seabirds are attracted to lights and are known to collide with buildings, light poles, wires, and other tall objects. Under section 7 of the ESA, it is the Federal agency's (or their non-Federal designee) responsibility to make the determination of whether or not the proposed project "may affect" federally listed species or designated critical habitat. A "may affect, not likely to adversely affect" determination is appropriate when effects to federally listed species are expected to be discountable (*i.e.*, unlikely to occur), insignificant (minimal in size), or completely beneficial. This conclusion requires written concurrence from the U.S. Fish and Wildlife Service. If a "may affect" determination is made, then the Federal agency must initiate formal consultation with the Service. Projects that are determined to have "no effect" on federally listed species and/or critical habitat do not require additional coordination or consultation with the U.S. Fish and Wildlife Service.

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Future written correspondence should be addressed to me. If you have questions or would like additional information, please contact Dawn Greenlee, Fish and Wildlife Biologist (phone: 808/792-9469; fax: 808-792-9581).

Sincerely,

for Loyal Mehrhoff
Field Supervisor

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Loyal Mehrhoff
Field Supervisor
United States Department of the Interior
Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96805

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii, 2010-TA-0075

Dear Mr. Mehrhoff:

Thank you for your letter dated December 18, 2009, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we wish to provide the following information in response to your comments.

The proposed project is located in a developed property located in an urbanized area of Wailuku. There are no known rare, threatened, or endangered species of fauna or avifauna found at the project site. We note that the lighting design for the project site will specify the shielding of all lights and directional down lighting so that there will be no upward illumination from the poles. Additional project information will be incorporated in the Draft Environmental Assessment (EA), a copy of which be sent to you for review and comment.

environment planning government

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhplanning.com www.mhplanning.com

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We appreciate the input we received from the department. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:lh
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
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LINDA LINGLE
GOVERNOR

RUSS K. SAITO
COMPTROLLER

SANDRA L. YAHIRO
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1323.9

DEC 1 0 2009

Ms. Erin Mukai, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Mukai:

Subject: Proposed Ka Lima O Maui Affordable Housing Project at TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Thank you for the opportunity to provide comments on the Proposed Ka Lima O Maui Affordable housing Project. The project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions, please call me at 586-0400 or have your staff call Mr. Clarence Kubo of the Public Works Division at 586-0488.

Sincerely,

RUSS K. SAITO
State Comptroller

5

DEC 2 2 2009

LINDA LINGLE
GOVERNOR

KAREN SEDDON
EXECUTIVE DIRECTOR

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND TOURISM
HAWAII HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET, SUITE 300
Honolulu, Hawaii 96813
FAX: (808) 587-0600

IN REPLY REFER TO:
09:PEO/128

December 17, 2009

Ms. Erin Mukai
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Mukai:

Re: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-045:016

Thank you for seeking our comments on the proposed Ka Lima O Maui Affordable Housing Project. The proposed project is consistent with the affordable housing objectives and policies set forth in the Hawaii State Plan. It will provide greater opportunities for persons with disabilities and/or economical challenges.

We look forward to reviewing the draft Environmental Assessment and Chapter 201H application.

Sincerely,

Karen Seddon

Karen Seddon
Executive Director

c: Department of Housing and Human Concerns

6

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Karen Seddon, Executive Director
Department of Business,
Economic Development and Tourism
State of Hawaii
Hawaii Housing Finance and
Development Corporation
677 Queen Street, Suite 300
Honolulu, Hawaii 96813

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii; 09:PEO/28

Dear Ms. Seddon:

Thank you for your letter dated December 17, 2009, responding to our request for early consultation on the subject project. On behalf of the applicant, Ka Lima O Maui, we would like to thank you for your positive feedback on the Ka Lima O Maui Affordable Housing Project and look forward to your continued input in the completion of this project.

We sincerely appreciate the comments we received from your office. A copy of the Draft Environmental Assessment (EA) will be forwarded to your department for review and comment. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
F:\DATA\KaLimaOMaui\AffHousing\DBEDT.ecres.doc

DEC 1 7 2009

LINDA LINGLE
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

OFFICE OF THE SUPERINTENDENT

December 16, 2009

Ms. Erin Mukai, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Mukai:

Subject: Early Consultation, Draft Environmental Assessment for the Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui

The Department of Education (DOE) has reviewed your request for early consultation on the Draft Environmental Assessment (EA) for the Proposed Ka Lima O Maui affordable housing project.

The DOE requests clarification on the nature of the project in the EA. The DOE would like to know whether the occupants of the 16 single-occupancy units would be allowed to have children living with them.

Thank you for the opportunity to comment. If you have any questions, please call Jeremy Kwock of the Facilities Development Branch at (808) 377-8301.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:jmb

c: Randolph Moore, Assistant Superintendent, OSFSS
Bruce Anderson, CAS, Baldwin/Kekaulike/Maui Complex Areas

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Kathryn Matayoshi
Acting Superintendent
State of Hawaii
Department of Education
P.O. Box 2369
Honolulu, Hawaii 96804

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Ms. Matayoshi:

Thank you for your letter dated December 16, 2009, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we wish to provide the following information in response to your comments.

The Ka Lima O Maui Affordable Housing Project is being developed specifically to focus on the needs of disabled and/or economically challenged individuals. A more detailed description of the project will be provided in the Draft Environmental Assessment (EA). All units of the housing complex have been designated as single occupancy only. Accordingly, children will not be living in the Ka Lima O Maui Affordable Housing project's residential complex and, therefore, will not create additional need for educational services.

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Again, thank you for your comments. Upon completion, a copy of the Draft EA will be provided to your office for review and comment. We appreciate the input we received from the department. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:lh
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
F:\DATA\KaLimaOMaui\AffHousing\DOE.ecres.doc

DEC 10 2009

LINDA LINGLE
GOVERNOR
STATE OF HAWAI'I

KAULANA H. R. PARK
CHAIRMAN
HAWAIIAN HOMES COMMISSION

ANITA S. WONG
DEPUTY TO THE CHAIRMAN

ROBERT J. HALL
EXECUTIVE ASSISTANT

STATE OF HAWAI'I
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAI'I 96805

December 3, 2009

Ms. Erin Mukai
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96732

Dear Ms. Mukai:

Subject: PROPOSED KA LIMA O MAUI AFFORDABLE HOUSING PROJECT AT TMK (2)3-8-046:016, WAILUKU, MAUI, HAWAII

Thank you for the opportunity to review and provide comments on the subject project intended to develop 16 one-bedroom apartments for disabled and/or economically challenged individuals.

The location is most suitable to this type of use with medical, social services, police, recreational, and residential facilities nearby. The proposal makes good use of an otherwise irregular lot. As a sister agency dedicated to providing affordable housing, we commend Ka Lima O Maui for their foresight and initiative in addressing a serious need of their clients.

Should you have any questions, please contact our Planning Office at 620-9519.

Aloha and mahalo,

Kaulana H.R. Park, Chairman
Hawaiian Homes Commission

Cc: Chantal Ratte, Executive Director
Ka Lima O Maui

11

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Kaulana H.R. Park, Chairman
Hawaiian Homes Commission
State of Hawaii
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, Hawaii 96805

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Mr. Park:

Thank you for your letter dated December 3, 2009, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we would like to thank you for your positive feedback on the Ka Lima O Maui Affordable Housing Project and look forward to your continued input in the completion of this project. We sincerely appreciate the comments we received from your office.

When completed, a copy of the Draft Environmental Assessment (EA) will be provided to your office for your review and comment. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:lh
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
F:\DATA\KaLimaOMaui\AffHousing\DHHL.ecres.doc

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LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EMD / CWB

12022PDCL.09

December 4, 2009

Ms. Erin Mukai
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Mukai:

Subject: Request for Early Consultation Comments for the Preparation of a Draft Environmental Assessment (DEA) for the Proposed Ka Lima O Maui Affordable Housing Project Wailuku, Island of Maui, Hawaii TMK: (2) 3-8-046:016

The Department of Health (DOH), Clean Water Branch (CWB), received your transmittal letter, dated November 24, 2009, requesting early consultation comments on the subject project for the preparation of a DEA. The DOH-CWB has reviewed the document and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

   a. Storm water associated with construction activities, including excavation, grading, clearing, demolition, uprooting of vegetation, equipment staging, and storage areas that result in the disturbance of one (1) acre or more of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the start of the construction activities.

   b. Hydrotesting effluent.

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

3. For types of wastewater not listed in Item 2 above or wastewater discharging into Class 1 or Class AA waters, you must obtain an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 Water Quality Certification are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

DCL:ml

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Alec Wong, P.E., Chief
Clean Water Branch
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii; EMD/CWB 12022PDCL.09

Dear Mr. Wong:

Thank you for your letter dated December 4, 2009, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we wish to provide the following information in response to your comments presented in the same order of your letter.

Response to Comment No. 1:

The applicant recognizes your concern relating to any impact the project may have on state waters. The applicant wishes to assure you that the project will meet the Department of Health's (DOH) criteria and any impact to state waters due to the construction of the project will be addressed and discussed in the Draft Environmental Assessment (EA), as applicable. Mitigation measures will also be discussed.

Response to Comment No. 2:

The applicant recognizes that a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater may be required. As applicable, an application for an NPDES permit will be submitted.

Response to Comment No. 3:

If other types of wastewater apply to the project, the applicant acknowledges that a NPDES individual permit must be obtained.

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Response to Comment No. 4:

For any discharges relating to the project construction or operation activities, the project engineer and contractor will ensure that the applicant complies with the State's Water Quality Standards.

We appreciate the input we received from the department. A copy of the Draft EA will be submitted to your office for review and comment. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:lh
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
Stacy Otomo, Otomo Engineering, Inc.
F:\DATA\KaLimaOMaui\AffHousing\DOHCWB.ecres.doc

DEC 14 2009

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M. D.
DIRECTOR OF HEALTH

LORRIN W. PANG, M. D., M. P. H.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2102

December 11, 2009

Ms. Erin Mukai
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai`i 96793

Dear Ms. Mukai:

Subject: Proposed Ka Lima O Maui Affordable Housing Project, Wailuku, Hawaii
TMK: (2) 3-8-046:016

Thank you for giving us the opportunity to review and comment on this project. The following comments are offered:

1. The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules, Chapter 11-46 "Community Noise Control". A noise permit may be required and should be obtained before the commencement of this project.

It is strongly recommended that the Standard Comments found at the Department's website: http://hawaii.gov/health/environmental/env-planning/landuse/landuse.html be reviewed, and any comments specifically applicable to this project should be adhered to.

Should you have any questions, please call me at 808 984-8230 or e-mail me at patricia.kitkowski@doh.hawaii.gov.

Sincerely,

Patti Kitkowski

Patti Kitkowski
Acting District Environmental Health Program Chief

18

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Patti Kitkowski
Acting District Environmental Health Program Chief
State of Hawaii
Department of Health
54 High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Ms. Kitkowski:

Thank you for your letter dated December 11, 2009, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we wish to provide the following information in response to your comments.

We note your comment that a noise permit may be required for the project pursuant to Hawaii Administrative Rules (HAR), Chapter 11-46, "Community Noise Control". As applicable, a noise permit will be secured prior to commencement of construction. As recommended, Ka Lima O Maui will review the Standard Comments found at the Department's website for its applicability to the proposed project.

Again, thank you for your comments. Upon completion, a copy of the Draft Environmental Assessment (EA) will be provided to your office for review and comment. Should you have any questions, please do not hesitate to contact me at 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:lh
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
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LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 28, 2009

Munekiyo & Hiraga, Inc.
305 High Street Suite 104
Wailuku, Hawaii 96793

Attention: Mr. Erin Mukai

Ladies and Gentlemen:

Subject: Proposed Ka Lima O Maui Affordable Housing Project

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Engineering Division, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Historic Preservation will be submitting comments through a separate letter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charlene E. Unoki

for Morris M. Atta
Administrator

20

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 30, 2009

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
~~Div. of Boating & Ocean~~ Recreation
x Engineering Division
Div. of Forestry & Wildlife
Div. of State Parks
Commission on Water Resource Management
Office of Conservation & Coastal Lands
Land Division - District

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LAND DIVISION
2009 DEC 23 P 1:42
DEPT. OF LAND & NATURAL RESOURCES STATE OF HAWAII

'09 DEC 01 PM02:13 ENGINEERING

FROM: Morris M. Atta
SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project
LOCATION: Island of Maui
APPLICANT: Munekiyo & Hiraga, Inc. on behalf of Ka Lima O Maui

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by December 20, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: _____
Date: 12/22/09

21

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/ Morris Atta
Ref.: Early Consultation for DEA for Proposed Ka Lima O Maui Affordable Hsg.Proj. Maui.001

COMMENTS

( ) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone ___.

(X) **Please take note that the project site according to the Flood Insurance Rate Map (FIRM), is located in Zone ~~C~~ X D.1. The National Flood Insurance Program (NFIP) does not regulate developments within Zone ~~C~~ X D.1.**

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

( ) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

( ) Mr. Robert Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.

( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.

( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

( ) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.

( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional Comments: _____

( ) Other: _____

Should you have any questions, please call Mr. Dennis Imada of the Planning Branch at 587-0257.

Signed: _____
CARTY CHANG, ACTING CHIEF ENGINEER

Date: 12/22/09

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Morris M. Atta, Administrator
Land Division
State of Hawaii
Department of Land and Natural Resources
Land Division
P. O. Box 621
Honolulu, Hawaii 96809

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Mr. Atta:

Thank you for your letter dated December 28, 2009, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we wish to provide the following information in response to your comments presented in your letter.

The applicant acknowledges that the Ka Lima O Maui Affordable Housing Project is located in Zone X and therefore will not be subject to regulation by the National Flood Insurance Program (NFIP).

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We appreciate the input from your office. A copy of the Draft Environmental Assessment (EA) will be forwarded to your department for review and comment. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
F:\DATA\KaLimaOMaui\AffHousing\DLNReng.ecres.doc

DEC 2 8 2009

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

HRD09/4753

December 21, 2009

Erin Mukai
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hi 96793

RE: Early consultation for the Ka Lima o Maui Affordable Housing Project, Wailuku, Maui, TK: (2) 3-8-046: 016.

Aloha e Erin Mukai,

The Office of Hawaiian Affairs (OHA) received your letter requesting comments on the above-mentioned project. Ka Lima o Maui proposes to develop an affordable housing project for disabled and/or economically challenged individuals on the two acres in Wailuku, Maui. The project calls for the construction of 16 single-occupancy, one bedroom apartments contained within two separate residential buildings totaling 6,000 square feet. Ka Lima will prepare a Draft Environmental Assessment for the project, in accordance with Chapter 343, Hawai'i Revised Statutes. OHA has reviewed the project and offers the following comments.

The Draft Environmental Assessment should include a Cultural Impact Assessment (CIA), in accordance with Chapter 343 of the Hawaii Revised Statues (HRS). The CIA should include information relating to the Native Hawaiian practices and beliefs associated with the general area of the project site, and it is recommended that the community be involved in this assessment. Consideration must also be afforded to any individuals accessing the project area for constitutionally protected traditional and customary purposes, in accordance with the Hawai'i State Constitution, Article XII, Section 7.

OHA requests clarification whether an archaeological inventory survey for the project will be submitted to the State Historic Preservation Division for review and approval. If so, OHA should be allowed the opportunity to comment on the criteria assigned to any cultural or

archaeological sites identified within the archaeological inventory survey. We request the applicant's assurances that should iwi kūpuna or Native Hawaiian cultural or traditional deposits be found during the construction of the project, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

In addition, OHA recommends that the applicant use native vegetation in its landscaping plan for subject parcel. Landscaping with native plants furthers the traditional Hawaiian concept of mālama 'āina and creates a more Hawaiian sense of place.

Thank you for the opportunity to comment. If you have further questions, please contact Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Administrator

C: OHA Maui CRC Office

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Clyde W. Nāmu`o
Administrator
State of Hawaii
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Mr. Nāmu`o:

Thank you for your letter dated December 21, 2009, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we wish to provide the following information in response to your comments in the same order presented of your letter.

Response to Comment Regarding Cultural Impact Assessment:

The Draft Environmental Assessment (EA) for the proposed Ka Lima O Maui Affordable Housing project will include a Cultural Impact Assessment (CIA), in accordance with Chapter 343 of the Hawaii Revised Statues (HRS). The CIA will address Native Hawaiian practices and beliefs associated with the area of the proposed project site as well as include interviews with individuals familiar with the project area.

Response to Comment Regarding an Archaeological Inventory Survey:

An Archaeological Assessment Survey (AAS) for the project was prepared by Xamanek Researches, LLC and was submitted to the State Historic Preservation Division (SHPD) for review and approval. A copy of the AAS will be included in the Draft EA. The applicant also recognizes OHA's concerns regarding the discovery of iwi kupuna or Native Hawaiian cultural or traditional deposits during the construction of the project. In the event that these deposits are found, construction work will immediately cease in the vicinity of the find and appropriate mitigative protocols will be implemented in coordination with SHPD.

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Response to Comment Regarding Native Hawaiian Plants:

Your recommendation to use native Hawaiian plants for landscaping purposes has been provided to the applicant. Use of native plants appropriate to the area will be utilized to the extent practicable.

Upon completion, a copy of the Draft Environmental Assessment (EA) will be provided to your office for review and comment. Should you have any questions, please do not hesitate to call me at (808) 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:lh
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
Erik Fredericksen, Xamanek Researches, LLC
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LINDA LINGLE
GOVERNOR

JAN 12 2010

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

IN REPLY REFER TO:

STP 8.0005

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

January 7, 2010

Ms. Erin Mukai, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Mukai:

Subject: Ka Lima O Maui Affordable Housing Project
Early Consultation (EC)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project.

DOT understands that the subject project proposes to construct 16 single-occupancy, one-bedroom apartments contained within two separate residential buildings totaling 6,000 square feet. The project will also include the renovation of an existing 2,500 square feet building used by Kalima O Maui's Waiver Program, as well as the construction of a new building providing office space of 3,600 square feet and storage and garage space of 3,600 square. Access to the project is from Mahalani Street.

The subject project could potentially impact the State highway, Kaahumanu Avenue, due to its contribution of traffic. Therefore, the Draft Environmental Assessment (DEA) should discuss and evaluate project traffic impacts to Kaahumanu Avenue through the inclusion of a traffic assessment report.

DOT appreciates the opportunity to provide its early comments and requests that four (4) copies of the project DEA with the traffic assessment be provided when the DEA is completed.

If there are any questions, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Brennon T. Morioka, Ph.D., P.E.
Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Mr. Morioka:

Thank you for your letter dated January 7, 2010, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we would like to offer you the following response.

The applicant acknowledges your comment regarding the project's potential impact of traffic on Kaahumanu Avenue. A Traffic Impact Assessment Report (TIAR) has been prepared by the traffic engineer, Phillip Rowell, and will be included in the Draft Environmental Assessment (EA). The TIAR will address the project's effects on the Kaahumanu Avenue-Mahalani Street intersection.

Four (4) copies of the Draft EA will be provided to your office for review and comment during the 30-day public review period.

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We appreciate the input from your office. Should you have any questions, please do not hesitate to contact me at (808) 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:lh
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
Phillip Rowell, Traffic Consultant
F:\DATA\KaLimaOMaui\AffHousing\StateDOT.ecres.doc

CHARMAINE TAVARES
Mayor

CHERYL K. OKUMA, Esq.
Director

GREGG KRESGE
Deputy Director

TRACY TAKAMINE
Solid Waste Division

DAVID TAYLOR, P.E.
Wastewater Reclamation
Division

JAN 27 2010

COUNTY OF MAUI
DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT

2200 MAIN STREET, SUITE 100
WAILUKU, MAUI, HAWAII 96793

January 25, 2010

Ms. Erin Mukai
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

SUBJECT: **KA LIMA O MAUI AFFORDABLE HOUSING PROJECT**
EARLY CONSULTATION
TMK (2) 3-8-046:016, WAILUKU

We reviewed the subject project as a pre-application consultation and have the following comments:

1. Solid Waste Division comments:

   a. Include options for construction waste disposal/recycling/reuse in the discussion of potential impacts and mitigation measures.

2. Wastewater Reclamation Division (WWRD) comments:

   a. Although wastewater system capacity is currently available as of 1/25/2010, the developer should be informed that wastewater system capacity cannot be ensured until the issuance of the building permit.
   b. Wastewater contribution calculations are required before building permit is issued.
   c. Developer shall pay assessment fees for treatment plant expansion costs in accordance with ordinance setting forth such fees. The property is located in the Wailuku Sewer Service Area.
   d. Developer is required to fund any necessary off-site improvements to collection system and wastewater pump stations.
   e. Plans should show the existing single service lateral for the subject property that will service the subject facilities.
   f. Plans shall show the existing property sewer service manhole near the property line. If a property sewer service manhole does not exist, one shall be installed.

g. Commercial kitchen facilities within the proposed project shall comply with pre-treatment requirements (including grease interceptors, sample boxes, screens etc.)

h. Non-contact cooling water and condensate should not drain to the wastewater system.

If you have any questions regarding this memorandum, please contact Gregg Kresge at 270-8230.

Sincerely,

Cheryl K. Okuma, Director

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Cheryl K. Okuma, Director
Department of Environmental Management
County of Maui
2200 Main Street, Suite 100
Wailuku, Maui, Hawaii 96793

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8 046:016, Wailuku, Maui, Hawaii

Dear Ms. Okuma:

Thank you for your letter dated January 25, 2010, responding to our request for early consultation comments. On behalf of the applicant, Ka Lima O Maui, we offer the following information in response to your comments in the order presented in your letter.

Response to Comments from the Solid Waste Division:

Construction waste disposal/recycling/reuse options will be included in the Draft Environmental Assessment (EA).

Response to Comments from the Wastewater Reclamation Division (WWRD):

a. We note your comment that wastewater system capacity cannot be ensured until the issuance of the building permit.

b. We acknowledge that wastewater calculations are required before issuance of a building permit.

c. The applicant acknowledges your comment. Through the 201H-38, Hawaii Revised Statutes (HRS) application process, Ka Lima O Maui intends to seek an exemption from Chapter 14.35, Maui County Code, relating to wastewater assessment fees, subject to approval by the Maui County Council. Ka Lima O Maui is a non-profit organization that is proposing the development of 100 percent affordable housing for its clients and for economically challenged individuals. Ka Lima O Maui will continue coordination with the Department of Environmental Management (DEM) regarding wastewater services for the proposed project.

d. The applicant acknowledges your comment regarding offsite improvements. System adequacy will be addressed by the project's civil engineer.

e. Your comments have been forwarded to the applicant and project engineer for action.

f. Your comments have been forwarded to the applicant and project engineer for action.

g The applicant will comply with pre-treatment requirements if commercial kitchen facilities are incorporated in the project's final plans

h. The applicant acknowledges that non-contact cooling water and condensate should not drain to the wastewater system.

Thank you for your comments. A copy of the Draft EA will be mailed to the DEM upon completion for your consideration and review. Should you have any questions, please do not hesitate to call me at 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
Stacy Otomo, Otomo Engineering, Inc.
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DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
HOUSING DIVISION
COUNTY OF MAUI

CHARMAINE TAVARES
Mayor

LORI TSUHAKO
Director

JO-ANN T. RIDAO
Deputy Director

35 LUNALILO STREET, SUITE 102 • WAILUKU, HAWAII 96793 • PHONE (808) 270-7351 • FAX (808) 270-6284

December 10, 2009

Ms. Erin Mukai
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Erin Mukai

Subject: Proposed Ka Lima O Maui Affordable Housing Project at TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

The Department has reviewed your November 24, 2009 letter regarding the above subject project. Based on our review, we have determined that the subject project would be exempt from chapter 2.96, Maui County Code (MCC) on the basis of an affordable housing project with more than the required residential workforce housing units (Section 2.96.030 B. 6. of Chapter 2.96, MCC).

Also, please continue to keep the Department apprised of the status of the subject project and the 201H-038 HRS application process.

Please call Ms. Cara Bohne of our Housing Division at 270-5748 if you have any questions.

Sincerely,

Wayde T. Oshiro

WAYDE T. OSHIRO
Housing Administrator

cc: Director of Housing and Human Concerns

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Wayde T. Oshiro
Housing Administrator
Department of Housing and Human Concerns
County of Maui
35 Lunalilo Street, Suite 102
Wailuku, Hawaii, 96793

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Mr. Oshiro:

Thank you for your letter dated December 10, 2009, responding to our request for early consultation on the subject project. On behalf of the applicant, Ka Lima O Maui, we appreciate your confirmation that the project is exempt from Chapter 2.96, Maui County Code (MCC). As a 201H-38, Hawaii Revised Statutes (HRS) Affordable Housing Project, we will continue to coordinate the project planning with the Department of Housing and Human Concerns (DHHC). As the approving agency; the Draft Environmental Assessment (EA) will be submitted to the DHHC for review and approval.

Should you have any questions, please do not hesitate to contact me at 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
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environment planning government

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhplanning.com www.mhplanning.com

CHARMAINE TAVARES
Mayor

TAMARA HORCAJO
Director

ZACHARY Z. HELM
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2 , Wailuku, Hawaii 96793

December 14, 2009

Munekiyo & Hiraga, Inc.
Attention: Erin Mukai
305 High Street, Suite 104
Wailuku, Hawaii 96793

**SUBJECT: Early Consultation for Draft Environmental Assessment
Proposed Ka Lima O Maui Affordable Housing Project
TMK (2) 3-8-046: 016
Wailuku, Maui, Hawai'i**

Dear Ms. Mukai:

Based on our review of the proposed Ka Lima O Maui project, the Parks Department does not have any comments or objections at this time.

The applicant will be exempt from park and playground requirements for the subject as the subdivision will be a 100 percent affordable housing project.

Please feel free to contact me or Mr. Patrick Matsui, Chief of Parks Planning and Development, at 270-7931 should you have any questions.

Sincerely,

TAMARA HORCAJO
Director of Parks & Recreation

cc: Patrick Matsui, Chief of Parks Planning and Development
TH:PM:ca
S:\PLANNING\CSA\County Reviews\EA Reviews\Ka Lima Draft EA Prep.doc

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Tamara Horcajo, Director
Department of Parks and Recreation
County of Maui
700 Hali'a Nakoa Street, Unit 2
Wailuku, Hawaii, 96793

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Ms. Horcajo:

Thank you for your letter dated December 14, 2009, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we appreciate the input that we have received from your office. A copy of the Draft Environmental Assessment (EA) will be provided for your review and comment.

Should you have any questions, please do not hesitate to contact me at 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
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planning
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CHARMAINE TAVARES
Mayor

JEFFREY S. HUNT
Director

KATHLEEN ROSS AOKI
Deputy Director

JAN 14 2010

COUNTY OF MAUI
DEPARTMENT OF PLANNING

January 12, 2010

Ms. Erin Mukai
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Mukai:

SUBJECT: EARLY CONSULTATION COMMENTS REGARDING A DRAFT ENVIRONMENTAL ASSESSMENT TO BE SUBMITTED FOR THE PROPOSED KA LIMA O MAUI AFFORDABLE HOUSING PROJECT, TO BE CONSTRUCTED ALONG MAHALANI STREET, WAILUKU, ISLAND OF MAUI, HAWAII; TMK: (2) 3-8-046:016 (EAC 2009/0046)

The Department of Planning (Department) is in receipt of your letter, dated November 24, 2009, regarding the above-referenced project. The Department understands that Ka Lima O Maui is proposing to develop a 100 percent (100%) affordable housing project on a 2-acre property for Maui's population of disabled and/or economically challenged individuals. The project consists of constructing two (2), 3,000 square feet (sq. ft.) residential buildings containing eight (8) single-occupancy, one-bedroom apartments in each building. The project also involves the renovation of an existing 2,500 sq. ft. building and construction of a new building that will provide 3,600 sq. ft. of office space, and 3,600 sq. ft. of storage and garage space.

The Department understands that the Applicant seeks to process this proposal under Section 201H-038, Hawaii Revised Statutes. The Department advises the Applicant that if the project is not processed under Section 201H-038, then the project will need either a Change in Zoning (CIZ), or a County Special Use Permit (CUP) in order to operate as the property is currently zoned as R-3 Residential by the County.

250 SOUTH HIGH STREET, WAILUKU, MAUI, HAWAII 96793
MAIN LINE (808) 270-7735; FACSIMILE (808) 270-7634
CURRENT DIVISION (808) 270-8205; LONG RANGE DIVISION (808) 270-7214; ZONING DIVISION (808) 270-7253

Thank you for the opportunity to comment on the proposed project. Should you require further clarification, please contact Staff Planner Danny Dias at danny.dias@mauicounty.gov or at (808) 270-7557.

Sincerely,

CLAYTON I. YOSHIDA, AICP
Planning Program Administrator

for JEFFREY S. HUNT, AICP
Planning Director

xc: Danny A. Dias, Staff Planner
2009/EAC File
General File

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MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Kathleen Ross Aoki, Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Ms. Aoki:

Thank you for the Planning Department's letter dated January 12, 2010, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we wish to provide the following information in response to your letter.

The 201H-38, Hawaii Revised Statutes (HRS), application will seek exemptions from Title 19, Zoning. The applicant acknowledges that should the 201H-38, HRS application not be processed, then appropriate land use entitlements processing will be required.

We appreciate the input we received from the department. A copy of the Draft Environmental Assessment (EA) will be provided to your office for review and comment. Should you have any questions, please do not hesitate to contact me at 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:lh
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
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305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhplanning.com www.mhplanning.com

planning environment government

POLICE DEPARTMENT
COUNTY OF MAUI

CHARMAINE TAVARES
MAYOR

OUR REFERENCE

YOUR REFERENCE

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

GARY A. YABUTA
CHIEF OF POLICE

CLAYTON N.Y.W. TOM
DEPUTY CHIEF OF POLICE

December 14, 2009

Ms. Erin Mukai, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Mukai:

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project
TMK (2) 3-8-046:016, Wailuku

Thank you for your letter of November 24, 2009, requesting comments on the above subject.

We have reviewed the information submitted for this project and have enclosed a copy of our comments. Thank you for giving us the opportunity to comment on this project.

Very truly yours,

Assistant Chief Danny J. Matsuura
for: Gary A. Yabuta
Chief of Police

c: Jeffrey Hunt, Planning Department

COPY

TO	:	GARY YABUTA, CHIEF OF POLICE, COUNTY OF MAUI
VIA	:	CHANNELS
FROM	:	STEPHEN ORIKASA, ADMINISTRATIVE SERGEANT, WAILUKU PATROL DIVISION
SUBJECT	:	RESPONSE TO A REQUEST FOR COMMENTS REGARDING THE PROPOSED KA LIMA O MAUI AFFORDABLE HOUSING PROJECT

Concur
Al Matsuura
12/14/09

This communication is submitted as a response to a request for comments by Munekiyo & Hiraga, Inc., Planner, Erin, regarding the following;

SUBJECT : Proposed Ka Lima O Maui Affordable Housing Project at TMK (2) 3-8-046:016, Wailuku, Maui, Hawaii

RESPONSE:

Following a review of the submitted documents, concerns from the police perspective would be upon the safety of pedestrian and vehicular movement.

In consideration of the properties current use and location, increases should be minimal and not have a significant impact upon current pedestrian and vehicular movement conditions. The proposed structures are situated upon a property which is of adequate size for on-site/off-street vehicle parking and turn around area. There also appears to be adequate sight distance during ingress and egress from this property.

Respectfully submitted for your review and approval.

Stephen T. Orikasa E#716
Administrative Sergeant/Wailuku Patrol Division
12/14/09 @ 0830 Hours

Concur with Sgt. Orikasa - no concerns at this time. Recommend approval.
Capt. J Singer 8467 12/14/09 1235 HTS

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Gary Yabuta, Chief of Police
County of Maui
Maui Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Chief Yabuta:

Thank you for your letter dated December 14, 2009, responding to our request for early consultation comments on the subject project.

Your analysis that the project will have minimal impact on current pedestrian and vehicular movement conditions is consistent with the Traffic Impact Analysis Report (TIAR), prepared for the project. A copy of the TIAR will be included in the Draft Environmental Assessment (EA), which will be forwarded to your office for review and comment.

We appreciate the input from your office. Should you have any questions, please do not hesitate to contact me at 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:lh
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
Phillip Rowell, Phillip Rowell and Associates
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DEC 1 7 2009

CHARMAINE TAVARES
Mayor

MILTON M. ARAKAWA, A.I.C.P.
Director

MICHAEL M. MIYAMOTO
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

RALPH NAGAMINE, L.S., P.E.
Development Services Administration

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET, ROOM NO. 434
WAILUKU, MAUI, HAWAII 96793

December 14, 2009

Ms. Erin Mukai, Planner
MUNEKIYO & HIRAGA, INC.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Ms. Mukai:

SUBJECT: PROPOSED KA LIMA O MAUI AFFORDABLE HOUSING PROJECT; TMK: (2) 3-8-046:016

We reviewed the subject application and have no comments at this time.

Please call Michael Miyamoto at 270-7845 if you have any questions regarding this letter.

Sincerely,

MILTON M. ARAKAWA, A.I.C.P.
Director of Public Works

MMA:MMM:ls
xc: Highways Division
Engineering Division
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DEC 0 7 2009

CHARMAINE TAVARES
MAYOR

DON A. MEDEIROS
Director
WAYNE A. BOTEILHO
Deputy Director
Telephone (808) 270-7511
Facsimile (808) 270-7505

DEPARTMENT OF TRANSPORTATION

COUNTY OF MAUI
200 South High Street
Wailuku, Hawaii, USA 96793-2155

November 30, 2009

Ms. Erin Mukai
Munekiyo & Hiraga Inc.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Subject: Proposed Ka Lima O Maui Affordable Housing Project

Dear Ms. Mukai,

Thank you for the opportunity to comment on this project. We have no comments to make at this time.

Please feel free to contact me if you have any questions.

Sincerely,

Don Medeiros
Director

DEC 2 3 2009

CHARMAINE TAVARES
Mayor

JEFFREY K. ENG
Director

ERIC H. YAMASHIGE, P.E., L.S.
Deputy Director

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2155
www.mauiwater.org

December 16, 2009

Ms. Erin Mukai
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku HI 96793

Re: Proposed Ka Lima O Maui Affordable Housing Project
TMK: 3-8-046:102 and 016

Dear Ms. Mukai:

Thank you for the opportunity to comment in preparation of a Draft Environmental Assessment (EA) and 201H Application for this project.

Source Availability and Consumption
The project area is served by the Central Maui System. The main sources of water for this system are the designated Iao aquifer, Waihee aquifer, and the Iao tunnel and Iao-Waikapu Ditch from the designated Na Wai Eha. New source development projects include Maui Lani Wells, Waikapu South well and Waiale Surface Water Treatment Plant. The EA should identify potable and non-potable demand and source, including the source for the private water system serving the existing structure on the subject property. Demand for the proposed development once built out would be about 10,000 gpd based on system standards. The development will be subject to the County's availability policy, codified in Title 14 of the Maui County Code. Chapter 14.12 does currently not exempt affordable housing projects from providing verification of a long term reliable source of water.

System Infrastructure
The project site is served by a 12-inch waterline and one fire hydrant at about 70 feet distance to the North. Domestic, irrigation and fire flow calculations will be required in the building permit process. A backflow preventer will be required, unless already present on site.

"By Water All Things Find Life"

The Department of Water Supply is an Equal Opportunity provider and employer. To file a complaint of discrimination, write: USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington DC 20250-9410. Or call (202) 720-5964 (voice and TDD)

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Conservation
A water conservation checklist for condominiums is attached for reference. We recommend that the following conservation measures be included in the EA and implemented:
Eliminate Single-Pass Cooling: Single-pass, water-cooled systems should be eliminated per Maui County Code Subsection 14.21.20. Although prohibited by code, single-pass water cooling is still manufactured into some models of air conditioners, freezers, and commercial refrigerators.
Maintain Fixtures to Prevent Leaks: A simple, regular program of repair and maintenance can prevent the loss of hundreds or even thousands of gallons a day. The applicant should establish a regular maintenance program.
Use Climate-adapted Plants: Native plants that are adapted to the Plant Zone 4 should be used for all landscaping purposes. Native and climate-adapted plants conserve water and protect the watershed from degradation due to invasive alien species.
Prevent Over-Watering By Automated Systems: Provide rain-sensors on all automated irrigation controllers. Check and reset controllers at least once a month to reflect the monthly changes in evapo-transpiration rates at the site. As an alternative, provide the more automated, soil-moisture sensors on controllers.

Pollution Prevention
In order to protect the underlying Iao aquifer, we recommend that the following best management practices be included in the EA and implemented during construction to minimize infiltration and runoff from all construction and vehicle operations:
1. Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the water.
2. Properly and promptly dispose of all loosened and excavated soil and debris material from drainage structure work.
3. Retain ground cover until the last possible date.
4. Stabilize denuded areas by sodding or planting as soon as possible. Replanting should include soil amendments and temporary irrigation. Use high seeding rates to ensure rapid stand establishment.
5. Avoid fertilizers and biocides, or apply only during periods of low rainfall to minimize chemical run-off.
6. Keep run-off on site.

Should you have any questions, please contact our Water Resources and Planning Division at 244-8550.

Sincerely,

Jeffrey K. Eng, Director
emb

c: engineering division
attachments:
A Checklist of Water Conservation Ideas for Condominiums
Plant Brochure: "Saving Water in the Yard

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A Checklist of Water Conservation Ideas for Condominiums

COOLING

Cooling Towers

Cooling Towers are used to reject heat from air conditioning systems. In a cooling tower, a circulating stream of warm water contacts an air flow, causing evaporation of a portion of the water. When this water evaporates, the water which remains behind is cooled. The cooled water then circulates through a cooling system, warms and then returns to the tower.

- ☞ Understand Your System: Prepare an inventory of each cooling tower you have, its cooling capacity, and the equipment or processes that it serves
- ☞ If you purchase chemicals for the treatment of the recirculating cooling tower water, have the chemical vendor explain the purpose and action of each chemical.
- ☞ Have your chemical vendor provide a written report of each service call, and be sure that the vendor explains the meaning of each analysis performed,as well as the test results.
- ☞ Tell your chemical vendor that water conservation is a priority, and ask about alternatives that may reduce the amount of water bled-off from the towers.
- ☞ Have vendors bid for your facility's water cooling tower water treatment. Require a predetermined minimum level of water efficiency. Have them provide figures showing projected annual water and chemical consumption and costs.
- ☞ Consider incorporating sulfuric acid to reduce carbonate scale and achieve significantly higher cycles of concentration. If you use sulfuric acid, be sure to observe appropriate safety precautions.
- ☞ Ozone is another alternative that can help remove dissolved minerals and act as a biocide. Again, observe the appropriate safety precautions.
- ☞ If available, use reclaimed water as a source of cooling tower make-up water.
- ☞ Blow-down water is the release of some of the circulating water to remove suspended and dissolved solids left behind as pure water evaporates from the system. Re-use blow down where possible for non-potable uses.

Evaporative Coolers

Evaporative coolers lower air temperature by increasing the humidity of incoming air being drawn into a building. The air's ambient or "dry bulb" temperature is lowered when the air absorbs water vapor. After a short period of operation, the recirculating air in the cooler reaches wet bulb temperature, which is theoretically the lowest temperature to which the entering air may be cooled. Some evaporative coolers have recirculation pumps.

All evaporative coolers require either a small amount of bleed-off or regular cleaning to maintain and prevent damage to the coolers pads. The principle opportunity for conservation in evaporative cooling is to reduce the amount of water bled-off, and to reuse that water wherever possible.

- ☞ Be sure your coolers have pumps to recirculate the water. This decreases water consumption and increases cooling efficiency.
- ☞ Check to make sure you are not bleeding off an excessive amount of water. For a typical small cooler, anything more htan a few gallons per hour may be excessive.
- ☞ Pipe the bleed-off water from your coolers to help water a landscaped area!

Eliminate Once Through Cooling!

Some coolers pass water through the equipment only once, and then discard it. "Single pass" technology is not good for two reasons. First, these single pass coolers use too much water! Secondly, they do not cool as effectively, because the water does not cool to wet bulb temperature. This type of cooling is illegal under Maui County Codes! Make sure your air conditioners, ice makers and other cooling systems are not single pass models!

- ☞ Replace single-pass cooling models with air-cooled or recirculating models
- ☞ Connect to a recirculating cooling water loop. Or retrofit models to be recirculating.
- ☞ If a piece of equipment can not be replaced immediately, remember, it is illegal to dump single pass cooling water into the sewer system. Re-use this water for landscaping or other non-potable uses.

For More Information Contact the Maui County Board of Water Supply - Water Resources & Planning Division @ 243-7199

A Checklist of Water Conservation Ideas for Condominiums

PLUMBING MEASURES FOR EACH UNIT

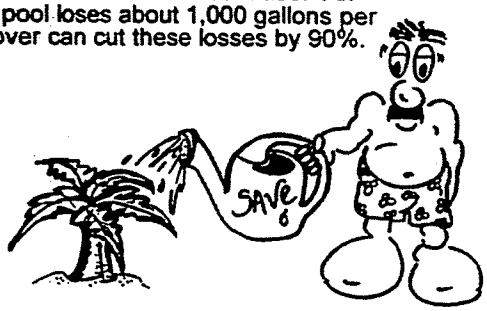
- Replace toilets with Ultra Low Flush Models, or retrofit with low flow flappers. Contact the Maui County Board of Water Supply at 243-7199 or the Wastewater Division at 243-7417 for more information.
- Retrofit faucets with aerators, or consider alternative faucet types such as self closing or, automatic sensor controlled faucets.
- Replace showerheads with low flow models. Contact the Maui County Board of Water Supply at 243-7199, or the Public Works Wastewater Division at 243-7417 to find out how you can get these!
- Check for leaks! Check for leaks! Check for leaks! Do dye tablet or food coloring tests in toilets to check for hidden leaks. Check for dripping faucets indoors and out!

COMMON LAUNDRY AREAS

- Efficient washing machines can save up to 20 gallons per load. These also save on energy. If you are replacing laundry facilities don't even consider anything but the new horizontal axis models. These not ony save up to 40% of water used, but deliver even more substantial energy savings - up to 65%!
- Water boilers also require blow-down, or bleed-off, just like air conditioners. Monitor total dissolved solids, and blow down only when necessary!
- Avoid excessive filter or softener back flush. Back flush only when needed.

NON-LANDSCAPED AREAS OUTDOORS

- Never hose your sidewalks and driveways. This is a complete waste of water, and a hose can use 25 gallons in just 5 minutes. Remember: A broom is best.
- Check for leaks! Note the number of outdoor faucets on the outsides of buildings. Make a list and check every one regularly.
- Cover Pools and Jacuzzis when not in use. An average sized pool loses about 1,000 gallons per day. A pool cover can cut these losses by 90%.



EDUCATION

- Knowledge is power. Educate people about how they can help to save water at your building or facility. You may be surprised at how willing people are to chip in, once they know what to do!

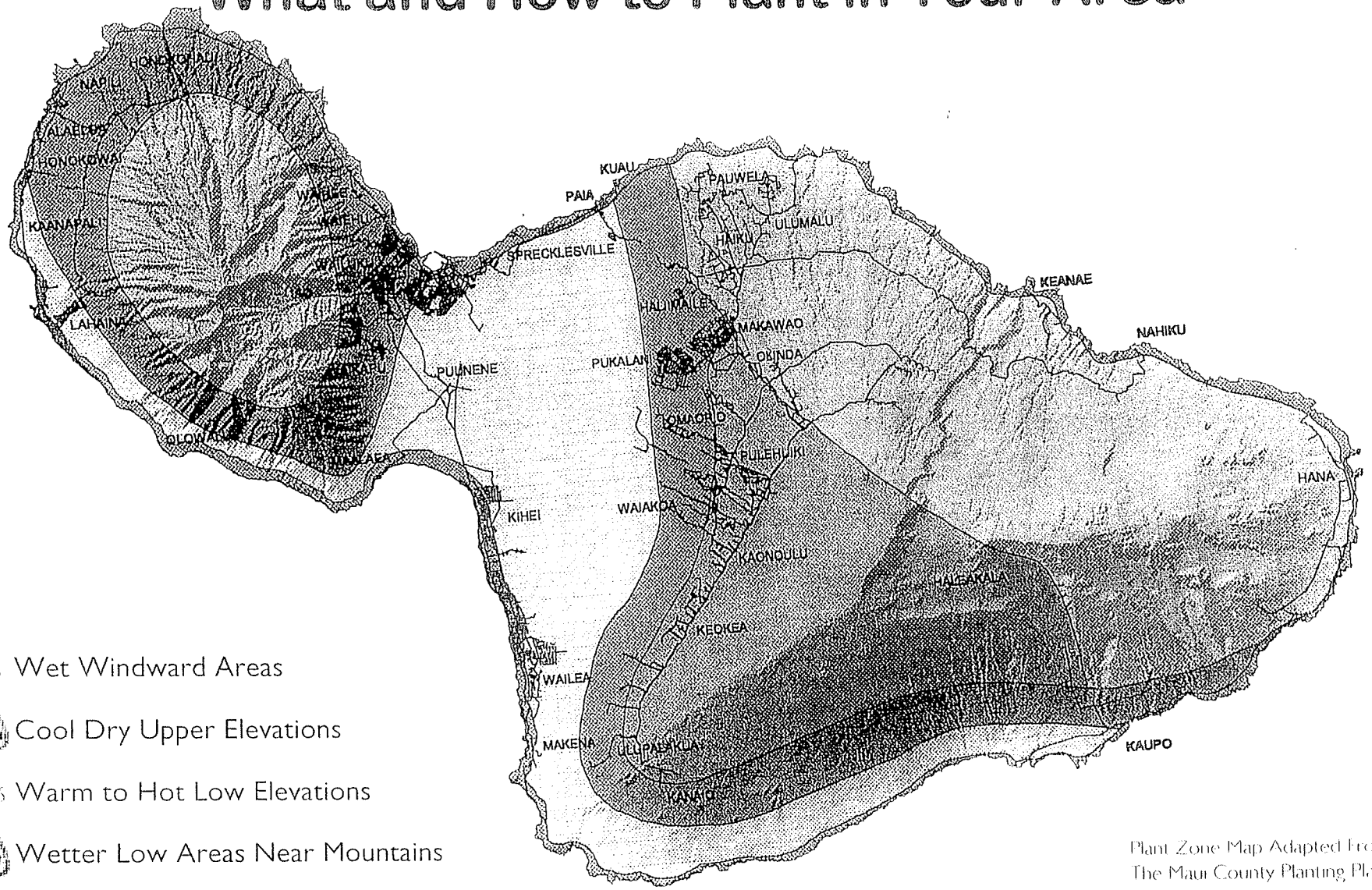
LANDSCAPES

- Understand your system: Develop a schematic of all water entry points. Know where your faucets, time clocks, solenoids, booster pumps, sprinklers, bubblers, valves, pipes and etc. are located.
- Make a checklist of system elements and check each one regularly for leaks! Finding and repairing leaks can lead to big savings, especially in irrigation systems!
- Use turf only where actually necessary. Avoid turf except in picnic or active play areas.
- Choose the right plants. Native plants appropriate for your region are best. These save water, because they are adapted to survive on the natural rainfall of the area. Besides saving water, they also help to avoid the spread of invasive alien plant species which can destroy native ecosystems. And they contribute to the true Hawaiian sense of place.
- Avoid over-watering! Use soil moisture over-rides and rain-shutoffs on all automated systems. Reset controllers at least once per month to account for changing evapotranspiration.
- Zone your plants. This means that plants with similar water needs should be grouped together. This avoids wasting water, overwatering some plants and under-watering others.
- Never water during the heat of the day. The best time to water is just around sunrise. Evenings are also acceptable. Once the sun comes up, the evapotranspiration rate soars, and much of your water is wasted.
- Having your soil tested also helps you to learn what type of watering is needed. Clay soils take from ¼ to ½" of water per hour before water starts running off and being wasted. Sandy soils require somewhat more frequent, shorter watering.
- Mulch, compost or other organic material will help soils hold moisture, keep the ground from overheating and discourage weeds. Loosening the soil while you add the organic matter will also help keep your lawn healthier
- Root feeder or water aerator probes around trees and bushes will help to direct water where it is needed. You can also build a watering basin in the soil around the base of your plants to help the water soak in deeply.

For More Information, Contact the Maui County Board of Water Supply - Water Resources & Planning Division @ 243-7199

Saving Water in The Yard

What and How to Plant in Your Area



1 Wet Windward Areas

2 Cool Dry Upper Elevations

3 Warm to Hot Low Elevations

4 Wetter Low Areas Near Mountains

5 Windward Coastal Salt Spray Zones

Plant Zone Map Adapted From
The Maui County Planting Plan

Tips From The Maui County Department of Water Supply

By Water All Things Find Life

Zone-specific Native and Polynesian plants for Maui County

Zone 1

TYPE: **F** Fern **G** Grass **Gr** Ground Cover **Sh** Shrub **P** Palm **S** Sedge **Tr** Tree **V** Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, ama'uma'u				
Gr - Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia arecina	lo'ulu, hawane	40'	10'	1,000' to 3,000'	Dry to Wet
P	Pritchardia forbesiana	lo'ulu	15'			
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	Cordyline fruticosa	ti, ki	6			
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh - Tr	Broussonetia papyrifera	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Tr	Acacia koa	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Charpentiera obovata		15'			
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Hibiscus furcellatus	'akiohala, hau-hele	8'			
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
V	Alyxia oliviformis	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 2

TYPE: **F** Fern **G** Grass **Gr** Ground Cover **Sh** Shrub **P** Palm **S** Sedge **Tr** Tree **V** Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, ama'uma'u				
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia mauiensis var. diffusa	Maui wormwood, 'ahinahina	2'	3'	1,000' to higher	Dry to Medium
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Styphelia tameiameiae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	Nototrichium sandwicense	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Acacia koa	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	Charpentiera obovata		15'			
Tr	Erythrina sandwicensis	wiliwili	20'	20'	sea to 1,000'	Dry
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 2

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Sophora chrysophylla	mamane	15'	15'	1,000' to 3,000'	Medium
V	Alyxia oliviformis	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 3

TYPE: **F** Fern **G** Grass **Gr** Ground Cover **Sh** Shrub **P** Palm **S** Sedge **Tr** Tree **V** Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Boerhavia repens	alena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehiensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Cressa truxillensis	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Heliotropium anomalum var. argenteum	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr	Sesuvium portulacastrum	'akulikuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
Gr - Sh	Lycium sandwicense	'ohelo-kai, 'ae'ae	2'	2'	sea to 1,000'	Dry to Medium
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 3

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Bidens mauiensis	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	Bidens menziesii ssp. menziesii	ko'oko'olau	1'	3'		
Sh	Bidens micrantha ssp. micrantha	ko'oko'olau	1'	3'		
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Gossypium tomentosum	mao, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Solanum nelsonii	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	Styphelia tameiameiae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kauaiensis kauaiensis	'akia, Molokai osmanthus				
Sh - Tr	Broussonetia papyrifera	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	Nototrichium sandwicense	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Canthium odoratum	Alahe'e, 'ohe'e, walahe'e	12'	8'	sea to 3,000'	Dry to Medium
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Diospyros sandwicensis	lama	12'	15'	sea to 3,000'	Dry to Medium
Tr	Erythrina sandwicensis	wiliwili	20'	20'	sea to 1,000'	Dry
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 3

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Nesoluma polynesicum	keahi	15'	15'	sea to 3,00'	Dry
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Reynoldsia sandwicensis	'ohe makai	20'	20'	1,000' to 3,000'	Dry
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 4

TYPE: **F** Fern **G** Grass **Gr** Ground Cover **Sh** Shrub **P** Palm **S** Sedge **Tr** Tree **V** Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, ama'uma'u				
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehiensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia arecina	lo'ulu, hawane	40'	10'	1,000' to 3,000'	Dry to Wet
P	Pritchardia forbesiana	lo'ulu	15'			
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia australis	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 4

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Artemisia mauiensis var. diffusa	Maui wormwood, 'ahinahina	2'	3'	1,000' to higher	Dry to Medium
Sh	Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	Bidens menziesii ssp. menziesii	ko'oko'olau	1'	3'		
Sh	Bidens micrantha ssp. micrantha	ko'oko'olau	1'	3'		
Sh	Cordyline fruticosa	ti, ki	6			
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	Solanum nelsonii	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	Styphelia tameiameiae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kauaiensis kauaiensis	'akia, Molokai osmanthus				
Sh - Tr	Broussonetia papyrifera	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	Nototrichium sandwicense	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Acacia koa	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Canthium odoratum	Alahe'e, 'ohe'e, walahe'e	12'	8'	sea to 3,000'	Dry to Medium
Tr	Charpentiera obovata		15'			
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Diospyros sandwicensis	lama	12'	15'	sea to 3,000'	Dry to Medium
Tr	Hibiscus furcellatus	'akiohala, hau-hele	8'			
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 4

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Sophora chrysophylla	mamane	15'	15'	1,000' to 3,000'	Medium
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet
V	Alyxia oliviformis	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 5

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Boerhavia repens	alena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehiensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Cressa truxillensis	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Heliotropium anomalum var. argenteum	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Sesuvium portulacastrum	'akulikuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lycium sandwicense	'ohelo-kai, 'ae'ae	2'	2'	sea to 1,000'	Dry to Medium
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia australis	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium
Sh	Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	Bidens mauiensis	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Gossypium tomentosum	mao, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 5

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Solanum nelsonii	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kauaiensis kauaiensis	'akia, Molokai osmanthus				
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Hibiscus furcellatus	'akiohala, hau-hele	8'			
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet
V	Ipomoea pes-caprae	beach morning glory, pohuehue	1			

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
black wattle	Acacia mearnsii	Mimosaceae
blackberry	Rubus argutus	Rosaceae
blue gum	Eucalyptus globulus	Myrtaceae
bocconia	Bocconia frutescens	Papaveraceae
broad-leaved cordia	Cordia glabra	Boraginaceae
broomsedge, yellow bluestem	Andropogon virginicus	Poaceae
buffelgrass	Cenchrus ciliaris	Poaceae
butterfly bush, smoke bush	Buddleja madagascariensis	Buddlejaceae
cats claw, Mysore thorn, wait-a-bit	Caesalpinia decapetala	Caesalpiniaceae
common ironwood	Casuarina equisetifolia	Casuarinaceae
common velvet grass, Yorkshire fog	Holcus lanatus	Poaceae
fiddlewood	Citharexylum spinosum	Verbenaceae
fire tree, faya tree	Myrica faya	Myricaceae
glorybower	Clerodendrum laponicum	Verbenaceae
hairy cat's ear, gosmore	Hypochoeris radicata	Asteraceae
haole koa	Leucaena leucocephala	Fabaceae
ivy gourd, scarlet-fruited gourd	Coccinia grandis	Cucurbitaceae
juniper berry	Citharexylum caudatum	Verbenaceae
kahili flower	Grevillea banksii	Proteaceae
klu, popinac	Acacia farnesiana	Mimosaceae
logwood, bloodwood tree	Haematoxylon campechianum	Caesalpiniaceae
loquat	Eriobotrya japonica	Rosaceae
meadow ricegrass	Ehrharta stipoides	Poaceae
melaleuca	Melaleuca quinquenervia	Myrtaceae
miconia, velvet leaf	Miconia calvescens	Melastomataceae
narrow-leaved carpetgrass	Axonopus fissifolius	Poaceae
oleaster	Elaeagnus umbellata	Elaeagnaceae
oriental mangrove	Bruguiera gymnorrhiza	Rhizophoraceae
padang cassia	Cinnamomum burmanii	Lauraceae
palmgrass	Setaria palmifolia	Poaceae
pearl flower	Heterocentron subtriplinervium	Melastomataceae
quinine tree	Cinchona pubesens	Rubiaceae
satin leaf, caimitillo	Chrysophyllum oliviforme	Sapotaceae
silkwood, Queensland maple	Flindersia brayleyana	Rutaceae
silky oak, silver oak	Grevillea robusta	Proteaceae
strawberry guava	Psidium cattleianum	Myrtaceae
swamp oak, saltmarsh, longleaf ironwood	Casuarina glauca	Casuarinaceae
sweet vernalgrass	Anthoxanthum odoratum	Poaceae
tree of heaven	Ailanthus altissima	Simaroubaceae
trumpet tree, guarumo	Cecropia obtusifolia	Cecropiaceae
white ginger	Hedychium coronarium	Zingiberaceae
white moho	Heliocarpus popayanensis	Tiliaceae
yellow ginger	Hedychium flavescens	Zingiberaceae

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
	Jasminum fluminense	Oleaceae
	Arthrostema ciliatum	Melastomataceae
	Dissotis rotundifolia	Melastomataceae
	Erigeron karvinskianus	Asteraceae
	Eucalyptus robusta	Myrtaceae
	Hedychium gardnerianum	Zingiberaceae
	Juncus planifolius	Juncaceae
	Lophostemon confertus	Myrtaceae
	Medinilla cumingii	Melastomataceae
	Medinilla magnifica	Melastomataceae
	Medinilla venosa	Melastomataceae
	Melastoma candidum	Melastomataceae
	Melinis minutiflora	Poaceae
	Olea europaea	
	Oxyspora paniculata	Melastomataceae
	Panicum maximum	Poaceae
	Paspalum urvillei	Poaceae
	Passiflora edulis	Passifloraceae
	Phormium tenax	Agavaceae
	Pinus taeda	Pinaceae
	Prosopis pallida	Fabaceae
	Pterolepis glomerata	Melastomataceae
	Rhodomyrtus tomentosa	Myrtaceae
	Schefflera actinophylla	Araliaceae
	Syzygium jambos	Myrtaceae
Australian blackwood	Acacia melanoxylon	Mimosaceae
Australian tree fern	Cyathea cooperi	Cyatheaceae
Australian tree fern	Sphaeropteris cooperi	Cyatheaceae
Beggar's tick, Spanish needle	Bidens pilosa	Asteraceae
California grass	Brachiaria mutica	Poaceae
Chinese banyon, Maylayan banyon	Ficus mirocarpa	Moraceae
Chinese violet	Asystasia gangetica	Acanthaceae
Christmasberry, Brazilian pepper	Schinus terebinthifolius	Anacardiaceae
Formosan koa	Acacia confusa	Mimosaceae
German ivy	Senecio mikanioides	Asteraceae
Japanese honeysuckle	Lonicera japonica	Caprifoliaceae
Koster's curse	Clidemia hirta	Melastomataceae
Lantana	Lantana camara	Verbenaceae
Mauritius hemp	Furcraea foetida	Agavaceae
Mexican ash, tropical ash	Fraxinus uhdei	Oleaceae
Mexican tulip poppy	Hunnemannia fumariifolia	Papaveraceae
Mules foot, Madagascar tree fern	Angiopteris evecta	Marattiaceae
New Zealand laurel, karakaranut	Corynocarpus laevigatus	Corynocarpaceae
New Zealand tea	Leptospermum scoparium	Myrtaceae
Pampas grass	Cortaderia jubata	Poaceae
Panama rubber tree, Mexican rubber tree	Castilloa elastica	Moraceae
Shoebutton ardisia	Ardisia elliptica	Myrsinaceae
banana poka	Passiflora mollissima	Passifloraceae

Selection

As a general rule, it is best to select the largest and healthiest specimens. However, be sure to note that they are not pot-bound. Smaller, younger plants may result in a low rate of plant survival.[1] When selecting native species, consider the site they are to be planted in, and the space that you have to plant. For example: Mountain species such as koa and maile will not grow well in hot coastal areas exposed to strong ocean breezes. Lowland and coastal species such as wiliwili and Kou require abundant sunshine and porus soil. They will not grow well with frequent cloud cover, high rainfall and heavy soil.

Consider too, the size that the species will grow to be. It is not wise to plant trees that will grow too large.[2] Overplanting tends to be a big problem in the landscape due to the underestimation of a species' height, width or spread.

A large, dense canopied tree such as the kukui is a good shade tree for a lawn. However, it's canopy size and density of shade will limit what can be planted in the surrounding area. Shade cast by a koa and ohia lehua is relatively light and will not inhibit growth beneath it.

Keep seasons in mind when you are selecting your plants. Not all plants look good year round, some plants such as ilima will look scraggly after they have flowered and formed seeds. Avoid planting large areas with only one native plant. Mixing plants which naturally grow together will ensure the garden will look good all year round.[3] Looking at natural habitats helps to show how plants grow naturally in the landscape.

When planting an area with a mixed-ecosystem, keep in mind the size and ecological requirements of each plant. Start with the hardiest and most easily grown species, but allow space for fragile ones in subsequent plantings.

Acquiring natives

Plants in their wild habitat must be protected and maintained. It is best and easiest to get your plants from nurseries (see list), or friend's gardens. Obtain proper permits from landowners and make sure you follow a few common sense rules:

- collect sparingly from each plant or area.
- some plants are on the state or Federal Endangered Species list. Make sure you get permits (see app. A,B)

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[1] K. Nagata, P.6

[2] K. Nagata, P.9

[3] Nagata, P.9

Soil

Once you have selected your site and the plants you wish to establish there, you must look at the soil conditions on the site. Proper soil is necessary for the successful growth of most native plants, which preform poorly in hard pan, clay or adobe soils. If natives are to be planted in these types of soil, it would be wise to dig planting holes several times the size of the rootball and backfill with 50-75% compost.[4] A large planting hole ensures the development of a strong root system. The plant will have a headstart before the roots penetrate the surrounding poor soil.[5]

It is recommended that native plants not be planted in ground that is more dense than potting soil. If there is no alternative, dig a hole in a mound of soil mixed with volcanic cinder which encourages maximum root development. Fill the hole with water, if the water tends to puddle or drain too slowly, dig a deeper hole until the water does not puddle longer than 1 or 2 minutes.[6] Well-drained soil is one of the most important things when planting natives as you will see in the next section.

Irrigation

Most natives do very poorly in waterlogged conditions. Do not water if the soil is damp. Water when the soil is dry and the plants are wilting. Once established, a good soaking twice a week should suffice. Deep soaking encourages the development of stronger, and deeper root systems. This is better than frequent and shallow watering which encourage weaker, more shallow root systems.

The following is a watering schedule from Kenneth Nagata's Booklet, *How To Plant A Native Hawaiian Garden*:

WATER REQUIREMENT	WATERING FREQUENCY
Heavy	3x / week
Moderate	2x / week
Light	1x / week

Red clay soils hold more water for a longer period of time than sandy soils do. If your area is very sunny or near a beach, things will dry out faster. Even in the area of one garden, there are parts that will need more or less water. Soils can vary and amount of shade and wind differ. After plants are established (a month or two for most plants, up to a year for some trees), you can back off watering.

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[4] Nagata, p. 6

[5] Nagata, p. 8

[6] Nagata, p. 8

Automatic sprinkler systems are expensive to install and must be checked and adjusted regularly. Above-ground systems allow you to monitor how much water is being put out, but you lose a lot due to malfunctioning of sprinkler heads and wind. The most efficient way to save water and make sure your plants get enough water, is to hand-water. This way you are getting our precious water to the right places in the right amounts.[7]

Fertilizer

An all-purpose fertilizer 10-10-10 is adequate for most species. They should be applied at planting time, 3 months later, and 6 months thereafter. Use half the dosage recommended for ornamentals and pay special attention to native ferns which are sensitive to strong fertilizers. Use of organic composts and aged animal manures is suggested instead of chemical fertilizers. In addition, use of cinders for providing trace minerals is strongly recommended.[8]

Natives are plants which were here hundreds of years before the polynesians inhabited the Hawaiian Islands. They were brought here by birds, or survived the harsh ocean conditions to float here. They are well-adapted to Hawaii's varying soil and environmental conditions. This is why they make prime specimens for a xeriscape garden. However, natives will not thrive on their own, especially under harsh conditions. On the other hand, like any other plant, if you over-water and over-fertilize them, they will die. Follow the instructions given to you by the nursery you buy the plant from, or from this booklet. Better yet, buy a book (suggested readings can be found in the bibliography in the back of this pamphlet), read it, and learn more about native plants. I guarantee that you will be pleased with the results.

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[7] Bornhorst, p. 19-20

[8] Nagata, p. 6

Propagation

There are many ways to propagate and plant-out native Hawaiian species. One of the most thourough and helpful book is Heidi Bornhorst's book, *Growing Native Hawaiian Plants.* The easiest, and best way to obtain natives for the novice gardener is to get them from a reputable nursery (see appendix c). That way all you will have to do is know how to transplant (if necessary) and plant-out when you are ready. These are the two methods I have listed here.

Transplanting

1. Use pots that are one size bigger than the potted plant is in
2. Get your potting medium ready

Good potting medium is a ½, ½ mixture of peat moss and perlite. If the plant is from a dry or coastal area, add chunks of cinder or extra perlite. If it is a wet forest species, add more peat moss or compost. Be aware that peat moss is very acidic and certain plants react severely to acidity.

If the plant is to eventually be planted into the ground, make a mix of equal parts peat moss, perlite, and soil from the area in which the plant is to be planted. Slow-release fertilizer can be mixed into the potting medium.

3. Once pots, potting medium, fertilizer and water are ready, you can begin re-potting. Keep the plant stem at the same depth it was in the original pot. Avoid putting the plant in too large a pot, as the plant may not be able to soak up all the water in the soil and the roots may drown and rot.

Mix potting medium and add slow-release fertilizer at this time. Pre-wet the medium to keep dust down and lessen shock to the plant. Put medium in bottom of pot. Measure for the correct depth in the new pot. Make sure there is from ½ to 2 inches from the top of the pot so the plant can get adequate water. Try to stand the plant upright and center the stem in the middle of the pot.

Water the plant thoroughly after transplanting. A vitamin B-1 transplanting solution can help to lessen the transplant shock. Keep the plant in the same type of environment as it was before, sun or shade. If roots were broken, trimm off some of the leaves to compensate for the loss.[9]

Planting out

1. Plant most native Hawaiian plants in a sunny location in soil that is well-drained.
2. Make the planting hole twice as wide as the root ball or present pot, and just as deep.

If the soil is clay-like, and drains slowly, mix in some coarse red or bland cinder, coarse perlite or

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[9] Bornhorst, p.20-21

coarse compost. Place some slow-release fertilizer at the bottom of the hole.

3. Carefully remove the plant from the container and place it in the hole.

The top of the soil should be at the same level as the top of the hole, if it is too high or too low, adjust the soil level so that the plant is at the right depth.

4. Water thoroughly after you transplant.

Mulch

Most natives cannot compete with weeds, and therefore must be weeded around constantly in order to thrive. Mulch is a practical alternative, which discourages and prevents weeds from growing.

Hawaii's hot, humid climate leads to the breaking down of organic mulches. Thick organic mulches such as wood chips and leaves, may also be hiding places for pests.

Stone mulches are attractive, permanent and can help to improve soil quality. Red or black cinder, blue rock chips, smooth river rocks and coral chips are some natural choices.[10] Macadamia nut hulls are also easy to find and can make a nice mulch.[11]

Never pile up mulch right next to the stem or trunk of a plant, keep it a few inches away.

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[10] Bornhorst, p. 24

[11] Nagata, p. 7

ZONES

The Maui County Planting Plan has compiled a system of 5 zones of plant growth for Maui County. The descriptions of zones and maps for these zones are as follows:

Zone 1:

Wet areas on the windward side of the island. More than 40 inches of rain per year. Higher than 3,000 feet.

Zone 2:

Cool, dry areas in higher elevations (above 1,000 feet). 20 to 40 inches of rain per year.

Zone 3:

Low, drier areas, warm to hot. Less than 20 inches of rain per year. Sea level to 1,000 feet.

Zone 4:

Lower elevations which are wetter due to proximity of mountains. 1,000 to 3,000 feet.

Zone 5:

Salt spray zones in coastal areas on the windward side.

These zones are to be used as a general guide to planting for Maui County. In addition to looking at the maps, read the descriptions of the zones and decide which zone best fits your area. Plants can be listed in more than one zone and can be planted in a variety of conditions. For best results, take notes on the rainfall, wind, sun and salt conditions of your site. Use the zones as a general guide for selection and read about the plants to decide which best fits your needs as far as care and or function.

PLACES TO SEE NATIVES ON MAUI:

The following places propagate native Hawaiian plants from seeds and/or cuttings. Their purpose is to protect and preserve these native plants. Please contact them before going to view the sites, they can provide valuable information and referral to other sources.

1.	Hoolawa Farms P O Box 731 Haiku HI 96708	575-5099
2.	The Hawaiian Collection 1127 Manu Street Kula HI 96790	878-1701
3.	Kula Botanical Gardens RR4, Box 228 Kula HI 96790	878-1715
4.	Maui Botanical Gardens Kanaloa Avenue, Kahului across from stadium	249-2798
5.	Kula Forest Reserve access road at the end of Waipoli Rd Call the Maui District Office	984-8100
6.	Wailea Point, Private Condominium residence 4000 Wailea Alanui, Kihei public access points at Four Seasons Resort or Polo Beach	875-9557
7.	Kahanu Gardens, National Tropical Botanical Garden Alau Place, Hana HI 96713	248-8912
8.	Kahului Library Courtyard 20 School Street Kahului HI 96732	873-3097

PLACES TO BUY NATIVE PLANTS ON MAUI

1. Ho'olawa Farms
   Anna Palomino
   P O Box 731
   Haiku HI 96708
   575-5099

   * The largest and best collection of natives in the state. They will deliver, but worth the drive to go and see! Will propagate upon request

2. Kahanu Gardens
   National Tropical Botanical Garden
   Alau Place, Hana
   248-8912

3. Kihana Nursery
   1708 South Kihei Road
   Kihei HI 96753
   879-1165

4. Kihei Garden and Landscape
   Waiko Road, Wailuku
   P O Box 1058
   Puunene HI 96784
   244-3804

5. Kula Ace Hardware and Nursery
   3600 Lower Kula Road
   Kula HI 96790
   876-0734
   * many natives in stock
   * get most of their plants from Ho'olawa Farms
   * they take special requests

6. Kulamanu Farms - Ann Carter
   Kula HI 96790
   878-1801

7. Maui Nui Botanical Gardens
   Kanaloa Avenue
   (Across from stadium)
   Kahului HI 96732
   249-2798

8. Native Gardenscapes
   Robin McMillan
   1330 Lower Kimo Drive
   Kula HI 96790
   870-1421

   * grows native plants and installs landscapes including irrigation.

9. Native Hawaiian Tree Source
   1630 Piiholo Road
   Makawao HI 96768
   572-6180

10. Native Nursery, LLC
    Jonathan Keyser
    250-3341

11. New Moon Enterprises - Pat Bily
    47 Kahoea Place
    Kula HI 96790
    878-2441

12. Waiakoa Tree Farm - Kua Rogoff
    Pukalani HI 96768
    Cell - 264-4166

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Jeffrey K. Eng, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Mr. Eng:

Thank you for your letter dated December 16, 2009, responding to our request for early consultation comments on the subject project. On behalf of the applicant, Ka Lima O Maui, we wish to provide the following information in response to your comments presented in the same order of your letter.

Response to Comment Regarding Source Availability and Consumption:

Information regarding potable and non-potable water demand for the proposed project will be included in the Draft Environmental Assessment (EA). The Section 201H-38, Hawaii Revised Statutes (HRS), application will seek an exemption from Chapter 14.12 pertaining to the County's water availability policy.

Response to Comment Regarding System Infrastructure:

We note your comment that the project site is served by a 12-inch waterline and one fire hydrant located approximately 70 feet to the north. We also confirm that domestic, irrigation and fire flow calculations will be submitted during the building permit process for the project. Your comment regarding the requirement of the backflow preventer has been forwarded to the applicant and their civil engineer.

planning environment government

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhplanning.com www.mhplanning.com

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Response to Comment Regarding Conservation and Pollution Prevention:

The suggested water conservation measures will be forwarded to the applicant for the review and possible incorporation into the project plans and landscaping design of the project. Best Management Practices (BMPs) will be utilized for the project.

Thank you for your comments. Once completed, a copy of the Draft EA will be provided to your office for review and comment. Should you have any questions, please do not hesitate to contact me at 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
Stacy Otomo, Otomo Engineering, Inc.
F:\DATA\KaLimaOMaui\AffHousing\DWS.ecres.doc

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

December 2, 2009

Ms. Erin Mukai, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Subject: Proposed Ka Lima O Maui Affordable Housing Project
Mahalani Street
Wailuku, Maui, Hawaii
Tax Map Key: (2) 3-8-046:016

Dear Ms. Mukai,

Thank you for allowing us to comment on the proposed subject project.

In reviewing our records and the information received, Maui Electric Company (MECO) may be requiring access and electrical easements for our facilities to serve the subject project site. If the customer plans to add any additional electrical load to our system, we highly encourage the customer to submit an electrical service request so that any new service or service upgrade can be provided on a timely basis.

Should you have any questions or concerns, please call me at 871-2340.

Sincerely,

R. Okazaki

Ray Okazaki
Staff Engineer

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 31, 2010

Ray Okazaki, Staff Engineer
Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96733

SUBJECT: Proposed Ka Lima O Maui Affordable Housing Project, TMK (2)3-8-046:016, Wailuku, Maui, Hawaii

Dear Mr. Okazaki:

Thank you for your letter dated December 16, 2009, responding to our request for early consultation comments on the subject project. Your comments have been forwarded to the applicant. As the project progresses through the permitting process, the applicant will coordinate with Maui Electric Company their electrical needs.

We appreciate the input from your office. A copy of the Draft Environmental Assessment will be provided for your review and comment. Should you have any questions, please do not hesitate to contact me at 244-2015.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: Chantal Ratte, Ka Lima O Maui
JoAnn Ridao, Department of Housing and Human Concerns
F:\DATA\KaLimaOMaui\AffHousing\MECO.ecres.doc

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhplanning.com www.mhplanning.com

DEC 0 7 2009

Network Engineering and Planning
OSP Engineering - Maui

November 30, 2009

Hawaiian Telcom

60 South Church St.
Wailuku, HI 96793
Phone 808 242-5102
Fax 808 242-8899

Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Attention: Erin Mukai, Planner

Subject: Proposed Ka Lima O Maui Affordable Housing Project
TMK: (2) 3-8-046:016 (Parcel 16)

Dear Erin,

Thank you for allowing us to review and comment on the subject project. Your plans have been received and put on file.

Hawaiian Telcom, Inc. has no comment, nor do we require any additional information at this time.

Should you require further assistance, please call me at 242-5107.

Sincerely,

Tom Hutchison
OSP Engineer

CC: Lynette Yoshida, Network Engineering Senior Manager
BICS File # 0911-086 (3080)

X. REFERENCES

X. REFERENCES

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APPENDIX A.

Archaeological Assessment Survey, Prepared by Xamanek Researches, LLC

An Archaeological Assessment of 2.0-Acres Wailuku *Ahupua`a*, Wailuku District, Island of Maui
TMK (2) 3-8-046:016

Prepared on behalf of:

Ka Lima O Maui
Wailuku, Maui

Prepared by

Xamanek Researches, LLC
Pukalani, Maui

Erik M. Fredericksen
Jenny L. Pickett
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14 May 2010 (DRAFT)

ABSTRACT

Xamanek Researches, LLC conducted an Archaeological Assessment for 2 acres of land on Tax Map Key (TMK) 3-8-046:016. The subject area is located in Wailuku *Ahupua`a* and District; on the western portion of the central Maui isthmus. The subject and surrounding area is comprised of a network of Aeolian sand dunes. Portions of the project area have been previously disturbed by grubbing, grading and development.

Archaeological fieldwork occurred on 25 and 27 November 2010, and follow-up work was conducted on 20 January 2010. Fieldwork consisted of both surface and subsurface investigations throughout the subject area. Subsurface testing included sixteen controlled mechanical Backhoe test Trench (BT) excavations. No historic properties were identified during the course of the archaeological fieldwork. Previously disturbed Native Hawaiian remains were previously identified and preserved in perpetuity on the immediately adjacent parcel. Several additional burial features have been identified throughout the surrounding area.

This study was prepared following the Department of Land and Natural Resources, State Historic Preservation Division Hawai`i Administrative Rules (HAR 13-275-276) and is also in compliance with Maui County guidelines, rules, and recommendations. This report presents data gathered from a combination of background research and field survey results.

Archaeological monitoring is warranted for any potential future clearing, grubbing or grading activities. An archaeological monitoring program shall be established; in order to mitigate any potential future inadvertent discoveries that may occur in the subject area.

TABLE OF CONTENTS

ABSTRACT i

TABLE OF CONTENTS ii

LIST OF FIGURES iii

LIST OF PHOTOS iv

LIST OF TABLES iv

INTRODUCTION 1

STUDY AREA 4

Natural History 4

BACKGROUND RESEARCH 6

Pre-Contact Period 6

Early Post-Contact Period 7

Post-1850s Period 8

PREVIOUS ARCHAEOLOGICAL WORK 13

Previous Archaeological Studies in the general area 13

SETTLEMENT PATTERN AND EXPECTED FINDINGS 20

Settlement Pattern 20

Expected Findings 20

FIELD METHODS 22

RESULTS OF FIELDWORK 24

Subsurface Testing Results 28

SUMMARY AND CONCLUSIONS 41

PROJECT MITIGATION AND RECOMMENDATIONS 42

REFERENCES 43

APPENDICES **47**

Appendix A: Maps, photos and burial treatment plan for Site 50-50-04-4728 from the monitoring program for the Cameron Center Expansion 47
Appendix B: Additional photographs and profile maps of Backhoe Test Trenches that are not presented within the Backhoe Testing Results Section 51

LIST OF FIGURES

Figure 1. Portion of the U.S Geological Survey topographic map of Wailuku quad showing approximate location of the project area 2
Figure 2. Tax Map Key depicting the subject area. 3
Figure 3. TMK map depicting the present division of the Wailuku District 5
Figure 4. A painting of Kahului Harbor showing the completed Kahului Railroad, as well as houses possibly associated with Land Commission Awards 11
Figure 5. Selected archaeological studies conducted in the vicinity of the project area .. 19
Figure 6. Portion of the plan map of the Cameron Center Expansion project, showing Site 50-50-04-4728 and current project area, map adapted from L. Rotunno-Hazuka.... 25
Figure 7. Project area plan map showing BTs, buildings & sheds in blue, and concrete/asphalt driveways and parking lots in yellow, map adapted from Gholkar & Associates, Inc., Structural and Civil Engineering 27
Figure 8. Profile map of the west face wall of BT-1 35
Figure 9. Profile map of east face wall of BT-7 36
Figure 10. Profile map of the west face wall of BT-10 38
Figure 11. Profile map of the east face wall of BT-14 40

LIST OF PHOTOS

Photo # 1. The Makaweli Rock Crusher building—shown in 1941, following the April 1 tsunami of that year 12
Photo # 2. Overview of the project area, view to the north 23
Photo # 3. Overview of the project area, view to the south 23
Photo # 4. Overview of the chain link fence marking the outside perimeter of burial location, view to the southeast. 25
Photo # 5. Overview of the chain link fence marking the outside perimeter of the preserved burial location, view to the southwest. 26
Photo # 6. Overview of building, asphalt and concrete driveways and parking lots, view to the north 28
Photo # 7. Overview of asphalt driveways, view to the north 29
Photo # 8. Overview of fire hydrant, sheds, asphalt driveways and concrete parking lot, view to the north northwest 29
Photo # 9. Overview of the west face wall of BT-1, view to the west 35
Photo # 10. Overview of the east face wall of BT-7, view to the east 37
Photo # 11. Overview of the west face wall of BT-10, view to the west 38
Photo # 12. Overview of the east face wall of BT-14, view to the east 40

LIST OF TABLES

Table 1. Selected Archaeological Studies Carried out in Lower 'Īao Valley, and Central Maui Area. 18
Table 2.Results and stratigraphic descriptions of the Backhoe Test trenches (BTs) 30

INTRODUCTION

Xamanek Researches, LLC conducted an Archaeological Assessment on two acres of land in Wailuku Ahupua`a in the District of Wailuku on the Island of Maui (Figure 1). The subject area is located on Tax Map Key (TMK) 3-8-046:016 (Figure 2). The parcel is located in a developed portion of land bordering Kahului and Wailuku town within an area commonly referred to as *Sand Hills*.

Portions of the subject area have been previously disturbed by mechanical grubbing, grading, and filling activities. The subsurface deposition throughout the project area is comprised of Aeolian dunes, or wind-blown sand that through weathering, forms into concreted lithified sand. Human burials have been identified throughout the sand dunes over time. The burial discoveries have been identified in several forms: sometimes scattered across the surface, in shallow burial pits, or even elaborate pits excavated through meters of the concreted sand. Because the sand dunes actually move over long periods of time, some burials have been discovered c. 6.5 meters (20 feet) below existing surfaces. Although this assessment did not result in the identification of any archaeological features, there is always the possibility of encountering human skeletal remains throughout the general area. The Site 50-50-04-4728 preservation area, located on an adjacent parcel, contains human remains.

This report presents compiled information on the subject parcel in compliance with archaeological assessment guidelines as set forth in the State Department of Land and Natural Resources Historic Preservation Hawai`i Administrative Rules subsection 13-276-5 (a) and (c). During the fieldwork portion of this assessment, both pedestrian survey and subsurface sampling occurred.

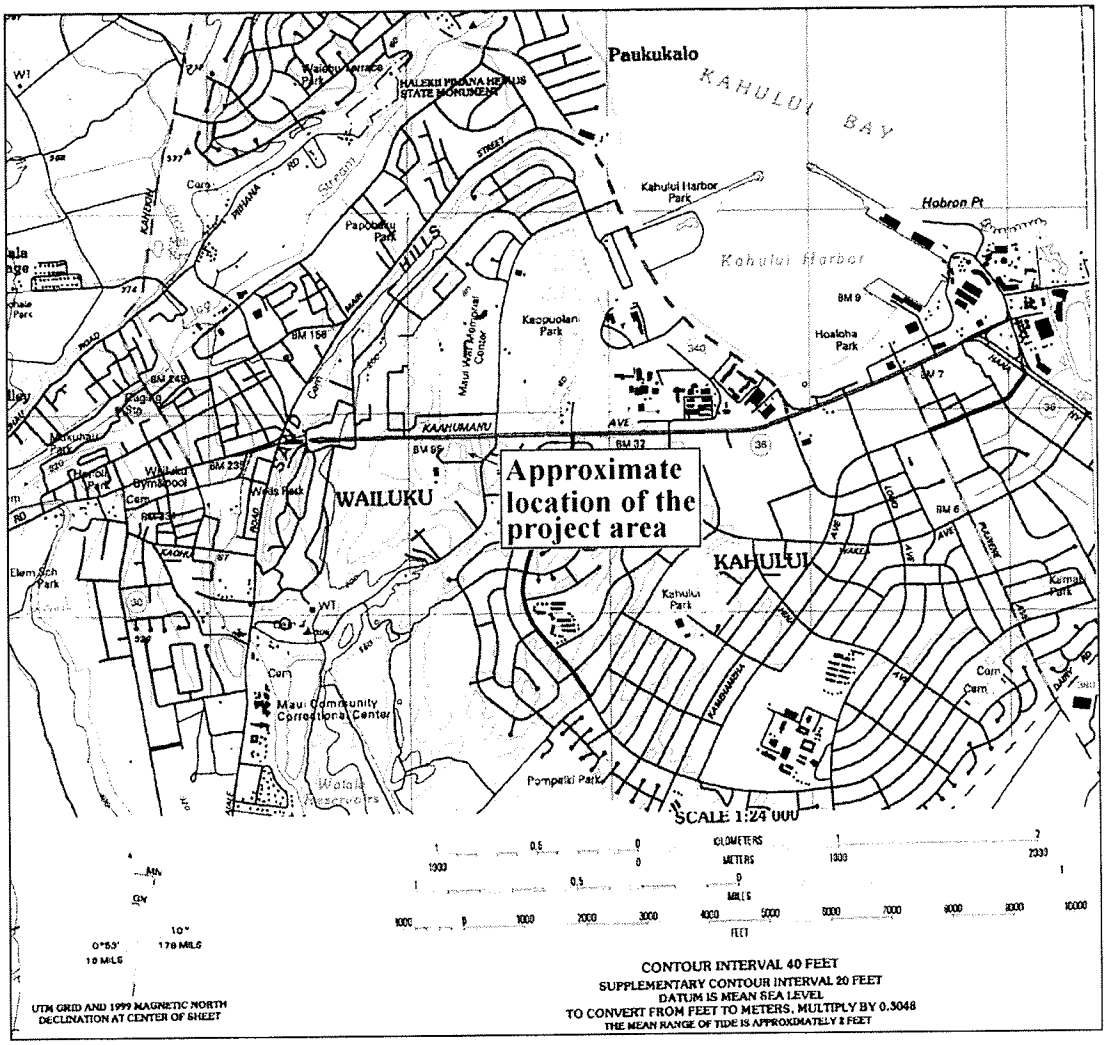

Figure 1: Portion of the U.S Geological Survey topographic map of Wailuku quad showing approximate location of the project area.

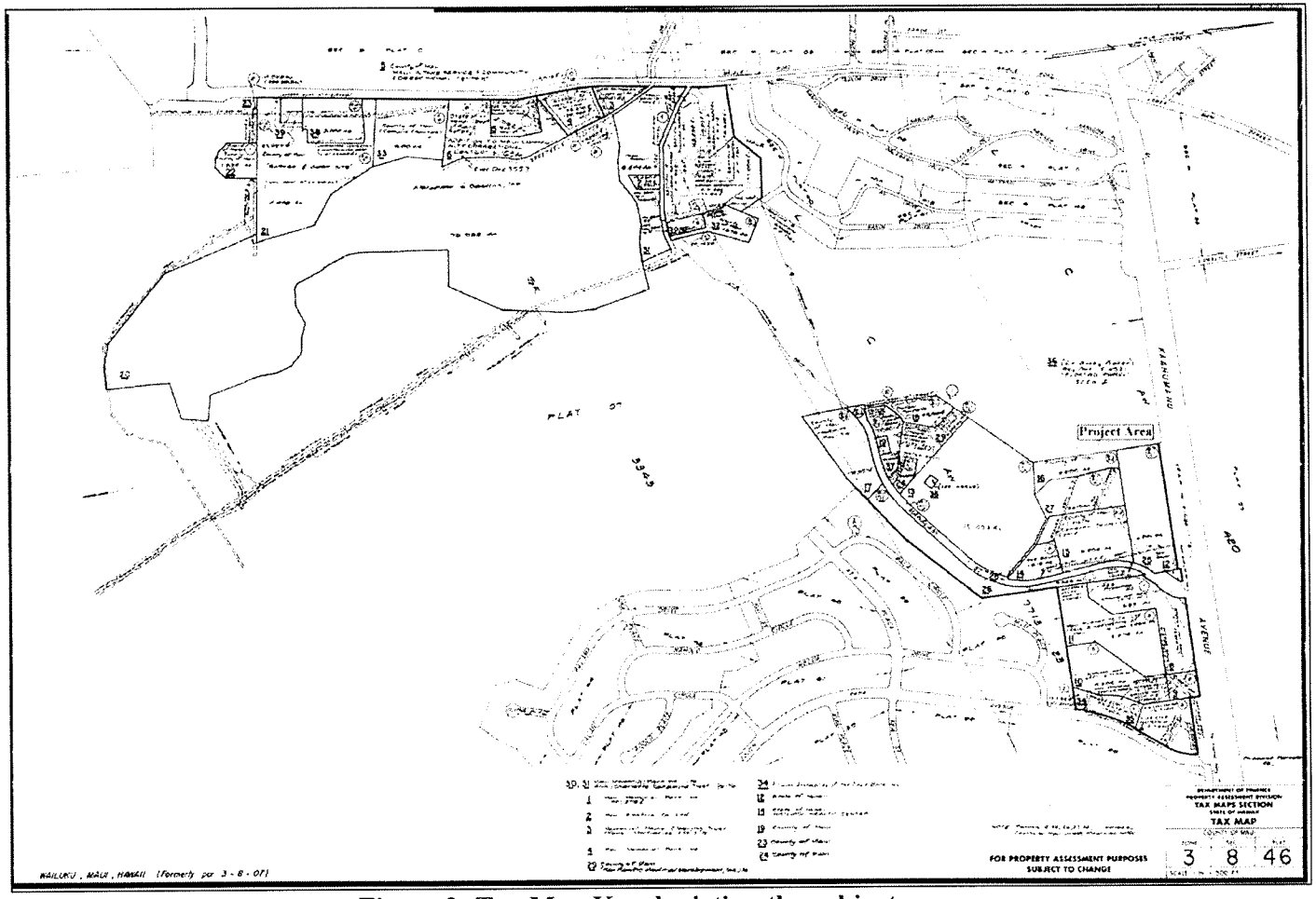

Figure 2: Tax Map Key depicting the subject area.

STUDY AREA

Natural History

The project area lies on the western side of the Kahului Isthmus, below the flank of the West Maui Mountains within an area commonly referred to as *pu`uone* or *sand hills*. The current landowner is Ka Lima O Maui. The area consists of an extensive Aeolian sand dune formation—a large geologic feature that extends at least eight miles from Waiehu through Waikapū. The sandy matrix is underlain by lava flows from Haleakalā and alluvial sediments from the West Maui Mountains (Stearns and Macdonald 1942: 54). Soil classification is Pulehu-Ewa-Jaucas association; further described as "Deep, nearly level to moderately sloping, well-drained and excessively drained soils that have a moderately fine-textured to coarse-textured subsoil or underlying material; on alluvial fans and in basins" (Foote, et.al 1972: 8).

The color of the sand varies from grayish-brown to light brown and golden that generally forms layers of strongly alkaline cemented sand hard pan otherwise known as lithified sand that undulates above and below the surface. Old root molds, or root castings, filled with hard, white alkaline deposits are a common feature in the sand dunes (Ibid., p. 117). Pu`uone sands occur on slopes of 7 to 30 degrees, and develop in material derived from coral and seashells (Ibid.).

Annual precipitation in this portion of Maui averages between 20 to 30 inches. The highest monthly rainfall occurs during the winter and spring months. Temperatures range from 60 to 80 degrees Fahrenheit in January to 68 to 90 degrees Fahrenheit in July. Winds are generally trade winds from the northeast, averaging 16 to 18 miles per hour (University of Hawaii, 1983:56).

The project area has been impacted by previous development. Most of the sand dunes in the immediate area have been developed, or partially developed; including the subject area. Previous grubbing, grading, and building has affected the natural environment.

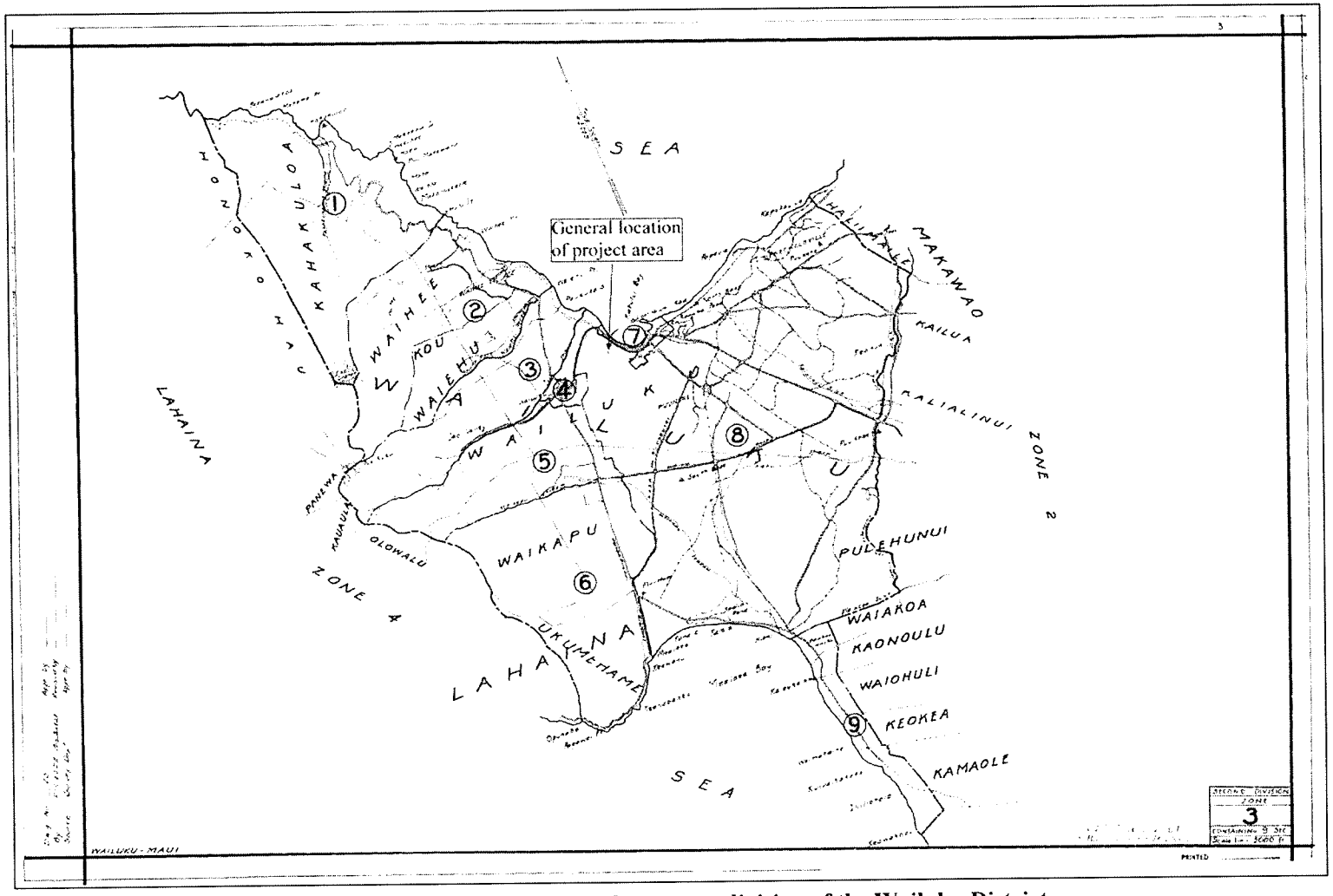

Figure 3: TMK map depicting the present division of the Wailuku District.

BACKGROUND RESEARCH

Pre-Contact Period

The *Ahupua'a* of Wailuku is a large land unit stretching around Kahului Bay from Paukūkalo to Kapukaulua. It includes `Īao Valley and the northern half of the Kahului Isthmus (Figure 3). `Īao Valley is noted as a place where chiefs were buried and wars were fought. Wailuku has been translated as "water of destruction" (Pukui, et. al., 1974: 225).

`Īao Valley and the two associated dune formations on the north and south sides of the river constitute the core area of Wailuku. The area is rich with natural and cultural resources. Wailuku was once the religious and political center of Maui culminating during the time of Chief Pi`ilani (approximately 1600 AD). In the late pre-Contact period, warfare increased as the chiefs from Maui, O`ahu and the Big Island struggled for political and military dominance. High Chief Pi`ilani succeeded in unifying the districts, or *moku* of Maui by warfare, but after his death, his sons fought with one another; each hoping to succeed their father as high chief. Eventually Kiha-a-Pi`ilani became victorious, but each following generation of chiefs struggled through warfare in order to secure their positions of political domination (Speakman, 1978: 9-13).

During the reign of the last powerful paramount chief or king of Maui, Kahekili (reigned from 1765 to 1790). Wailuku again became the site of intense warfare. Wailuku was considered to be the capital of Maui, as Kahekili's royal residence, Kalanihale, was located in Wailuku, and surrounded by his retinue.[1] In the mid-1770s, Kalanihale was marched upon by a Big Island chief named Kalani`opu`u and his *alapa* (the name given to his warriors). News of his coming preceded him, and Kahekili hid his warriors in the sand dunes above Haleki`i *heiau* to surprise the invading troops. A fierce battle ensued, and Kalani`opu`u's army was pushed to the sea and slaughtered (Speakman: 16-17).

By 1786, Kahekili controlled Maui, Moloka`i, Lāna`i, and O`ahu. This undisputed political control lasted 4 years. In 1790, Kamehameha the First invaded Kahekili's territory—an action that ended with the infamous battle of Kepaniwai[2] and the defeat of the Maui ruler. The word Kahului can be translated as "the winning", and the Bay takes

[1] The location is said to be located just north of the intersection of High Street and Main Street leading into Iao Valley in Wailuku town.

[2]Kepaniwai means literally "water dam" in reference to Iao Stream, because the stream was choked with human bodies after the slaughter there (Pukui, et. al., 1974, p. 109).

this name because Kamehameha I gathered his warriors there prior to fighting the battle in `Īao Valley (Pukui, et. al., 1974).

Early Post-Contact Period

The reign of Kamehameha I was intertwined with the increasing presence of foreigners in the Hawaiian Islands. The arrival of Captain Cook offshore at Kahului Bay in 1778 began the steady flow of outside influences that would forever alter the indigenous population and environment. One of the first of these influences came with missionaries, whose charge it was to save the "heathen" souls. The first missionaries arrived in Wailuku in 1832. Reverend Jonathan Green established a girls' seminary known as Central Female Boarding School in 1836, where young Hawaiian women were taught the foreign language, customs and religion.

Another influence to bring change to the Hawaiians was foreign commercialism, which came in the form of mass sugar production. The first sugarcane crops grown in Wailuku *ahupua`a* were harvested and processed around 1828. Kamehameha III, with the help of two Chinese technicians, established a water-powered mill in Wailuku. This was known as Hungtai Sugar Works, and its location was fairly close to the later location of the Wailuku Sugar Mill, which was established in 1862. Hungtai Sugar Works continued to operate until the opening of the new mill.

The population of Wailuku was listed during an 1831-32 missionary census as 2,256; with most of it being in the northern portion, presumably in `Īao Valley (Cordy, 1978: 59).

In Central Maui, on the southern and eastern side of the dunes (Pu`uone Dunes), an early commercial activity took the form of cattle ranching. This sizable area was used for pasturage. By as early as 1845, large herds of cattle were roaming the Kahului Isthmus (cattle had been introduced on the Big Island by Vancouver in 1793). The Maui cattle were under royal *kapu,* so were not to be molested. They were so destructive to the environment that Native Hawaiian landowners protested, but to no avail (Barrere, 1975: 52). In addition to the commercial raising of cattle, there were also other commercial efforts, one being a brief attempt at the production of cotton in the 1830s. This endeavor met with little commercial success however[3], and further adversely impacted the landscape.

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[3]The Anglican Church felt that "the Hawaiian people, freed from their service to and dependence on the chiefs should be self-supporting and thought that the encouragement of the manufacture of cloth from the superior cotton which grew luxuriantly in the islands would be a means to that end. They therefore suggested that a manufacturer be sent with sufficient machinery to get the project started. They felt that the people would continue to work with the encouragement and cooperation of the chiefs." (Lemmon et. al., 1973, p. 2.B.3). To this end they sent Miss Lydia Brown in 1835 with " 'a quantity of domestic spinning apparatus' (presumably spinning wheels and a loom)" (Ibid.), and "charged with the responsibility of teaching the Hawaiian girls the arts of carding, spinning, weaving and knitting locally grown cotton and wool." (Ibid.) As each class grew proficient enough to teach others, a new class was formed (Ibid., 2.B.4).

Post-1850s Period

After the Māhele (1848), much of the *ahupua`a* of Wailuku was designated as Crown Land, to be used in support of the royal "state and dignity". In 1872, Kamehameha V died, and his sister Princess Ruth Ke`elikolani inherited the land. She was designated as the owner of the *Ka`a* lands of Wailuku, the southern portion of the *ahupua`a*. The *ili* of *Owa* comprised of 743.40 acres, (LCA 420) and was granted to Kuihelani, a steward to Kamehameha I. The much smaller northern section (the *ili* of *Kalua*-LCA 7713, Apana 23--391 acres) was awarded to Princess Ruth's half-sister, Victoria Kamamalu. In 1882, Princess Ruth sold one-half of the Crown Lands of Hawaii to sugar producer, Claus Spreckels, in order to settle her debts with him. Spreckels already held a lease for 16,000 acres of Wailuku *Ahupua`a*, dating from 1878. Worried about what Spreckels might do with half of the Crown Lands, King Kalākaua gave him Land Grant 3343, a 24,000 acre portion of the southeastern section of Wailuku *Ahupua`a,* in return for the surrender of his claim (Adler, 1966: 262-263).

The Reciprocity Treaty of 1876 with the United States gave a boost to the sugar industry by increasing the prices of sugar. The dry eastern part of the *ahupua`a* became attractive as potential sugar land—if only water could be brought to it. In 1880, Spreckels began construction of "Spreckels' Ditch", located *makai* of the Hāmākua Ditch, which had been built earlier by Alexander and Baldwin to water their Maui Agricultural Company's fields in and around Pā`ia. The "Spreckels' Ditch" brought water from Haleakalā farther west onto the arid Kahului isthmus. The ditch was 30 miles long, delivered about 60 million gallons of water a day, and cost $500,000 to construct.

Spreckels also built another ditch, the Waihe`e ditch in 1882, which tapped the water resources from the West Maui Mountains, thus bringing water to both sides of the Wailuku Commons isthmus area (Adler, 1966: 48-49). These endeavors enabled him, in 1882, to found Hawaiian Commercial and Sugar Company. He continued involvement in that company until 1898, when control was wrested from his hands. The parent company still bears the name of Alexander and Baldwin, the principal participants in the transfer of corporate control. The production of sugar cane continues to be an activity in the isthmus area to this day, although some portions operated by C. Brewer and Company shifted to pineapple production.

The environmental conditions in the lower `Īao Valley, which in pre-Contact times were ideal for agricultural necessary to support a large population, were a wide valley floor, rich alluvial soils, and a constant water supply from `Īao Stream. These combined with the access to Kahului Harbor, rich in marine resources, made this area the prime pre-Contact location on West Maui for a political and religious center. The lower portion of `Īao Valley contained some of the most productive taro land on the island, and the abundance of Land Commission Awards in the lower valley attest to this. There are 66 LCA's, primarily taro patch *kuleana*, and 39 *po`alima* located between the old

Wailuku Mill site and Paukūkalo, on the southern side of `Īao stream. In addition, Kamehameha IV granted 13 awards directly to individual chiefs.[4]

Lower Main Street was built along the route of an old government road, which very likely followed the course of traditional transportation routes from the ocean to the inland portions of `Īao Valley. Many of the LCAs in this area have borders aligned with the road, indicating it was an important transportation corridor at the time the *kuleana* were granted. This corridor follows the natural boundary between the sand dune and the alluvial deposits of the valley. The Kahului Railroad paralleled Lower Main Street, and was one of the earliest known commercial projects that impacted the dune itself (see Figure 4).

The route of the railroad ran from Kahului Harbor to Wailuku Sugar Mill. The remnants of this old railroad bed can still be noted in a few places along Lower Main, and along Kahului Beach Road. The most striking architectural remnants of the railway system located along Kahului Beach Road are the 5 concrete pillars and arches, the most visible *makai* one impressed with the date "1921". In the past, a large wooden frame building rested on these pillars, serving as the housing for the Makaweli Rock Crusher apparatus. It was constructed so the train carrying rock from the quarry could off-load from the track-bed into the crusher. The concrete pilings elevated the crusher adequately above ground so trucks could be driven in and filled with crushed rock. This series of pillars (that was the footings for the Makaweli Rock Crusher Mill) still stands near the intersection of Kanaloa Avenue and Kahului Beach Road (see Photo # 1).

Railroad construction began in the late 1870s and continued for nearly 2 decades, as routes were added and service expanded. The Maui News contains articles dealing with activities in the general vicinity of the project area. One dated February 8, 1902, describes a problem and potential solution resulting from the railroad:

> Superintendent R.W. Fuller of the Kahului Railroad Company is preparing to make some important changes in the line of railroad track between Kahului and Wailuku. At present the sharp turn and the railroad crossing at the beach is extremely dangerous on account of the sand dunes that shut out the approaching trains from the view of those approaching the crossing with teams, especially the wind is blowing a gale. The track will be moved some hundreds of feet south of its present location, so that the point where it crosses the road as well as the approaching trains themselves can be seen for quite a distance. On crossing the road, the track will skirt the pasture at greater distance from the public road.

On June 8, 1907, another reference describes plans improving the land for further residential use in the future:

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[4] This is in contrast to the area south and east of Lower Iao Valley, in which the study parcel lies. Here there were 2 LCAs awarded—one to Victoria Kamamalu (7713), and one to Kuihelani (420). The largest land partition of Central Maui is Grant 3343 to Claus Spreckels.

> The Kahului Railroad Company is filling in the lowlands, in and about Kahului and will in time raise the level of the entire town site, when the work is completed and proper drains provided, the town should be free of mosquitos and the place a most desirable locality in which to live.

The railroad continued operations until after World War II. Then slowly, demands began to change, and segments of the system were phased out. An article in **The Maui News** of October 15, 1957 bore the headline "Iron Horses Bow Out as Wailuku Sugar Company Discontinues Use of Railroad". The railroad continued to serve other areas until 1966, when it ceased operation.

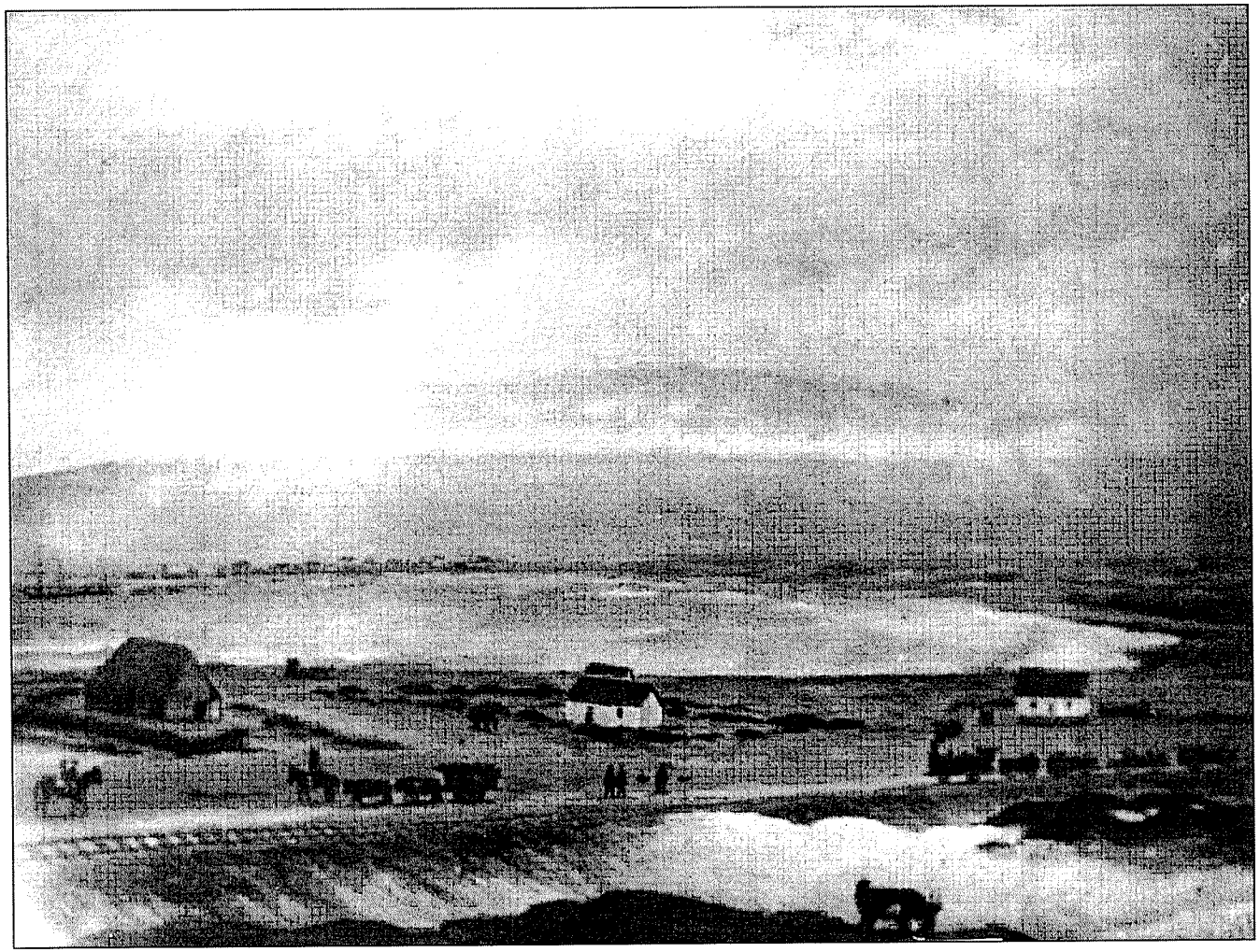


Figure 4: A painting of Kahului Harbor showing the completed Kahului Railroad, as well as houses possibly associated with Land Commission Awards.

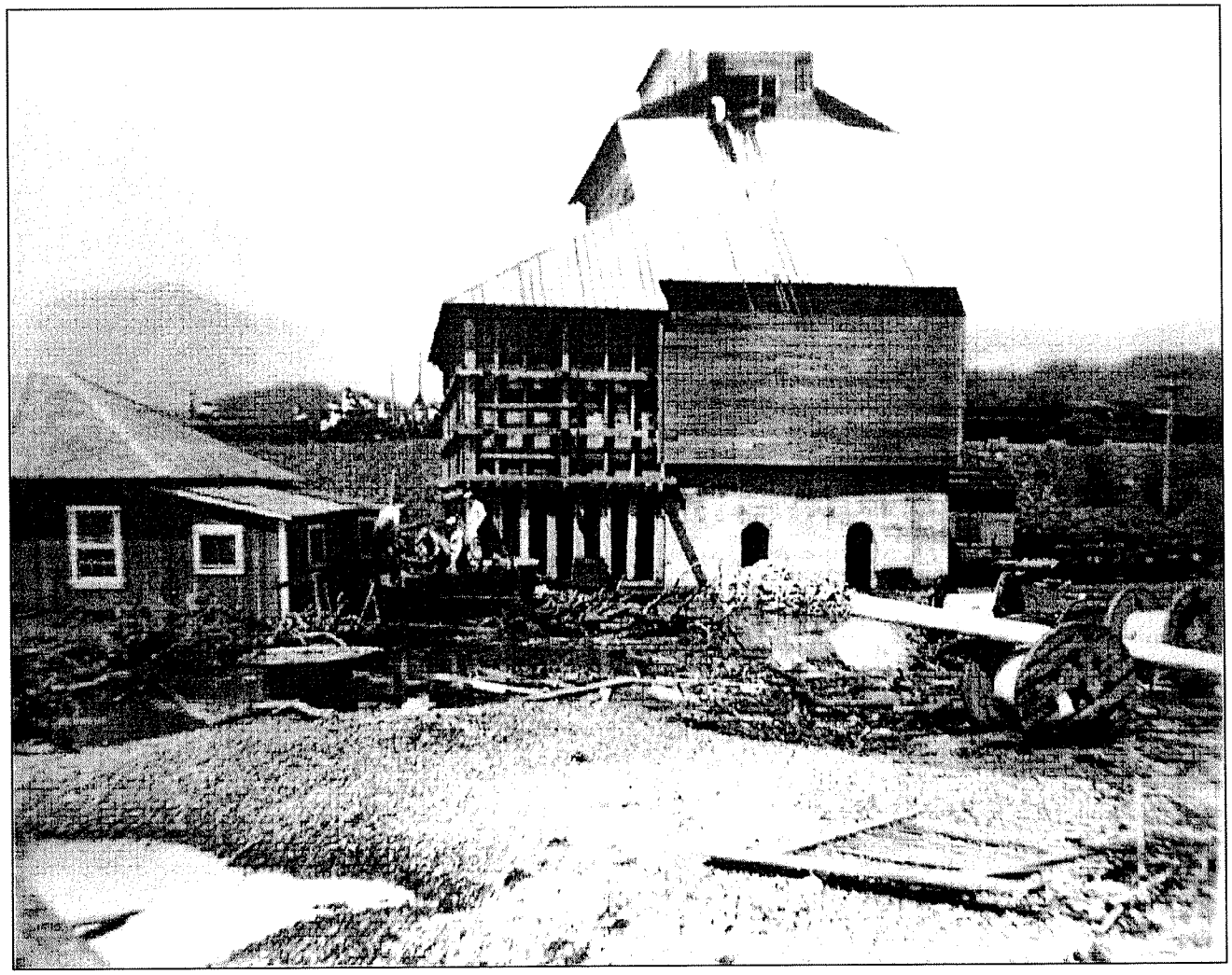


Photo # 1: The Makaweli Rock Crusher building—shown in 1941, following the April 1 tsunami of that year.

PREVIOUS ARCHAEOLOGICAL WORK

Previous Archaeological Studies in the general area

`Īao Valley/Pu`uone Dunes Area

The earliest archaeological work in the Wailuku area was part of the island-wide survey of *heiau* (place of worship) done by Winslow Walker during 1928-1931. He reported a number of *heiau* in the general area of Wailuku. The most well known in the area -*Pihana Heiau* and *Haleki'i Heiau*- lie on the northern side of `Īao Stream atop the large dune formation. Efforts in the 1970s led to the preservation and designation of a State Monument, under the supervision of the Division of State Parks (DLNR).

Walker reported that there were a number of other *heiau* in this area of Wailuku, which were said to have been consecrated by Liholiho during his visit to Maui for that purpose in 1801 (Walker, 1931: 146-147). At the time of his survey, none of the following reported *heiau* could be located: Keahuku, Olokua, Olopio, Mālena, Pohakuokahi, Lelemākō, Kāwelowelo, Kaulupala, Palamaihiki, and Oloolokalani (Ibid: 148).

Personal communication with Mr. Charles Keau (1992), a well-respected authority on history and prehistory of Maui, provided more information about some of these *heiau*, which Walker could not find. By Mr. Keau's account, there were 3 *heiau* located in the Lower Main Street corridor from Kahului Harbor to the intersection of Lower Main and Mill Streets. One was situated across the street from the Maui Soda Company. Another was located on parcel 083 (TMK: 3-4-039) between the Maui Electric Power Station and the County of Maui Wailuku Government cemetery. A third may have been located near the Home Maid Bakery. During the construction of the parking lot next to the bakery, Mr. Keau reported that Wesley Wong, a well-known local antiquity collector, found 5 adzes of "Tahitian" style. He did not specify when this was, but thought there might still be portions of the *heiau* there as well as some burials. More recent archaeological work has corroborated this prediction.

Nisei Veterans Memorial Center

Very significant archaeological findings were identified at the corner of Lower Main Street and Waiehu Beach road—the site of the Nisei Veterans Memorial Center. The Nisei Memorial project has been underway since 1992, and site has proven to be one of the more significant sites studied along the northern Maui coastline.

In February of 1992, Xamanek Researches began an archaeological inventory survey on the approximate 2-acre parcel of land near the intersection of Lower Main and Wai'ehu Beach Road (Fredericksen and Fredericksen, December 1992). The most notable feature surface feature was the former Kahului Railroad bed that ran the length of the property (SIHP -3112). Another historic site (SIHP -3119A) was a refuse disposal area about 20 centimeters below the existing surface. The predominant historic items were bottles and ceramics dating from the late 1800s, about the time the railroad was built and in use. A subsurface excavation that cut through the historic site, exposed a subsurface pre-Contact site designated as Site -3119B. Later, data recovery work at the site caused a revision in the site numbering system. All pre-Contact components of the site are now designated as Site -3120, while the historic components bear the Site -3119 designation.

Site -3120 became extremely interesting when a very early radiocarbon date of AD 233-410 was obtained. However, later data recovery work did not produce material of a comparable date. The deposits from which it came, turned out to have been previously disturbed by excavations done during the construction of the railroad bed, and the original source was not located.

In another area of Site -3120, test excavations produced a number of artifacts, including coral files, bone picks, an unfinished fishhook, and worked bone, along with large quantities of food midden. Data recovery research has shown Site -3120 to be a large habitation site, which contains a cluster of human burials. The latter remain *in situ* and will be preserved as a permanent burial/grave site. Several fire pit features were recovered and a series of 12 radiocarbon dates were obtained. They range from the very early date mentioned above (AD 233-410) to AD 1200-1740, with the majority of the pre-Contact dates falling in a range of AD 1400 to 1700 (Fredericksen, et al., 1998).

Archaeological monitoring followed the completion of data recovery, and a total of 38 additional human burials (SIHP -4668) were located in the southwestern corner of the 2-acre parcel near the crest of the dune. A radiocarbon date from carbon recovered in a large double posthole beneath one of the burials returned a conventional radiocarbon age of 620 +/- 50, and a calibrated date range of AD 1285-1420. The monitoring program is still in process.

Xamanek Researches surveyed the adjacent property to the south (TMK: 3-8-007: 038) in November of 1992. Fourteen backhoe test trenches were excavated, along with 3 manual test units, in the dune areas, and relatively undisturbed portions of the parcel. The *makai* portion of the property had been impacted by the installation of a sewer line, the mid-portion by the construction of the former Kahului Railroad bed (Site -3112) and a rock crusher mill (Site -3145). The only cultural materials recovered were historic items, most likely associated with the railroad construction (Fredericksen and Fredericksen, November 1992).

Central Maui Area

The central area of Maui, south of Ka`ahumanu Avenue, is noted for many burials in the Pu`uone Sand Dune formation, which stretches across the isthmus. There have been a number of studies documenting these finds (Fredericksen et al., 1997; 1998; Panteleo and Sinoto, 1996; Rotunno-Hazuka, 1994).

However, in the central area to the north of Ka`ahumanu Avenue, very few sites other than scattered burials have been found. The authors have conducted studies at Maui Community College, Maui Central Parkway (Fredericksen and Fredericksen, December 1992; Fredericksen, et. al., 1994), and at the Keiki Zoo Maui (Fredericksen and Fredericksen, September 1995)—all with negative results.

Archaeological Consultants of Hawai`i conducted an archaeological survey for the Maui Arts and Cultural Center, again without significant findings (Kennedy, 1990). Cultural Surveys Hawai`i, Inc conducted an archaeological inventory survey for the 110-acre Maui Central Park area (now Keopuolani Park). A large intact dune was contained in the bulk of the park. There were no indigenous cultural sites located during the Cultural Surveys Hawai`i inventory survey. However, scattered human remains (Site 50-50-04-4211) were previously identified on the surface near the Maui Arts and Cultural Center, during an earlier botanical survey conducted by Xamanek Researches in 1996. Subsequent archaeological work at the inventory level indicated that no additional human remains were present, and Site -4211 was evaluated as "no longer significant" (Heidel, Pyle and Hammatt, January 1997: 97). Other historic sites noted in the Maui Central Park inventory survey include Site -4232, a former World War II military facility, and Site -3112, the Kahului Railroad Berm.[5] Both sites were partially preserved through incorporation into the landscaping of the Park (Ibid: 96).

It was previously thought that the paucity of archaeological findings in this area indicated that the extensive military activity associated with World War II had altered the Central Maui landscape, thereby potentially obliterating most archaeological sites.

Xamanek Researches conducted an archaeological inventory survey along the Maui Lani Parkway, Lot 11-A in 1997. The project is directly west of the current project area. The inventory survey did not find any post-contact cultural deposits however an *in situ* indigenous burial was discovered. The burial feature was assigned SIHP 50-50-04-4401. In addition to this find, several other burials have been located along the Maui Lani Parkway Development. Sites -4368 and -4435 were also located by Xamanek Researches.

In 2001 Xamanek Researches monitored the Mahalani Street improvements project. The project involved widening, upgrading, and replacing existing drain lines, replacing sidewalks, and installing a pedestrian cross walk way and light. A 15-stall parking lot was constructed and was partially monitored during this project. A previously

[5] The Kanaloa Avenue construction-monitoring project located a previously unidentified pre-Contact habitation area (Site 5496) along with three *in situ* human burials and the remains of two previously disturbed individuals (Site 5495). Both of these sites lie in the northeastern portion of Keopuolani Park.

unidentified post-Contact wall was recorded and given Site -5113. No other significant findings were located during this project.

Maui Lani Development Project Area

Early surveys by Barrera (1976) of the 1,000 acre Maui Lani Project which within close proximity to the current study parcel, and of the Hale Laulea Subdivision (Barrera, 1983) in Kahului did not identify any sites. Neller (1984) investigated the area known as the "sand borrow site" after sand from there, used at a construction site in Lāhaina, was discovered to contain human remains. His research revealed one complete *in situ* burial, and skeletal fragments of at least 3 other individuals scattered in the vicinity.

In 1987, in response to a call from the Maui Police Department, the present authors visited this same general area ("sand borrow site") to determine the nature of skeletal material reported by local residents. The disturbed, flexed burial of a young female (18 to 25 years of age), and a 4 or 5 year old child nearby, lay partially exposed in a trail used by dirt bikers. At the request of the Police Department, the burials were removed. The presence of a shattered 4th thoracic rib and lower scapula blade on the left side, suggested that a frontal, traumatic puncture wound caused the death of the young female. The remains were curated at Maui Community College until they were turned over to the State Historic Preservation Division on Maui for permanent deposition.

In 1990, the Anthropology Department of the Bishop Museum under contract to Maui Lani Partners conducted test excavation on 4 sites which had been identified in a reconnaissance survey done in January 1990 (Rotunno and Cleghorn, February 1990). The sites included 2 parallel alignments, 2 adjacent rock mounds, and a single rock mound. These sites were determined to be of recent origin related to off-road vehicular traffic, and not archaeologically significant. The fourth site (Site 50-50-04-2797) is a human burial site found at the sand borrow pit near the eastern boundary of the Maui Lani Project area. No intact burials were recovered, but the scattered remains of at least 3 individuals were recovered in the surface layer (Rotunno-Hazuka et. al., May 1994a). A subsequent burial search was undertaken. These investigations resulted in the identification of at least 12 individuals from 10 burial features. Six of the features were preserved *in situ* (Rotunno-Hazuka et. al., May 1994b).

Archaeological subsurface sampling of the Maui Lani Development Phases 1 and 1A was conducted by Aki Sinoto Consulting. The objective of the work was to implement a strategy for subsurface sampling to test for the predictability of burials based on topographic features within the unmodified dune areas, and to address the deficiencies in the inventory survey (Pantaleo and Sinoto, January 1996).

A total of 90 backhoe trenches, 2 shovel scrapes and a manual trench were excavated in 58 localities (Ibid: iii). Six previously unrecorded burials were found – 4 associated with the sand borrow site (Site -2797); and one on top of a high dune (Site -4146), of the study area. The authors state: "No predictable pattern of traditional interment of the dead based on preference for topographic features was established during

the current investigation. Rather, the resultant data indicates only one concentration or complex of multiple burials at Site -2797 and isolated individual burials at the top of dunes in the highest locations in the project area" (Ibid.).

Wai`ale Road Corridor/Pu`uone Dunes

A pre-Contact human burial was found while road crews were excavating under the Ka`ahumanu Avenue bridge crossing Wai`ale Road (Site -4126).

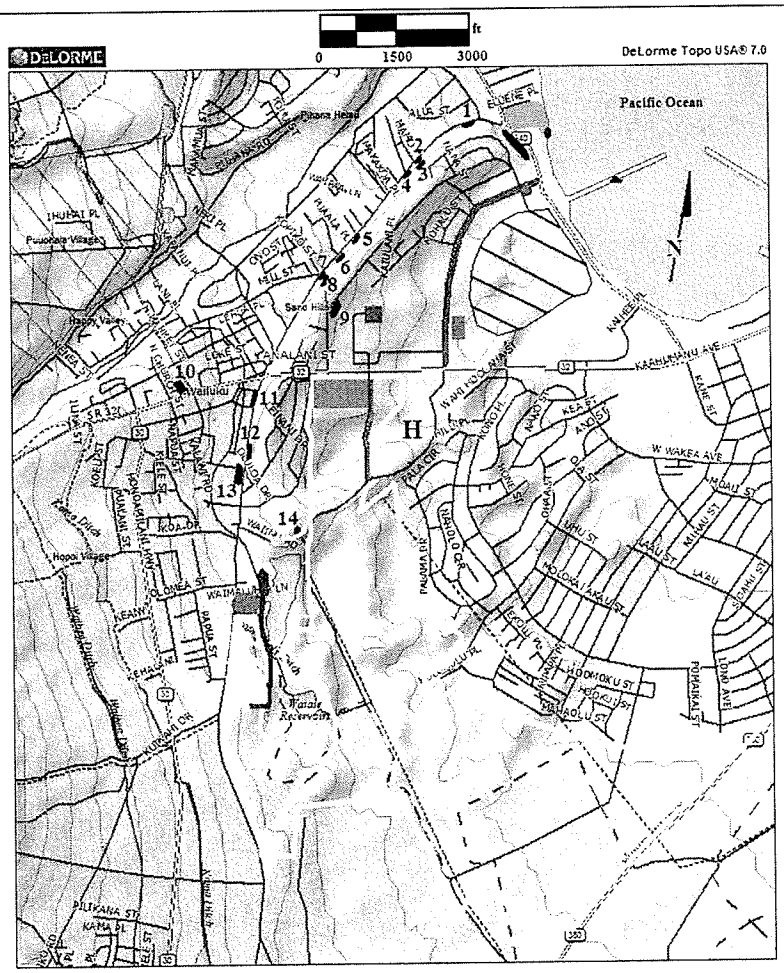
Along Wai`ale Road, which forms the western border of the Wailuku Sand Hills (Pu`uone Sand Dunes), monitoring for a drainage project for C. Brewer found human remains which had been disturbed by a former pipe line trench that runs perpendicular to the road (Site -4005). Site -3502 also contains human burial features, an historic coffin burial and another disturbed burial that is thought to be pre-Contact. Site -4067 is the remnant of a habitation site identified during the monitoring for the pipe line that revealed Site -4005. Site -4068 is a habitation site with an associated cluster of human burials (Dunn and Spear, 1995).

During construction for the Maui Homeless Shelter in May of 1992, 3 human burials were inadvertently discovered (Site 50-50-04-2916). These skeletal remains were investigated by Theresa Donham. She found the remains of an adult male in a grading cut, roughly 2 feet below the original surface (Burial 1). No cultural materials were associated, and a burial pit could not be identified. On May 21, a cranium (Burial 2) was exposed during construction of a desilting basin located along the lower slope of the dune at the southeastern corner of the project area (Donham, 1992, p. 3). A test unit measuring 5 by 3 meters was excavated to a depth of 0.50 to 0.75 meters below the surface. All sand material was screened and a total of 280 identifiable elements or skeletal fragments were recovered, along with 235 miscellaneous fragments. Two individuals were represented, an adult female, and a smaller adult individual of undetermined sex.

In 1999, Archaeological Services Hawai'i (ASH) monitored the construction activities for the Cameron Center Expansion. The skeletal remains of two individuals were encountered during this monitoring program. The human remains were placed in a preservation area, designated Site 50-50-04-4728. An area of previously disturbed human remains was also identified. The human remains represent two different individuals, an adult and an infant. The adult remains include a portion of a long bone and rib bone fragments and the infant remains consisted of a portion of a long bone and a portion of cranium. This is based on a discussion with Lisa Rotunno-Hazuka on 9 December 2009, and maps and photos given to us by her. There is no report on this monitoring program, according to Lisa Rotunno-Hazuka, because of a lack of funds. A one page burial treatment plan was written but not submitted to the SHPD for review. Site -4728 was reinterred at the northwest corner of the Cameron Center Expansion project area (**Error! Reference source not found.**), adjacent to the north side of the MEO Child Care Center.

Table 1: Selected Archaeological Studies Carried out in Lower `Īao Valley, and Central Maui Area.

Authors	Locations	Findings
Burgett and Spear, 1995	TMK: 3-8-37: 48, Lower Main St., Home Maid Bakery. Sites 3924 and 3925	Habitation sites; human burials. Dated c. AD 1430 to 1671.
Connolly, 1973	TMK: 3-8-36: 94, Lower Main St., Site 1171	Habitation site; burials discovered 1994 eroding from dune face.
Donham, 1994	TMK: 3-8-37: 49, Lower Main St., , Home Maid Bakery, Site 3556	Inadvertent burial discovery, both historic and pre-Contact burials
Fredericksen, W. and Fredericksen, D, December 1992a	TMK:3-8-07: 40 and 43; Maui Community College Parking Lot Extension.	Historic sites from WWII. No pre-Contact cultural materials.
Ibid., September 1995	TMK: 3-8-07: por. 1; Keiki Zoo Maui.	No findings of significance.
Ibid., February 1996	TMK: 3-8-07: 104; Maui Scrap Metal Company, Waikapu. Borrow Site, Site 3525.	Remains of at least 22 individuals recovered from mined sand.
Fredericksen D. and Fredericksen, W. December 1992b Fredericksen, et. al., November 1998	Inventory Survey - TMK: 3-8-07: 123, at Lower Main and Wai'ehu Road, Nisei Veterans Memorial Center. Data Recovery Report	Historic site, Kahului Railroad (Site 3112); large pre-Contact habitation site, with continuous occupation from c. 1200 AD to c. 1740 (Site 3120); numerous burials to be preserved *in situ*.
Fredericksen, et. al., July 1995; Fredericksen, E. and Fredericksen, D. September 1996	Inventory Survey and Data Recovery: TMK: 3-4-39: por. 81, 82, 83 at Lower Main and Mill Streets, Site 4127	Habitation site; dated c. AD 1450 to 1675.
Fredericksen, E., W., and D., September 1994	TMK: 3-8-07: por. 125; Maui Central Park, 10 acres along Kahului Beach Road	No significant findings.
Ibid., January 1997	TMK: 3-4-07: por. 121, Maui Lani Parkway corridor	No pre-Contact finds in corridor—human remains (Site 4368) on Golf Course Hole #10—monitoring recommended.
Ibid., May 1997	TMK: 3-8-47: por. 1, 2, 3, 4, 17, 18, 30, and 32; 3-9-07: por 121 Mahalani Street Extension	No significant findings—limited monitoring recommended.
Fredericksen, E., February 1997 (post-field summary)	TMK: 3-4-07: por. 121, Lot 11-A, Maui Lani Project—20.7 acres	One indigenous *in situ* burial (Site50-50-04-4401)-Monitoring recommended.
Heidel, Pyle and Hammatt, 1997	TMK: 3-8-07: 1 and 3-7-01: 2; Maui Central Park	Historic sites: 4232-WW II military camp; 3112-Kahului Rail-road Berm; 4211-scattered human remains.
Kennedy, 1992	TMK: 3-8-07; Maui Arts and Cultural Center.	No findings.
Pantaleo, J. and A. Sinoto, January 1996	TMK: 3-8-07: 2, 110; Phase 1 and Phase 1A, Maui Lani Partners Development, Wailuku.	No habitation sites. Human burials in several locations. Monitoring recommended. Additional burials during monitoring.
Rotunno and Cleghorn, 1990 Rotunno-Hazuka, et. al. May 1994a	TMK: 3-8-07: 2, 110: Maui Lani Development Property.	No pre-Contact sites other than burials (Site 2797).
Spear, 1995	TMK: 3-8-37: 48; Lower Main St., Site 4066.	Human burials and habitation layers.



1 - Connolly, 1973 and Fredericksen et al., December 1999
2 - Spear, 1995
3 - Burgett and Spear, 1995
4 - Donham, 1994
5 - Fredericksen, et al., September 2002
6 - Burgett and Spear, 1996
7 - Fredericksen, et al., 1996
8 - Fredericksen, et al., 1997
9 - Fredericksen, et al., December 1997
10 - Fredericksen et al., 2000, 2001 (Phase I and II)
11 - Fredericksen et al., February 1999
12 - Donham, 1992
13 - Dunn and Spear, 1995
14 - Fredericksen et al., August 1994

Fredericksen, E. November 1998
Fredericksen et al., 1997
Fredericksen et al., 1995
Heidel, Pyle and Hammatt, 1997
Rotunno and Cleghorn, 1990
Rotunno-Hazuka, et al., May 1994a
Fredericksen, W., January 1997
Donham, 1992
Pickett, 2006 (isolated burial)
Fredericksen, 2005
Fredericksen, et al., May 1997
Fredericksen et al., 2002
Fredericksen et al., December 1992b and October 1997
Fredericksen et al., 2002
Fredericksen, October 2005
Fredericksen et al., 1995

Figure 5: Selected archaeological studies conducted in the vicinity of the project area.

SETTLEMENT PATTERN AND EXPECTED FINDINGS

Settlement Pattern

The lower `Īao Valley portion of Wailuku *Ahupua'a* was a central political and religious area of West Maui, because of its fertile taro lands and close proximity to the sea. Given these conditions, a large population could be supported, and wherever large population clusters are found, the social framework of chiefly importance and religious expression is also present. This is attested to by the existence of the two *heiau* (Haleki'i and Pihana) atop the northern dune system, and others reported by Walker (1931) and Keau (1992, oral communication) within the `Īao Stream corridor. The middle and upper reaches of `Īao Valley were covered by *lo'i* and associated *'auwai,* which produced additional food items to support extensive political and religious activities. The Upper `Īao Valley had been traditionally known as a very significant sacred place in the history of Maui (Donham, MCCRC minutes, June 1, 1995). Coastal sites, such as Site -3120, have been occupied since the 1200s (and possibly much earlier), and no doubt provided the complex with marine resources. There seems to be a pattern in `Īao Valley, whereby sites closer to the ocean have earlier dates than the ones farther inland, suggesting that settlement occurred first along the sea shore and gradually moved inland as population increased.

An intensification of usage appears to have occurred during the 16th century, and seems to have peaked around the time of Pi`ilani, approximately 1600 AD (Ibid.). All radiocarbon dates, which have been recovered from the sites along this corridor fall into this temporal framework.

The study area lies near the base of the Pu`uone Dune Foundation, and is a part of the island that has been adversely affected by the presence of the military during World War II. A large Marine base existed in the area that is now Keopuolani Park. Before the construction of this base, a sizable plantation community known as—Raw Fish Camp—occupied the area. Prior to that, it was used as pasture land.

Expected Findings

As a consequence of the considerable amount of land alterations associated with clearing, grubbing, and grading; most surface traces of pre-Contact activity, if it existed, has been most likely destroyed. At the northeast section (*makai*) of the Kanaloa Avenue corridor, remnants of habitation sites with associated human burial features have been

identified, and there is a strong possibility that similar subsurface features are present on the remaining portions of the sand dune formation.

FIELD METHODS

At the request of Ka Lima O Maui, Xamanek Researches LLC, conducted an archaeological assessment survey on a 2.0 acre parcel of land in Wailuku. The study area is located in Wailuku *Ahupua`a*, Wailuku District, Island of Maui at TMK (2) 3-8-046: 016 (Figures 1 and 3 and Photos 1 and 3). This subject area is located approximately 1,225 m or 1.25 km from the shoreline of the Kahului Bay.

Archaeological fieldwork was conducted by archaeologists Hugh Coflin B.A. and Jonas Madeus, B.A. under the direction of Erik Fredericksen (SHPD Permit #10-07) who was the field director and principal investigator for the project. Fieldwork occurred on the 25th and the 27th of November 2009. In addition, Jenny Pickett, B.A., carried out follow-up fieldwork on 20 January 2010. A total of three fieldwork days were expended for this survey.

The archaeological investigation consisted of an approximate 80%[6] surface survey of the subject area, and subsurface testing of 16 Backhoe Test trenches (BTs). The pedestrian inspection of the project area was accomplished through systematic sweeps oriented east/west at 5-10 meter intervals. The survey began in the northeast corner of the project area and moved southeast. No surface archaeological sites were encountered during the pedestrian sweeps. The area that was not examined or tested is composed of a large building, three sheds, concrete parking lots, and asphalt driveways. These areas were visually scanned, but formal transects and subsurface sampling did not occur, in order to avoid potential damages and disturbances. Refer to Figure 4 that depicts the area containing buildings, sheds, concrete and asphalt driveways and parking lots.

Again, subsurface testing consisted of the mechanical excavation of 16 BTs. These BTs were closely monitored and the back dirt was periodically checked with shovels and rakes. None of the 16 BTs yielded significant cultural material remains.

Following the excavations, a representative wall from the various subsurface tests was hand scraped with a trowel to aid in recording the soil stratigraphy. The wall profiles were mapped to scale and described using Munsell soil colors and U.S Soil Conservation Service terminology. The completed excavations were then photographed and backfilled.

[6] Portions of the project area (c. 20%) are covered by a large building, sheds, parking lots and concrete and asphalt driveways.

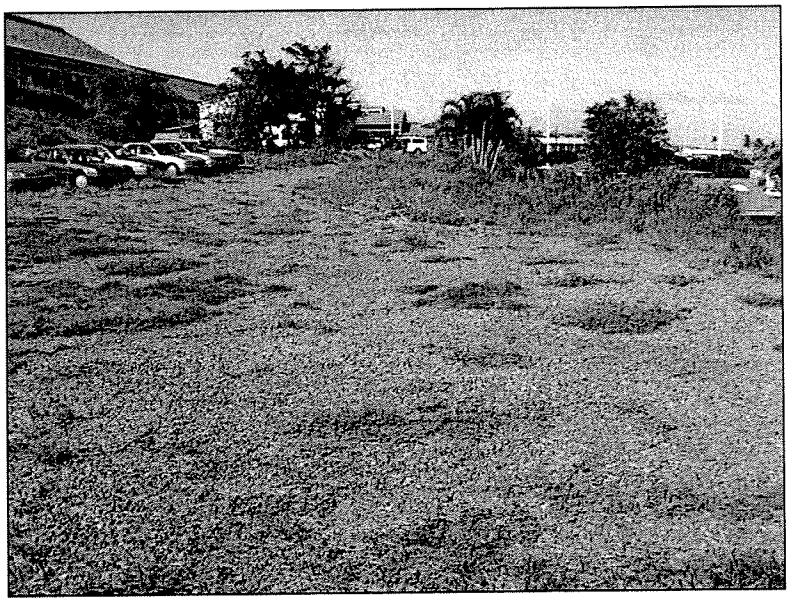


Photo # 2: Overview of the project area, view to the north.

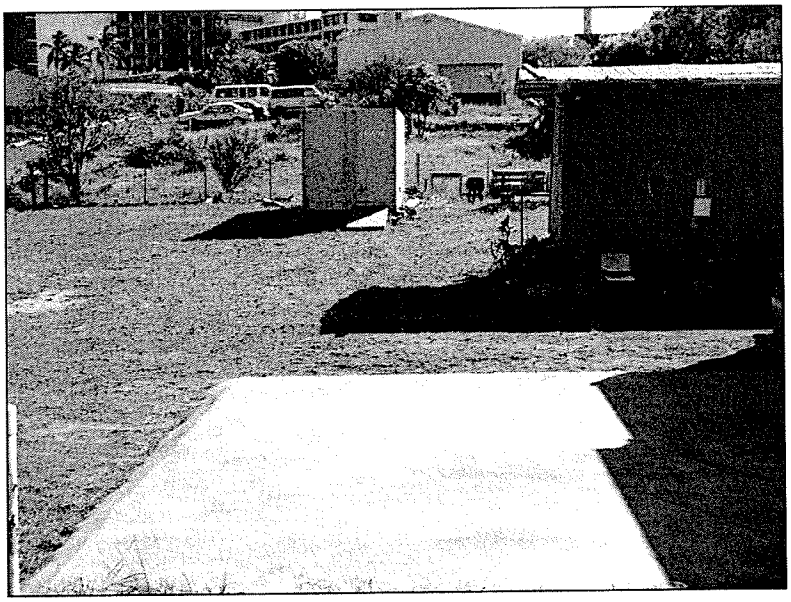


Photo # 3: Overview of the project area, view to the south.

RESULTS OF FIELDWORK

The current investigation did not encounter any surface archaeological features on the subject area. In addition, no subsurface historic properties were identified in the subject area during our assessment survey. This may be due in part, to extensive land modifications in the recent past. Our subsurface investigation of the project area indicates that sand dune deposits are present throughout the subject parcel.

An area of approximately 18 meters by 17 meters immediately outside the northeast corner of the project area has an enclosed chain link fence around its perimeter for the permanent preservation of the human burial feature assigned SIHP 50-50-04-4728 (Figure 7). Again, this burial feature was identified by Archaeological Services Hawai'i (ASH) during archaeological monitoring for the construction of the Cameron Center Expansion project. The grass inside of the enclosed chain link fence was mowed during the time of our assessment survey. There is no surface monument marking the site (Photo 4 and Photo 5). However, there is a depression in the grass near the southeast corner of the fenced off area that Ms. Lisa Rotunno-Hazuka pointed out as the location of SIHP - 4728 (Figure 6 and Appendix A).

If traditional Hawaiian burials and historic surface feature exist within the subject area, they are were not identified during the subsurface investigations. However, it is possible subsurface features may have been previously impacted by disturbance from commercial agriculture or the construction of the nursery, offices, and storage buildings.[7]

[7] The majority of this project area was previously operated as a nursery by Ka Lima O Maui. A warehouse building and some sheds are currently used for offices, classrooms and storage on the subject parcel.

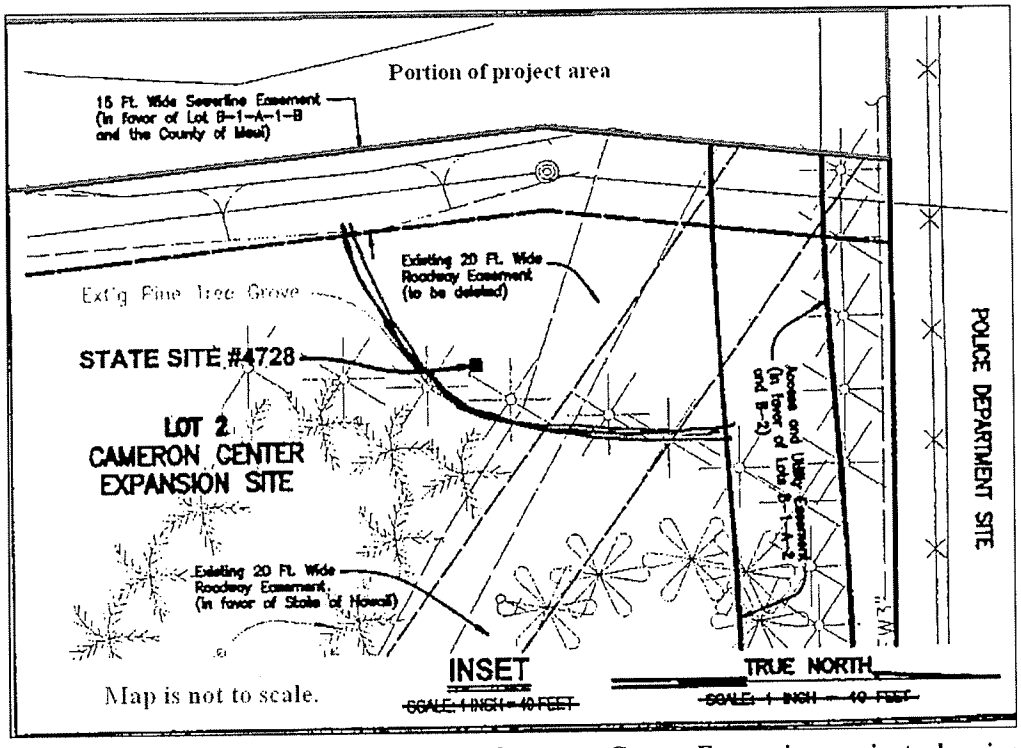


Figure 6: Portion of the plan map of the Cameron Center Expansion project, showing Site 50-50-04-4728 and current project area, map adapted from Lisa Rotunno-Hazuka.

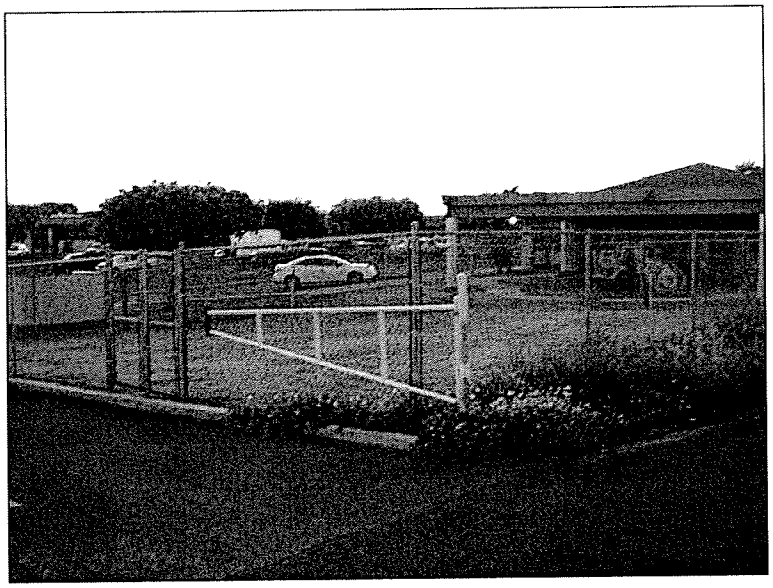


Photo # 4: Overview of the chain link fence marking the outside perimeter of the Site 4728 preservation area, view to the southeast.

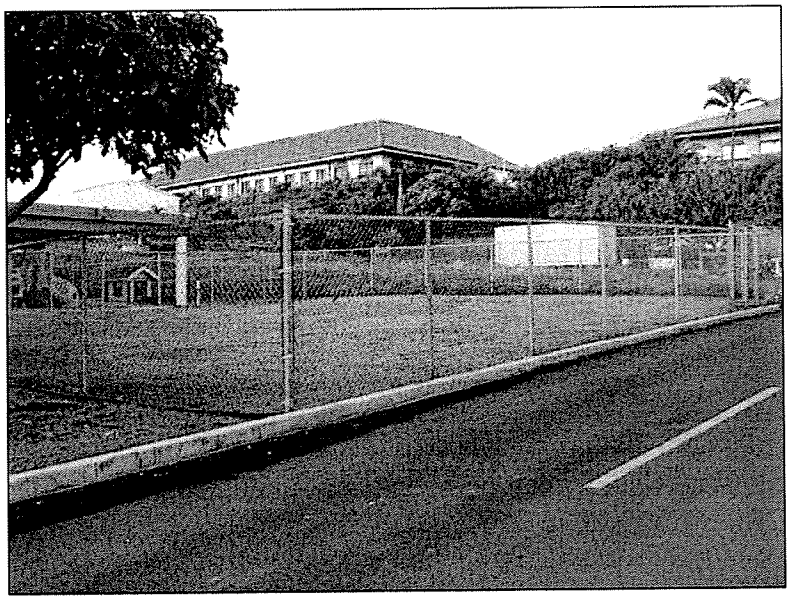


Photo # 5: Overview of the chain link fence marking the outside perimeter of the Site 4728 preservation area, view to the southwest.

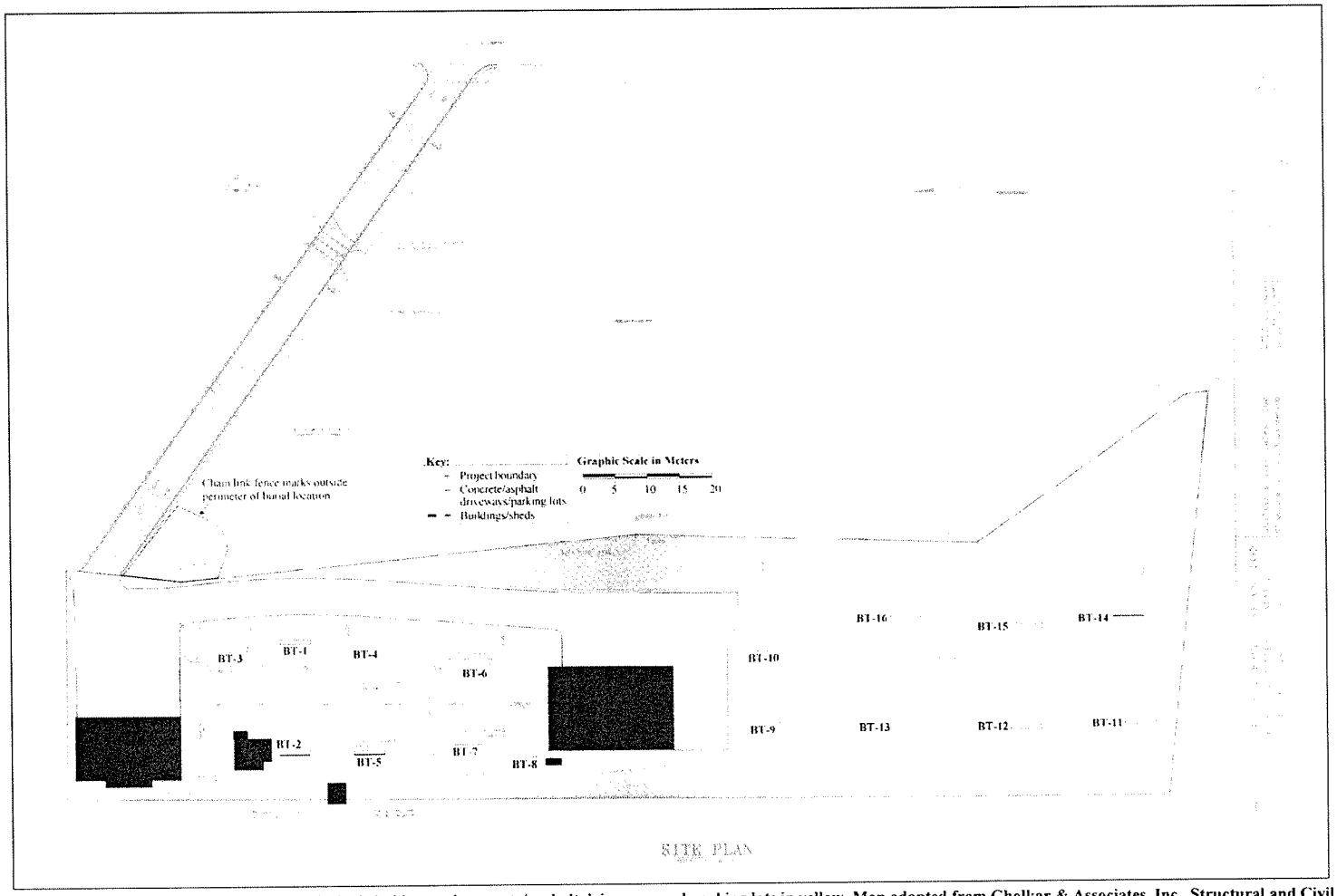


Figure 7. Project area plan map showing BTs, buildings & sheds in blue, and concrete/asphalt driveways and parking lots in yellow. Map adapted from Gholkar & Associates, Inc., Structural and Civil Engineering.

Subsurface Testing Results

As mentioned above, a total of 16 Backhoe Test trenches (BTs) were systematically laid out and excavated throughout the project area. The trenches measured 5 meters in length by 0.9-1.5 meters in width and 0.55-2.3 meters deep. The mechanical trenches were excavated in order to identify any subsurface cultural deposits and also to examine the subsurface stratigraphy of the subject area (Table 2). These BTs were excavated in the approximate 80% of the two acres planned for the proposed affordable housing. Again, the remaining approximate 20% of the project area was not subject to subsurface testing because it was covered by buildings, sheds, concrete and asphalt driveways, and parking lots (Figure 7 and Photo 6 through Photo 8). See Appendix B for additional photos and profile maps of the backhoe trenches that are not discussed in this section.

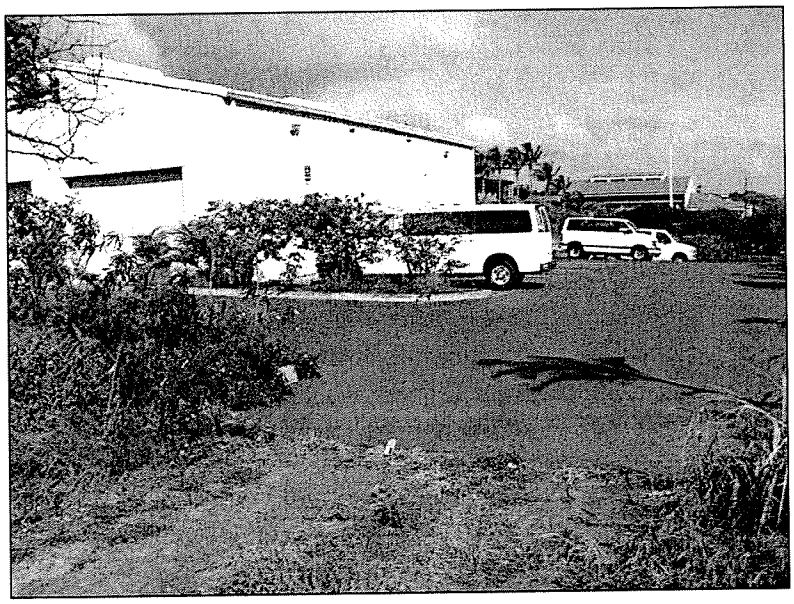


Photo # 6: Overview of building, asphalt and concrete driveways and parking lots, view to the north.

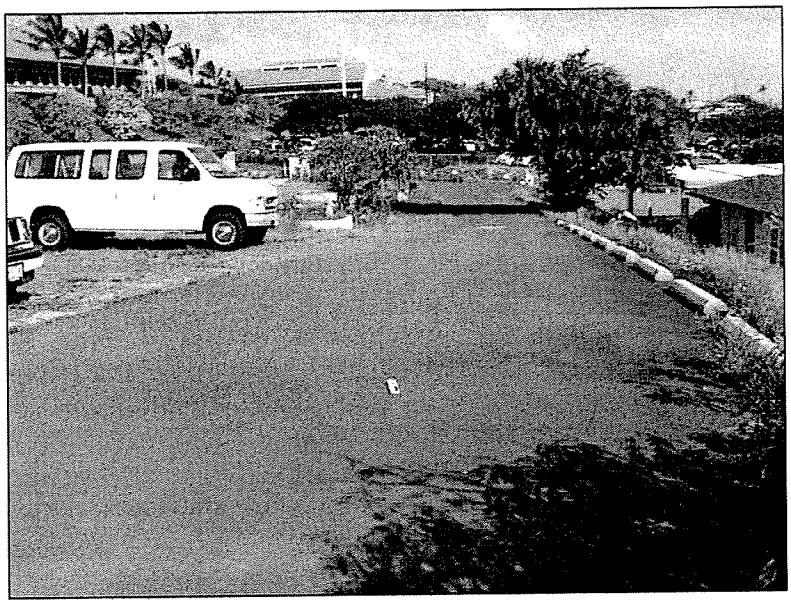


Photo # 7: Overview of asphalt driveways, view to the north.

Photo # 8: Overview of fire hydrant, sheds, asphalt driveways and concrete parking lot, view to the north northwest.

Table 2: Results and stratigraphic descriptions of the Backhoe Test trenches (BTs).

TU #	Length	Width	Wall profile	Layer	Depth	Layer descriptions	Cultural materials
BT-1	5.0 m	0.9 m	West face wall	I	0-15 cmbs	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	15-20 cmbs	10YR 5/4, yellowish brown; fine, silty sand, texture; moderate, fine, single grain, structure, dry consistency, slightly hard/ compacted ; moist consistency, friable; wet consistency, slightly sticky; plasticity, slightly plastic; boundary, clear; topography, smooth; no inclusions, contains no cultural materials	No cultural materials
				III	20-90 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth; no inclusions	Charcoal stain
				IV	90-170 cmbs	10YR 5/3,brown; fine-medium, silty sand, texture; weak, fine, single grain, structure; dry consistency, soft; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions, contains no cultural materials	No cultural materials
BT-2	5 m	0.9 m	East face wall	I	0-20 cmbs	7.5YR 4/3, brown, medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky, plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	15-135 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture, moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky, plasticity, non-plastic; boundary, n/a; topography, n/a, no inclusions but more concreted sand and or sand stone, contains no cultural materials	No cultural materials
BT-3	5.0 m	0.9 m	East face wall	I	0-15 cmbs	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	15-95 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth; no inclusions, contains no cultural materials	No cultural materials
				III	95-110 cmbs	10YR 4/2, dark grayish brown; fine-medium, sandy silt, texture; weak-moderate, fine, single grain, structure; dry consistency, soft ; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic, boundary, clear; topography, smooth; no inclusions, contains no cultural materials	No cultural materials
				IV	110-170 cmbs	10YR 5/3,brown; fine-medium, silty sand, texture; weak, fine, single grain, structure; dry consistency, soft; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a, topography, n/a; no inclusions, contains no cultural materials	No cultural materials

Table 1 continued

TU #	Length	Width	Wall profile	Layer	Depth	Layer descriptions	Cultural materials
BT-4	5.0 m	0.9 m	East face wall	I	0-15 cmbs	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable, wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	10-150 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions, contains no cultural materials	No cultural materials
BT-5	5.0 m	0.9 m	West face wall	I	0-20 cmbs	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	12-165 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted, moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions but more of the concreted sand or sand stones, contains no cultural materials	No cultural materials. There is more concreted or compacted sand.
BT-6	5.0 m	0.9 m	East face wall	I	0-45 cmbs	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	15-165 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions but more concreted sand or compacted sand, contains no cultural materials	No cultural materials. There is more concreted or compacted sand.
BT-7	5.0 m	0.9 m	East face wall	I	0-30 cmbs	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	10-180 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions but more of concreted or compacted sand, contains no cultural materials	No cultural materials. There is more concreted or compacted sand.
BT-8	5.0 m	0.9 m	South face wall	I	0-20 cmbs	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	15-55 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted, moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions but more of concreted or compacted sand, contains no cultural materials	No cultural materials. BT was terminated due to concreted sand

Table 1 continued

TU #	Length	Width	Wall profile	Layer	Depth	Layer descriptions	Cultural materials
BT-9	5.0 m	1.3 m	West face wall	I	0-170 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture, moderate, coarse, single grain, structure; dry consistency, loose to very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions, contains no cultural materials	No cultural material. This layer is very deep in this BT.
BT-10	5.0 m	0.9 m	West face wall	I	0-180 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, loose to very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions but more of the concreted or compacted sand, contains no cultural materials	No cultural material. This layer is very deep in this BT.
BT-11	5.0 m	0.9 m	West face wall	I	0-10 cmbs	10YR 4/2, dark grayish brown; fine-medium, gravelly sandy silt, texture; moderate, fine-medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 85% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	10-135 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted, moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions but more of compacted or concreted sand, contains no cultural materials	No cultural material. There is more compacted/ concreted/sand stones in this BT.
BR-12	5.0 m	0.9 m	West face wall	I	0-15 cmbs	10YR 4/2, dark grayish brown; fine-medium, gravelly sandy silt, texture; moderate, fine-medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 85% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	15-180 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted, moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions, contains no cultural materials	No cultural materials
BT-13	5.0 m	0.9 m	West face wall	I	0-20 cmbs	10YR 4/2, dark grayish brown; fine-medium, gravelly sandy silt, texture, moderate, fine-medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth, inclusions include roots and other organic materials, and 85% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	20-180 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions, contains no cultural materials	No cultural materials

Table 1 continued

TU #	Length	Width	Wall profile	Layer	Depth	Layer descriptions	Cultural materials
BT-14	.05 m	0.9 m	East face wall	I	0-20 cmbs	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	20-150 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth; no inclusions, contains no cultural materials	A piece of plywood is at the base of this layer
				III	115-220 cmbs	10YR 5/3,brown, fine-medium, silty sand, texture; weak, fine, single grain, structure; dry consistency, soft; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions, contains no cultural materials	A piece of plywood is on top of this layer and ½ inch PVC pipe
sBT-15	5.0 m	0.9 m	East face wall	I	0-20 cmbs	10YR 4/2, dark grayish brown; fine-medium, gravelly sandy silt, texture; moderate, fine-medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth, inclusions include roots and other organic materials, and 85% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	20-100 cmbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth; no inclusions, contains no cultural materials	No cultural materials
				III	80-200 cmbs	10YR 5/3,brown; fine-medium, silty sand, texture; weak, fine, single grain, structure; dry consistency, soft; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, smooth; topography, smooth; no inclusions, contains no cultural materials	No cultural materials
				IV	200-230 cmbs	7.5YR 6/8, reddish yellow; coarse, sand, texture; weak, coarse, single grain, structure; dry consistency, soft; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions, contains no cultural materials	No cultural materials
BT-16	5.0 m	1.5 m	West face wall	I	0-20 cmbs	10YR 4/2, dark grayish brown; fine-medium, gravelly sandy silt, texture; moderate, fine-medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material	No cultural materials
				II	20-145 mbs	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth; no inclusions, contains no cultural materials	Some refuse in this layer. There is a concentration of new coral and water worn rocks as well.
				III	140-180 cmbs	10YR 5/3,brown, fine-medium, silty sand, texture; weak, fine, single grain, structure; dry consistency, soft; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions, contains no cultural materials	No cultural materials

BT-1 through BT-16 were excavated in the areas of projected improvements for the Ka Lima O Maui nursery. Eight trenches were excavated on the northern half of the property and the other eight were excavated on the southern half. These BTs have similar soil characteristics (Table 2) such as color and consistency etc, so four representative samples out of the 16 BTs will be discussed below. **BT-1, BT-7, BT-10 and BT-14** were selected as the representative samples.

BT-1

BT-1 was excavated on the northern portion of the project area between BT-3 and BT-4 (Figure 7). BT-1 yielded four stratigraphic layers and terminated in Layer IV at the depth of 1.7 meters below surface (Figure 8 and Photo 9). A charcoal intrusion was noted in the previously disturbed portion of Layer III. Much of the area has been previously disturbed evidenced through observations of layer consistency, sand compaction, and bits of modern rubbish deposits noted throughout the test trenches.

Layer I (0-15 cmbs)	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; Fill: contains no cultural material
Layer II (15-20 cmbs)	10YR 5/4, yellowish brown; fine, silty sand, texture; moderate, fine, single grain, structure; dry consistency, slightly hard/ compacted ; moist consistency, friable; wet consistency, slightly sticky; plasticity, slightly plastic; boundary, clear; topography, smooth; no inclusions, contains no cultural materials
Layer III (20-90 cmbs)	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth; no inclusions, contains charcoal stained intrusion
Layer IV (90-170 cmbs)	10YR 5/3, brown; fine-medium, silty sand, texture; weak, fine, single grain, structure; dry consistency, soft; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; no inclusions, contains no cultural materials

No significant cultural material remains were noted during the excavation of BT-1. Layer III is a clean and compacted, or partially lithified sand layer. Layer IV consists of a silty loam sand layer with a noticeably darker color.

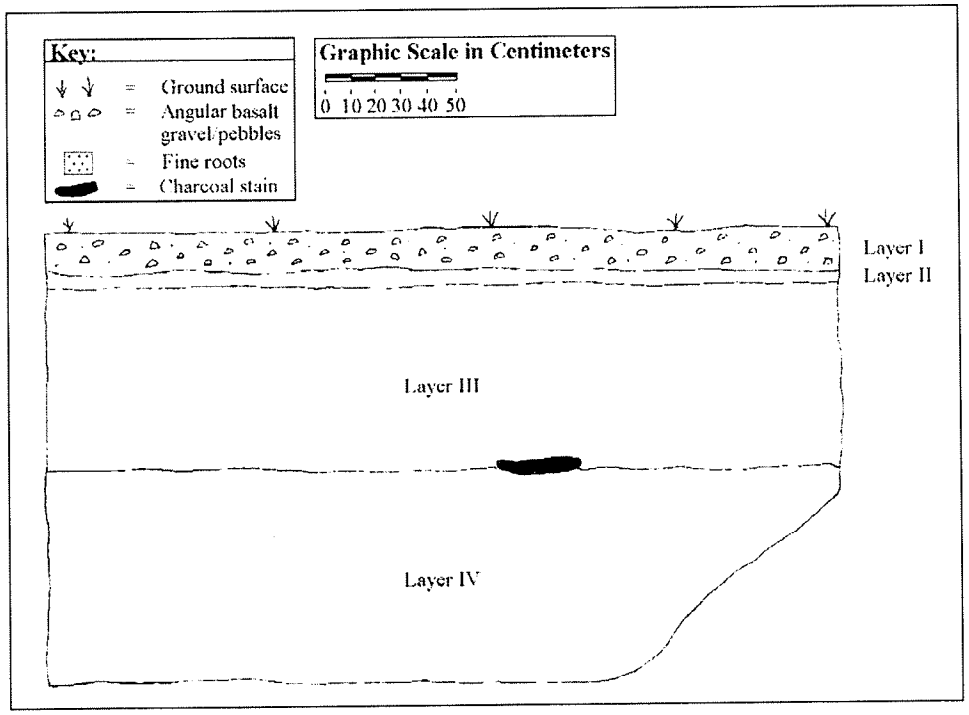


Figure 8: Profile map of the west face wall of BT-1.

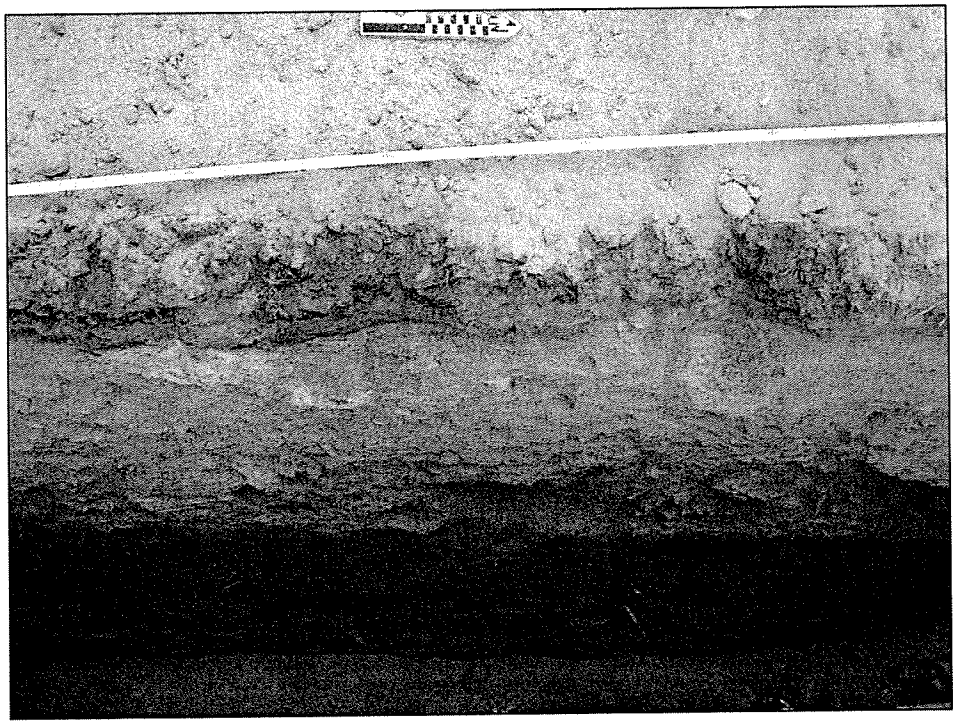


Photo # 9: Overview of the west face wall of BT-1, view to the west.

BT-7

BT-7 was situated near the west and central portion of the project area (Figure 7) and exposed two stratigraphic layers. BT-7 was terminated at a depth of 1.8 meters below the existing surface due to the absence of cultural materials (Figure 9 and Photo # 10).

Layer I (0-20 cmbs)	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material
Layer II (10-180 cmbs)	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions but more concreted or compacted sand, contains no cultural materials

No significant cultural material remains were identified during the excavation of BT-7. This trench was terminated 1.8 meters below the existing surface.

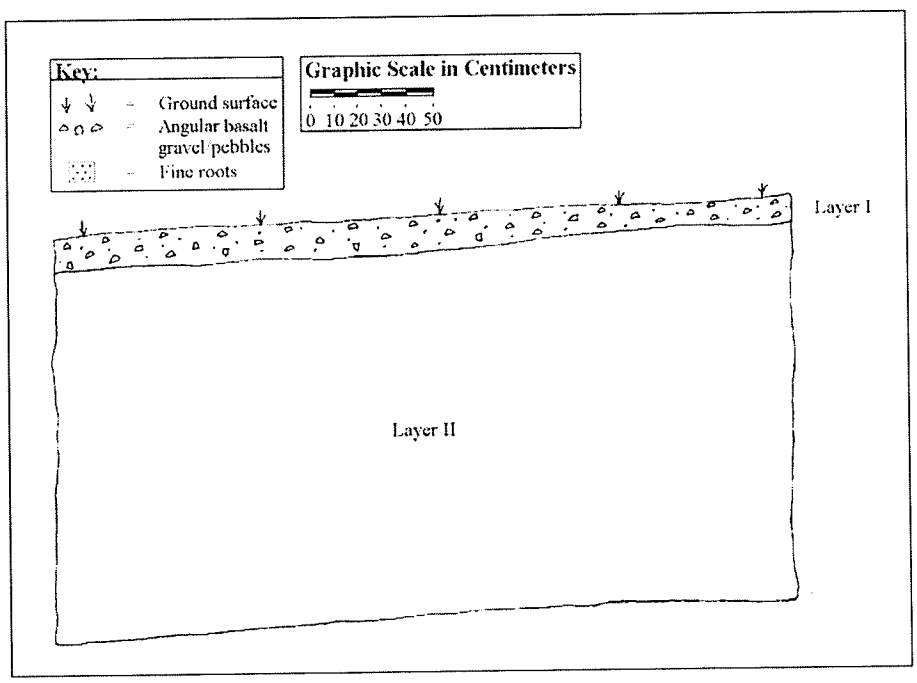


Figure 9: Profile map of east face wall of BT-7.

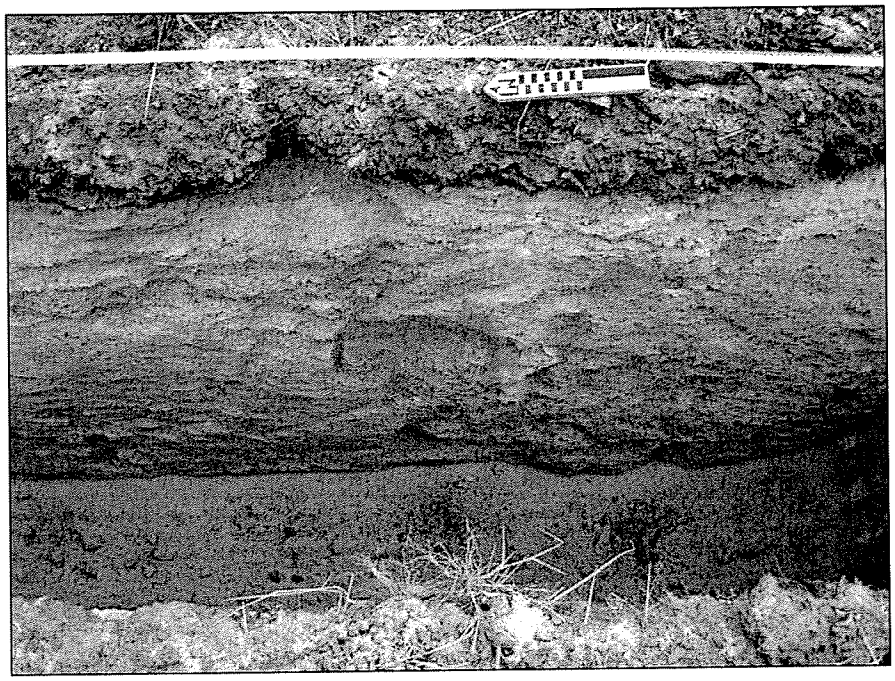


Photo # 10: Overview of the east face wall of BT-7, view to the east.

BT-10

BT-10 was placed and excavated near the central and eastern portion of the project area approximately 13.5 meters southeast of the large building in the central area of the property (see Figure 7) and yielded one stratigraphic layer. BT-10 terminated at a depth of 1.8 meters below surface due to lack of cultural materials (see Figure 10 and Photo # 11).

Layer I (0-180 cmbs)	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, loose to very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, n/a; topography, n/a; no inclusions but more of the concreted or compacted sand, contains no cultural materials

There were no cultural material remains encountered within BT-10.

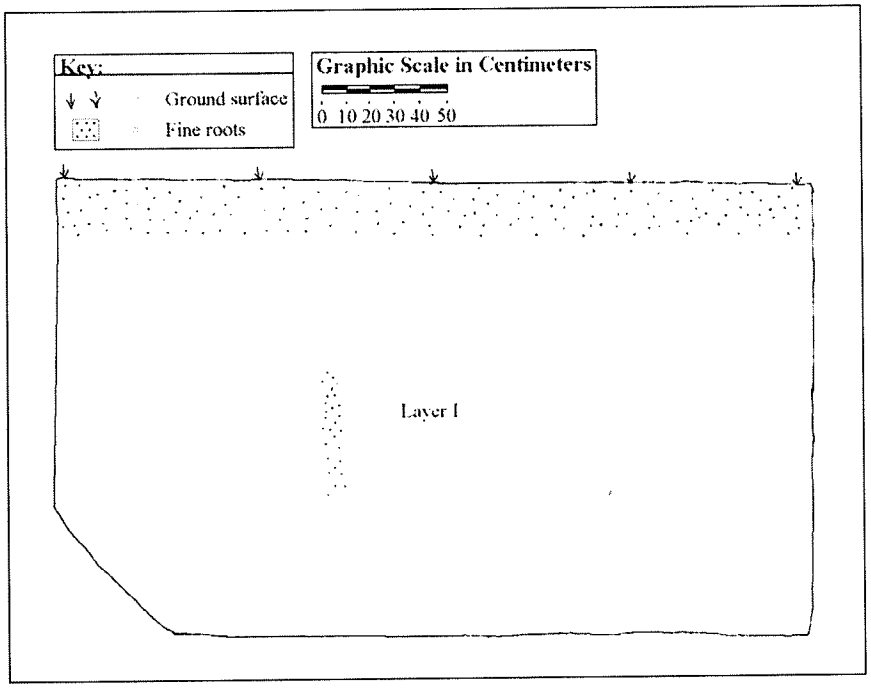


Figure 10: Profile map of the west face wall of BT-10.

Photo # 11: Overview of the west face wall of BT-10, view to the west.

BT-14

BT-14 was situated at the southeast corner of the project area approximately 50 meters south of BT-10 (see Figure 7). Three stratigraphic layers were observed. BT-14 terminated at a depth of 2.2 meters below surface (Figure 11 and Photo # 12).

Layer I (0-20 cmbs)	7.5YR 4/3, brown; medium, gravelly silty clay, texture; moderate, medium, single grain, structure; dry consistency, loose to semi-compacted; moist consistency, friable; wet consistency, slightly sticky; plasticity, slight plastic; boundary, clear; topography, smooth; inclusions include roots and other organic materials, and 75% angular basalt gravels and/or pebbles; contains no cultural material
Layer II (20-150 cmbs)	10YR 6/4, light yellowish brown; medium-coarse, sand, texture; moderate, coarse, single grain, structure; dry consistency, very hard/very compacted; moist consistency, firm; wet consistency, non-sticky; plasticity, non-plastic; boundary, clear; topography, smooth; no inclusions; contains modern plywood at transition between II & III
Layer III (115-220 cmbs)	10YR 5/3, brown; fine-medium, silty sand, texture; weak, fine, single grain, structure; dry consistency, soft; moist consistency, friable; wet consistency, non-sticky; plasticity, non-plastic; boundary; contains modern plywood and PVC pipe

There were no significant cultural material remains encountered in the deposits of BT-14. However, there was a sheet of ½ inch plywood on top of Layer III at the base of Layer II. There was also a ½ inch irrigation PVC pipe sticking out of Layer III. This finding suggests that Layers II and III in have been previously disturbed. Previously disturbed layers were also observed in the other trenches across the subject parcel. BT-14 terminated at 2.2 meters in depth.

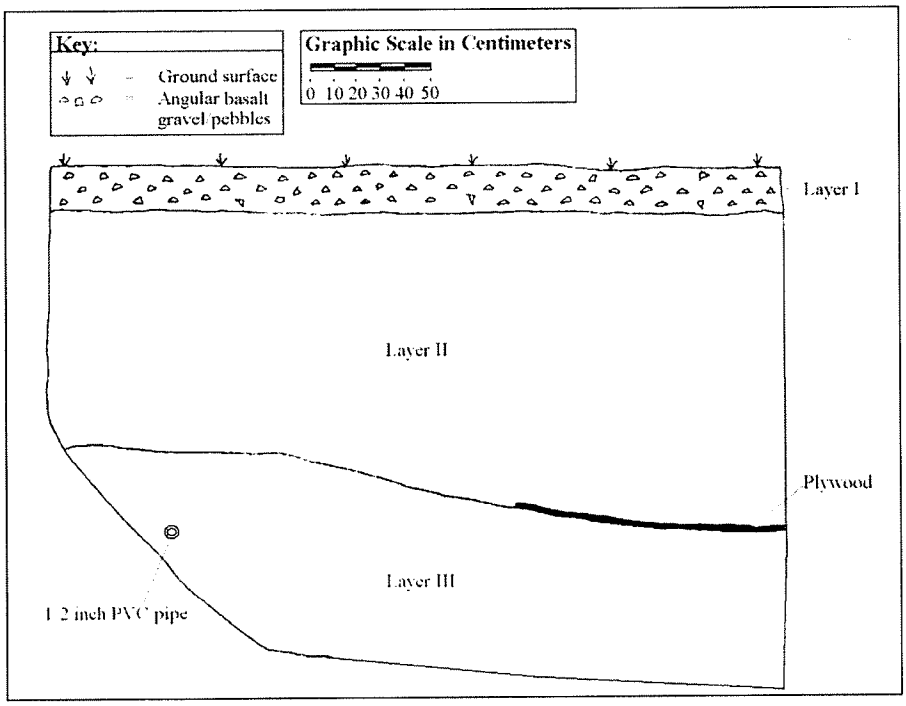


Figure 11: Profile map of the east face wall of BT-14.

Photo # 12: Overview of the east face wall of BT-14, view to the east.

SUMMARY AND CONCLUSIONS

No significant surface or subsurface cultural remains were identified during this archaeological assessment. A total of sixteen backhoe test trenches were excavated in order to assess the subsurface conditions on the subject parcel. Test results indicate that portions of the project area have been impacted by former grading activities including previous nursery related improvements and the construction of a large warehouse and storage buildings. Approximately 20% of the subject parcel was covered under buildings, sheds, and concrete and asphalt drive ways as well as parking lots at the time of this assessment survey. The remaining surface of the subject area was investigated by the excavation of mechanical subsurface test trenches and covered by a pedestrian survey.

Although no surface or subsurface historic properties were identified during the assessment, sand dune deposits were encountered in all test instances. There is always the possibility of encountering human burial features or possibly isolated finds of previously disturbed human skeletal remains in sand dune matrix. The presence of the Site 4728 preservation area on the adjacent parcel strongly suggests that human remains could be located within the subject parcel.

PROJECT MITIGATION AND RECOMMENDATIONS

Given the results of this archaeological survey, no further work beyond the assessment level is recommended for the project area at this point in time. However, given the location of the project area, and the presence of the previously identified site (Site 50-50-04-4728) on the immediately adjacent property to the east (TMK: 3-8-046: Parcel 027), precautionary archaeological monitoring is recommended for any future earthmoving activities on the subject parcel. This form of mitigation will help ensure that significant material culture remains are identified during future ground disturbance activities on the subject parcel Key (TMK: [2] 3-8-046:016).

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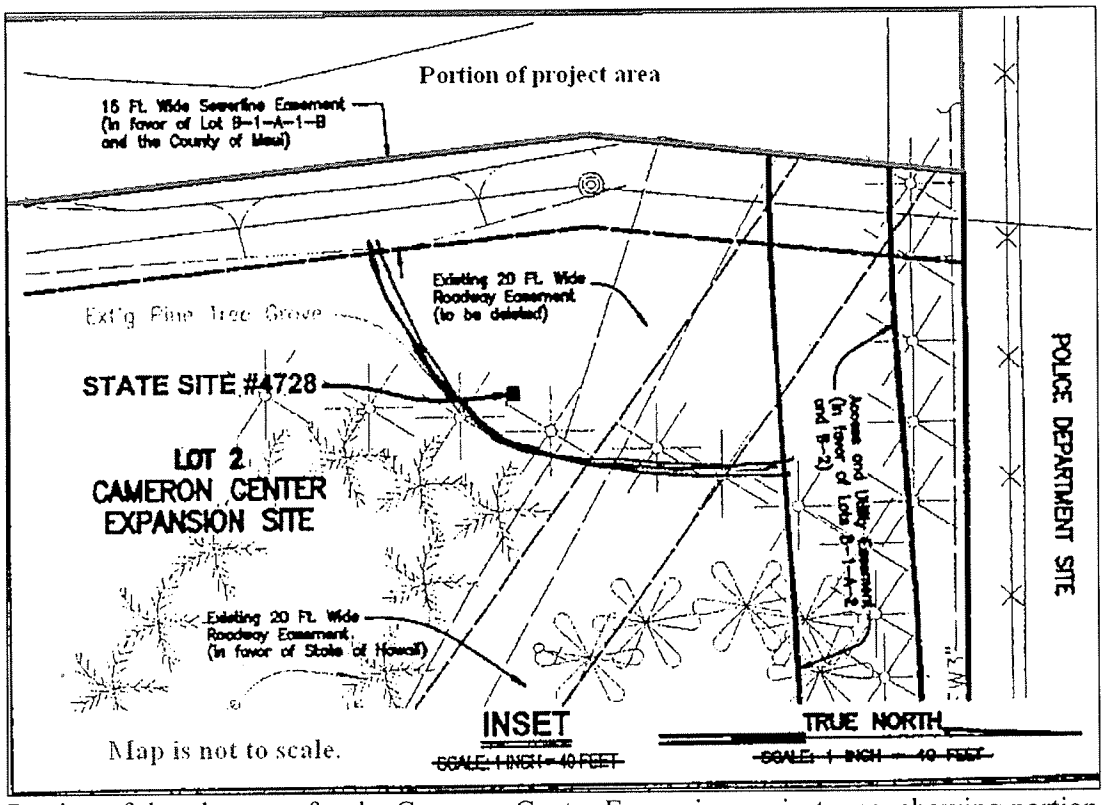
1995 Report on Monitoring of Curbing, Burial Crypt and Side-walk excavations at Site 50-50-04-4066, Wailuku, Maui, TMK: 3-8-37: 48, prepared for SHPD by Scientific Consultant Services, Honolulu.

Winieski, John and Hammett Hallett
November 1999 Archaeological Monitoring Plan for a proposed waterline replacement project In Paukūkalo , Wailuku *Ahupua'a* on Kainalu, Kaiko'o and Ukali Streets, and Lipo, Lilihua, and Kanai Places, Island of Maui (TMK 3-4-27, 28, 29). Prepared for Warren S. Unemori Engineering, Inc. Prepared by Cultural Surveys Hawai`i, Oahu.

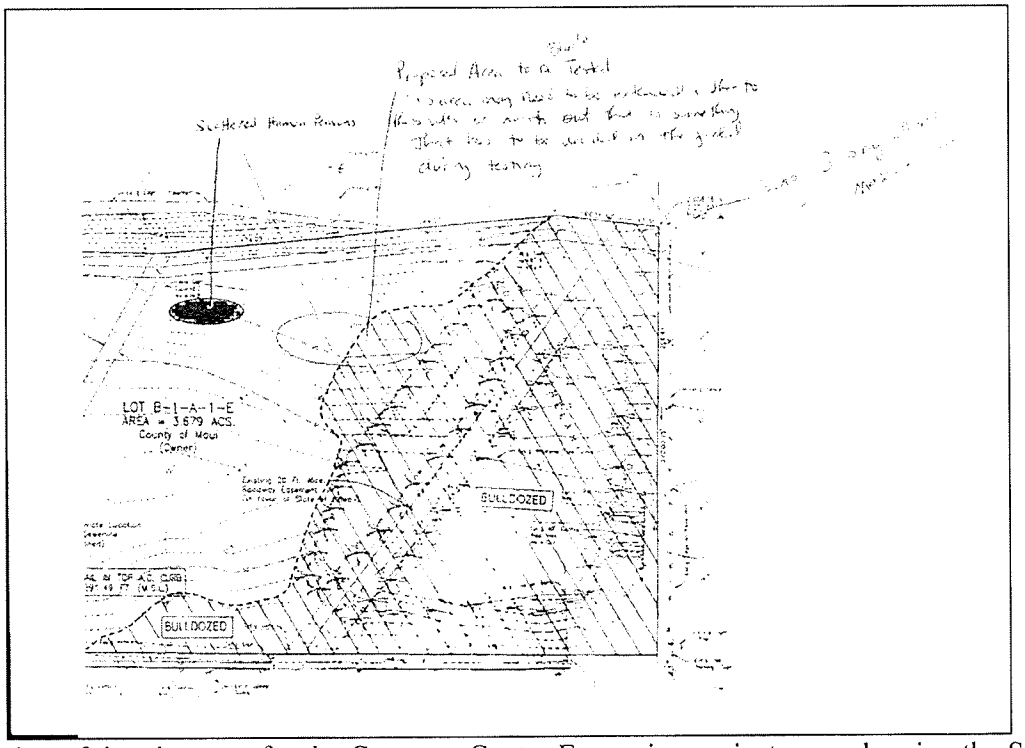
Walker, Winslow
1931 Archaeology of Maui, MS on file at Maui Historic Society, Wailuku, Maui.

APPENDIXES

Appendix A: Maps, photos and burial treatment plan for Site 50-50-04-4728 from the monitoring program for the Cameron Center Expansion.



Portion of the plan map for the Cameron Center Expansion project area, showing portion of current project area in yellow and the Site 50-50-04-4728 preservation area.



Portion of the plan map for the Cameron Center Expansion project area, showing the Site 4728 preservation area in blue.

A.S.H.

BURIAL TREATMENT PLAN
Reinterment proposal

1. Remains to be reinterred in the NW corner of Lot 2, the Cameron Center Expansion lot.

2. Proposed area is approximately 50ft. South of the Ka Lima Access Road and approximately 40 ft. west of west lot line. See photo, page 1 and Map, page 2. Lets discuss the buffer zone for this area.

3. Excavate a hole that measures approximately 3 ft. by 5 ft. by 5 ft. deep with a backhoe. Proposed area contains approximately 4-5ft. of fill. Place MECO pullbox inside hole. See pullbox assembly, page 3.

4. Once burial is placed in box and covered with sand, place concrete cover on top and secure. Cover up pull box with more sand.

5. Proposed boundaries for preservation will be demarcated by native shrubs or grasses. Details to be discussed.

6. Burial will be demarcated by a concrete pedestal with granite sign, page 4, may read "Native Hawaiian Cultural Preserve, State Site #50-50-04-4798, Please respect this area." And a logo or picture. Again, details to be discussed.

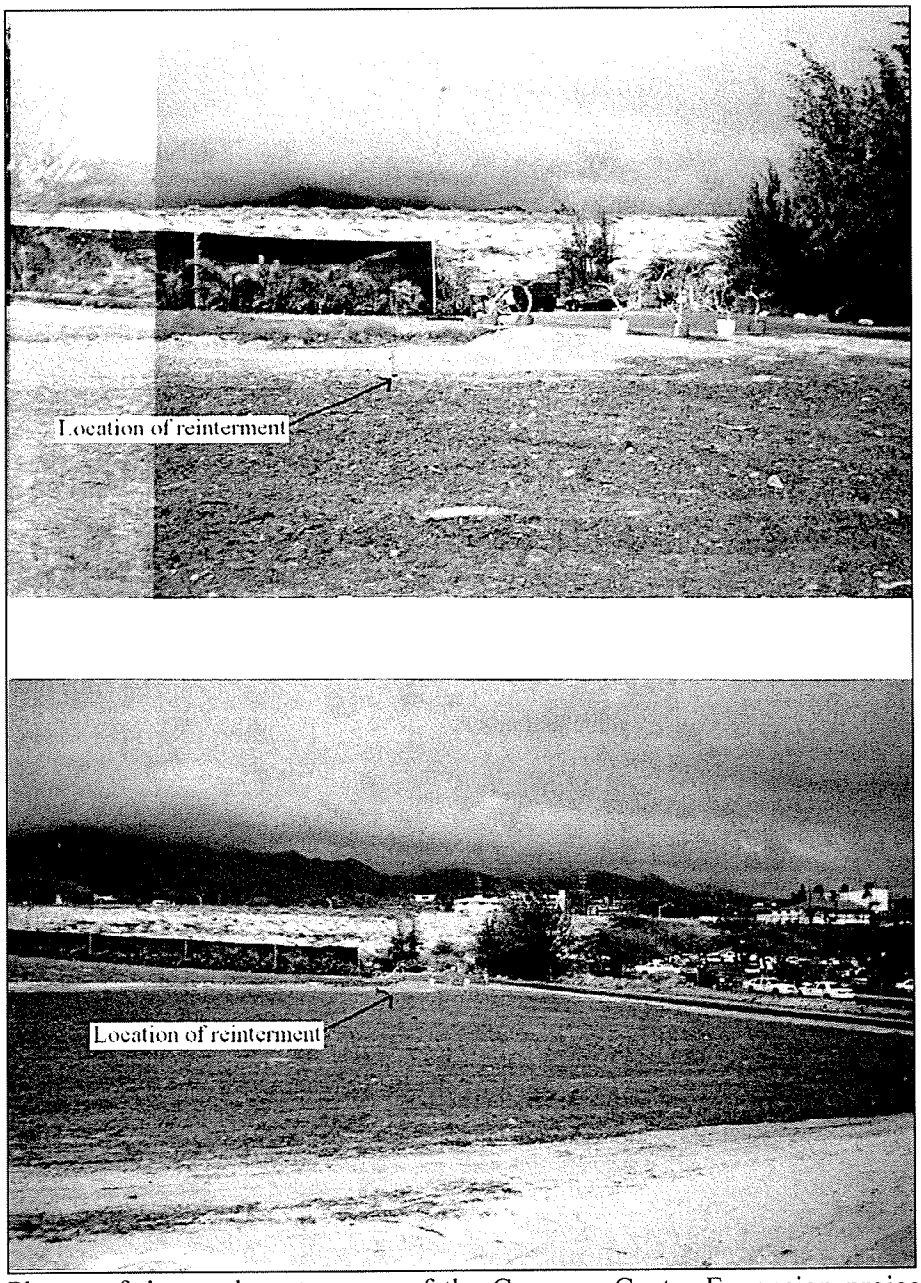
Archaeological Services Hawaii

Lisa Rotunno-Hazuka
16 S. Market St. Ste. J
Wailuku, Hi 96793

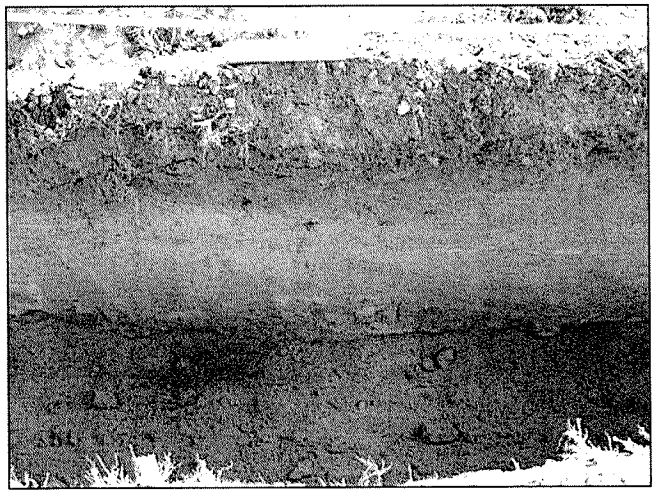
Phone 808-244-2012
Fax 808-244-9592

Burial Treatment Plan for Site 50-50-04-4728, prepared by Archaeological Services Hawai`i.

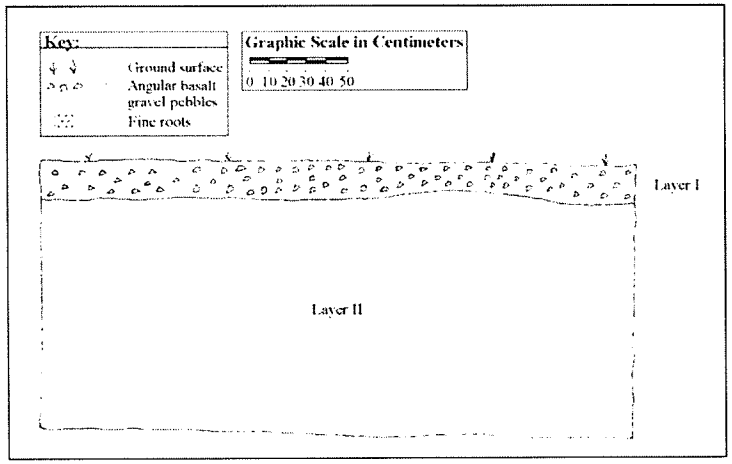
Appendix B: Additional photographs and profile maps of Backhoe Test Trenches that are not presented within the Backhoe Testing Results Section



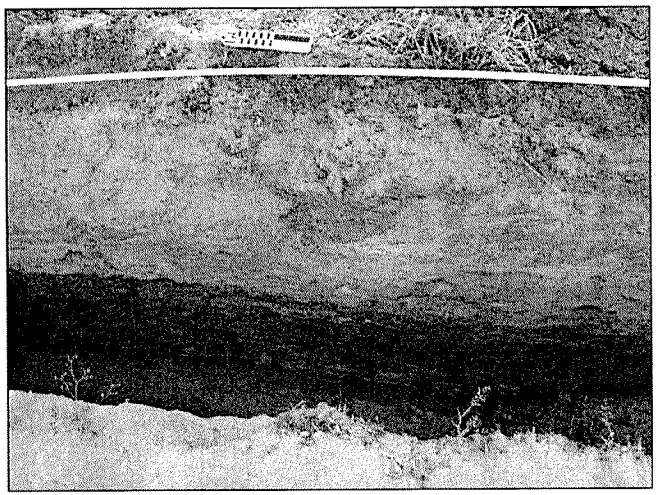
Photos of the northwest corner of the Cameron Center Expansion project, showing the Site 50-50-04-4728 preservation area.



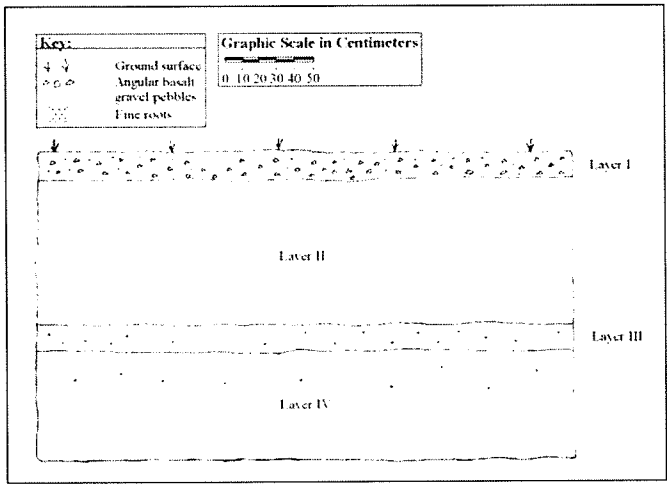
Overview of the east face wall of BT-2, view to east



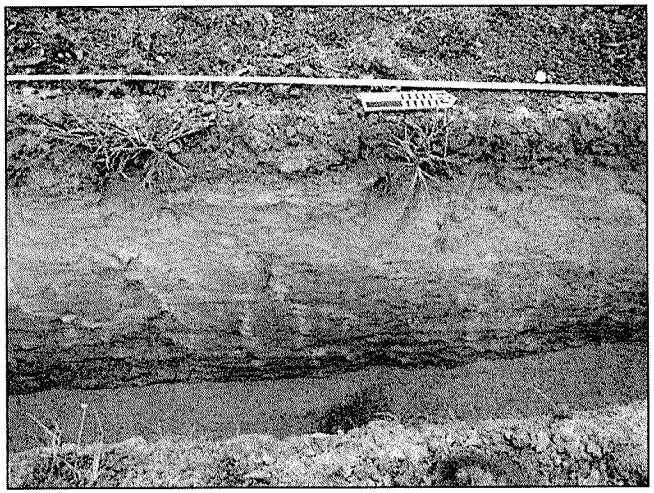
Profile map of the east face wall of BT-2



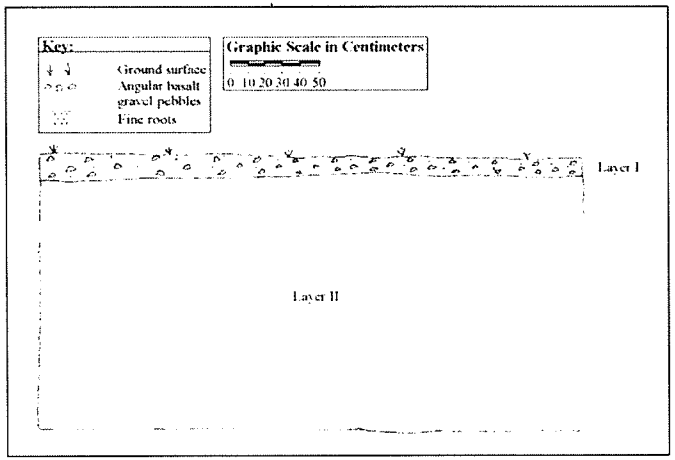
Overview of the west face wall of BT-3, view to west



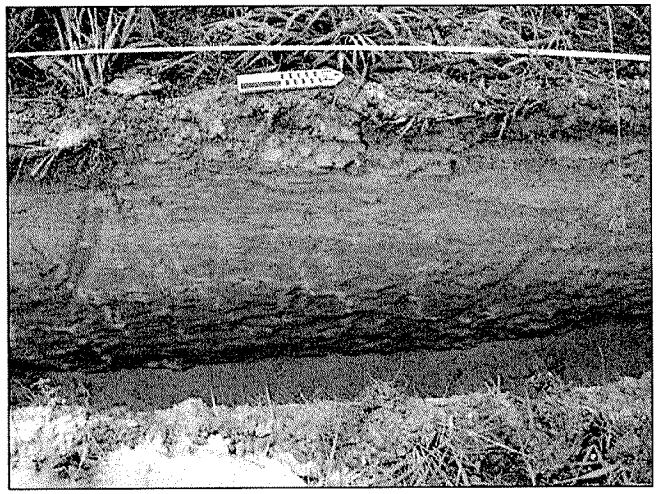
Profile map of the west face wall of BT-3



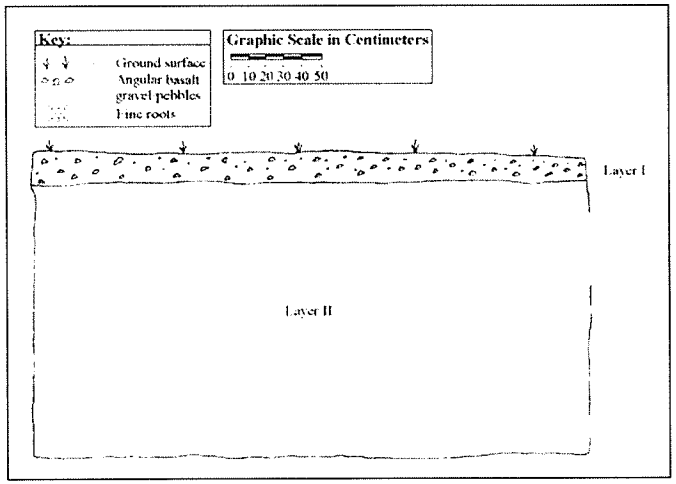
Overview of the west face wall of BT-4, view to west



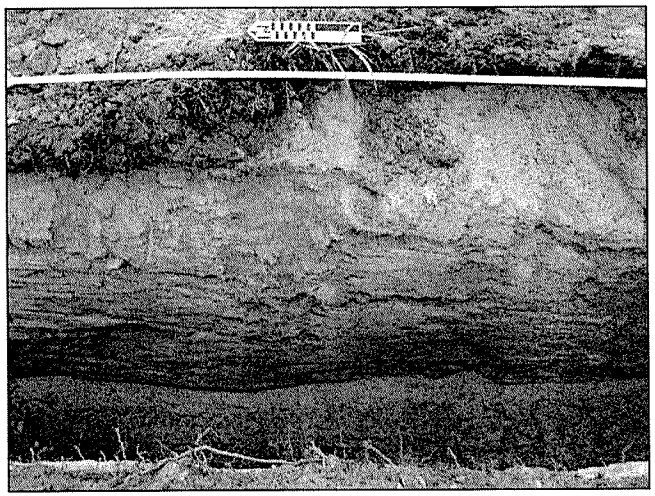
Profile map of the west face wall of BT-4



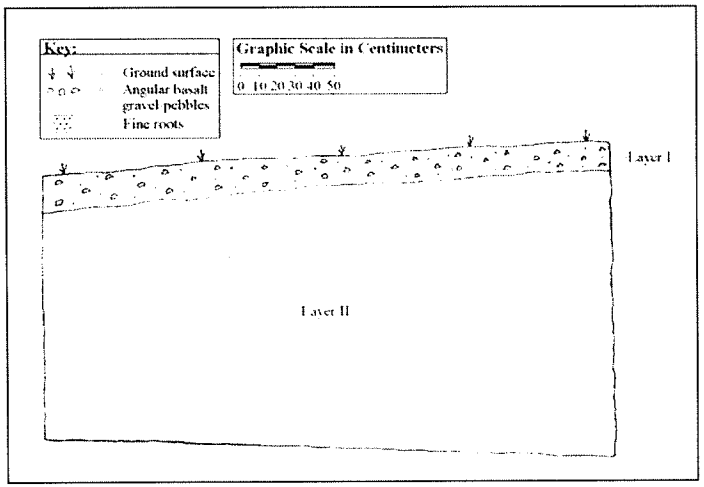
Overview of the west face wall of BT-5, view to west



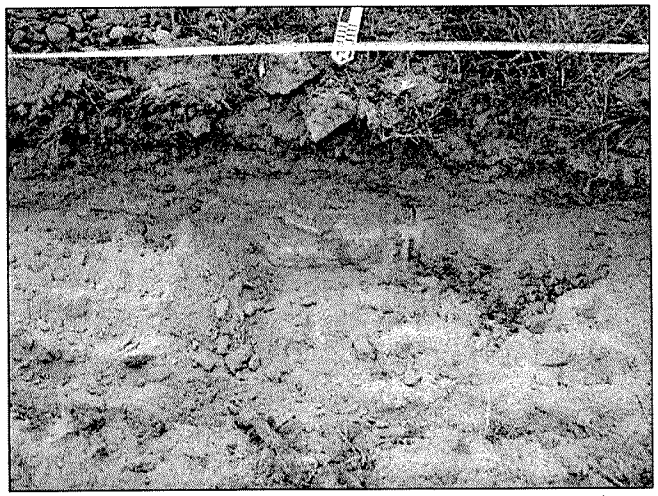
Profile map of the west face wall of BT-5



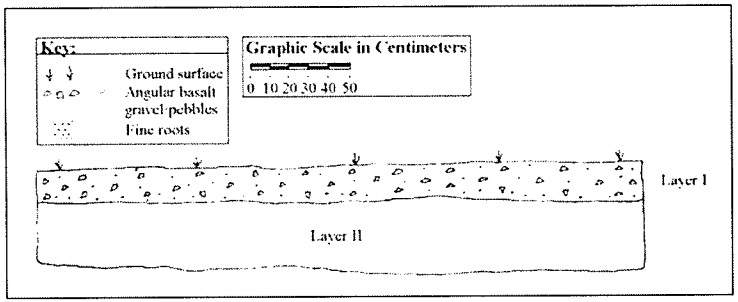
Overview of the east face wall of BT-6, view to east



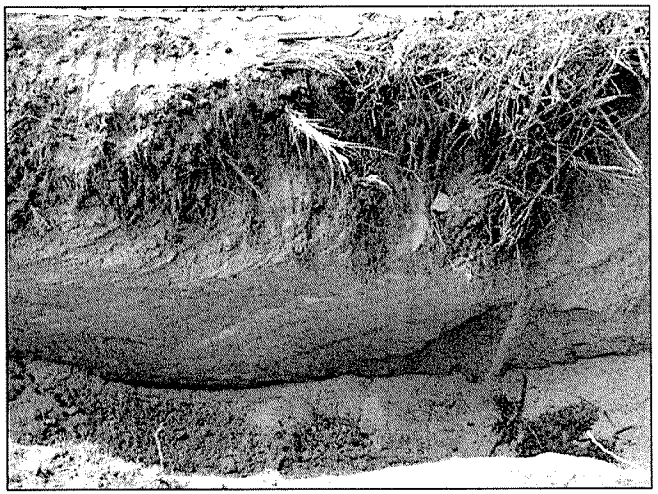
Profile map of the east face wall of BT-6



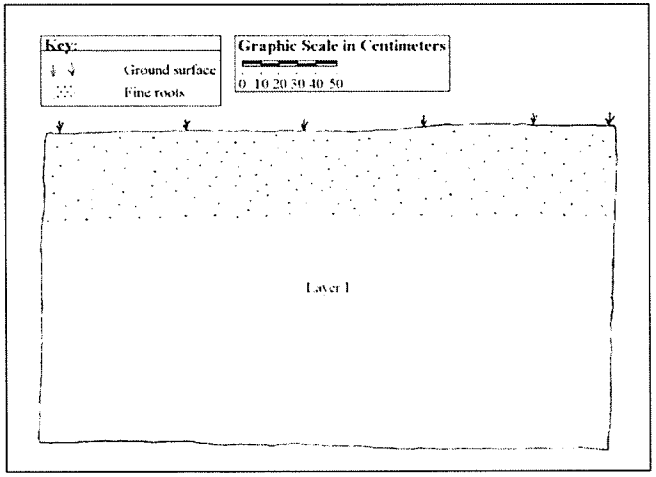
Overview of the south face wall of BT-8, view to south



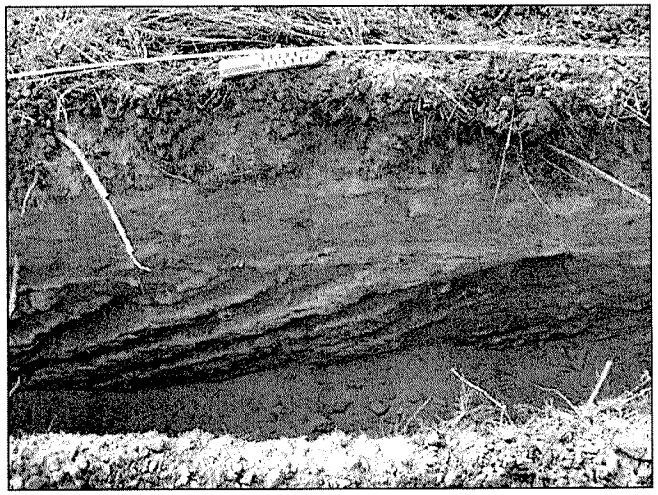
Profile map of the south face wall of BT-8



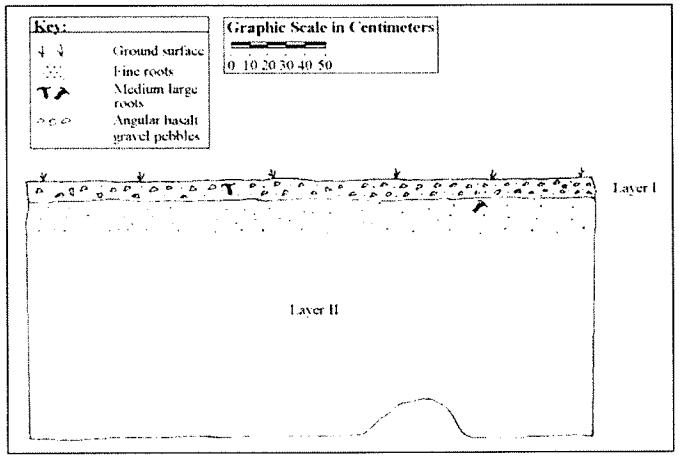
Overview of the west face wall of BT-9, view to west



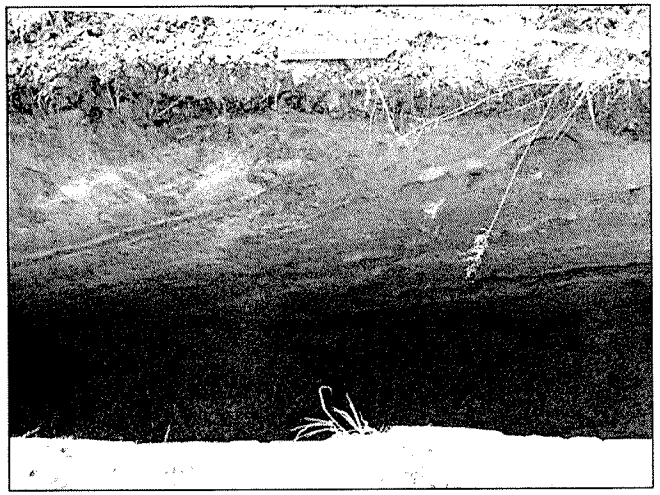
Profile map of the west face wall of BT-9



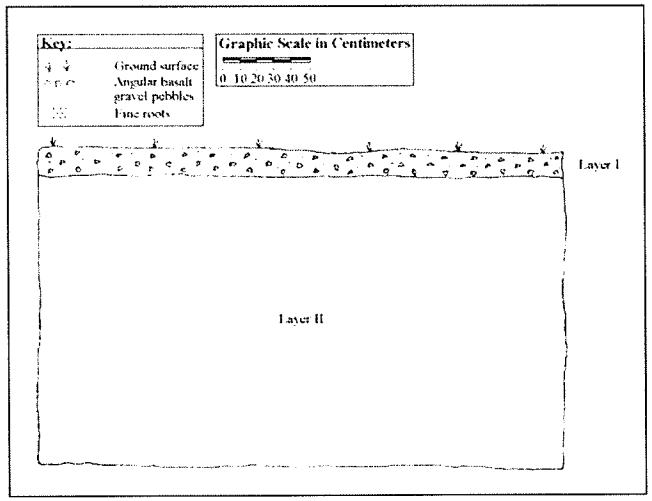
Overview of the west face wall of BT-11, view to west



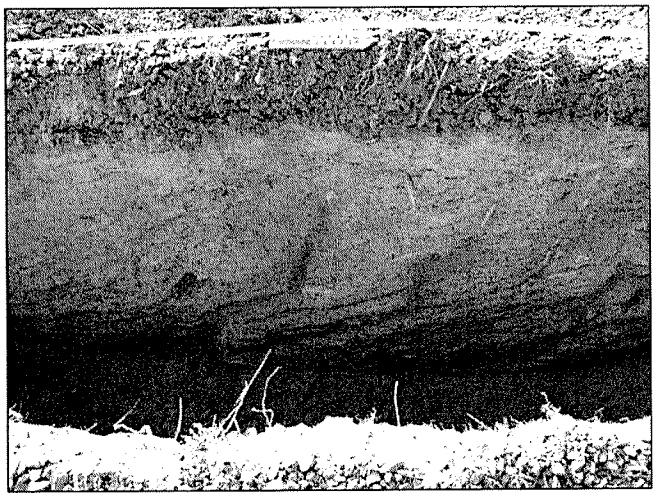
Profile map of the west face wall of BT-11



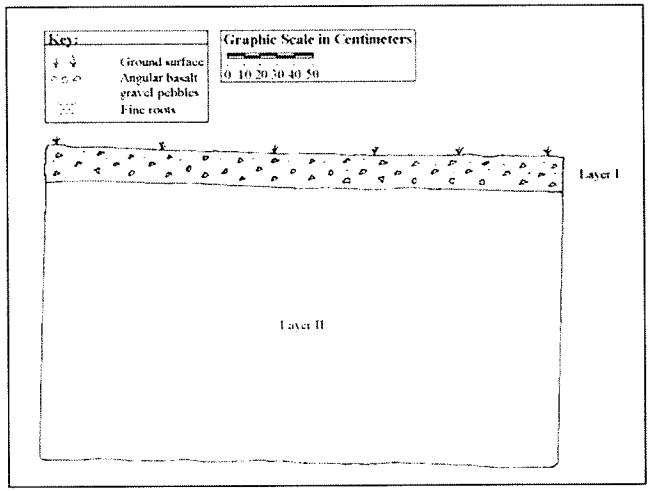
Overview of the west face wall of BT-12, view to west



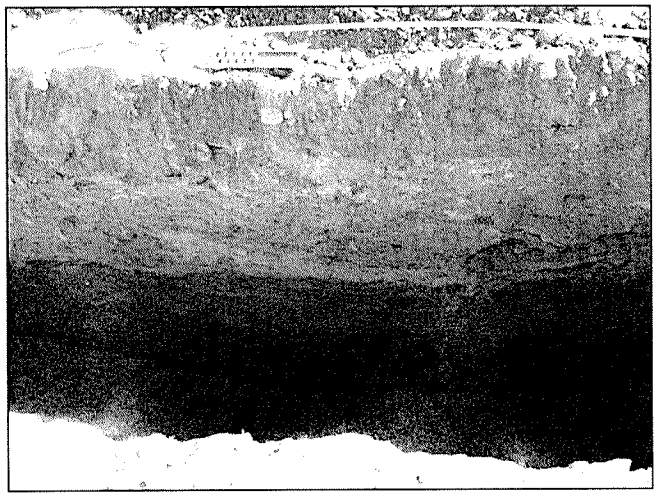
Profile map of the west face wall of BT-12



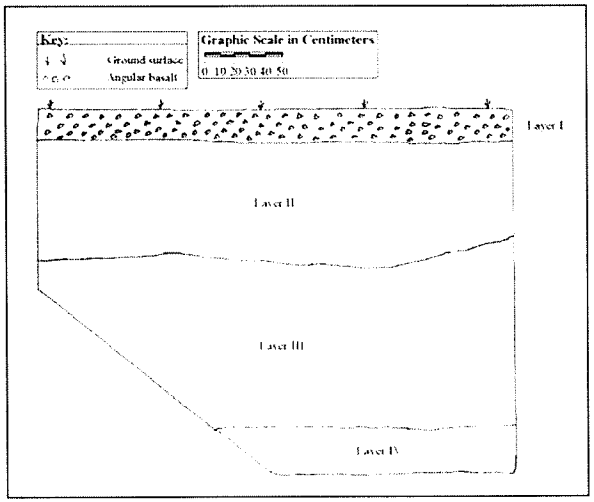
Overview of the west face wall of BT-13, view to west



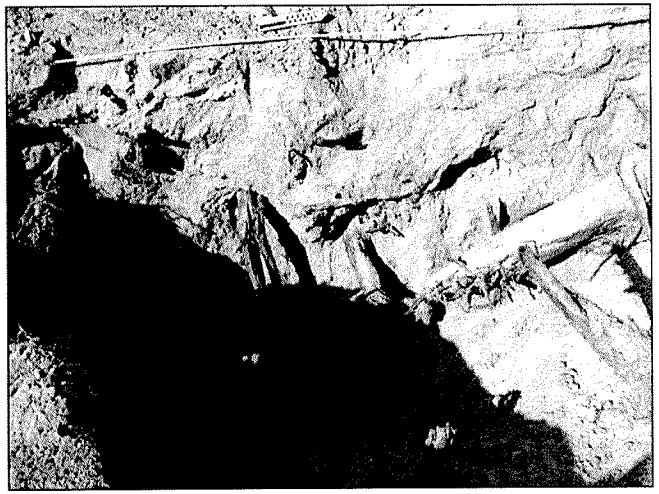
Profile map of the west face wall of BT-13



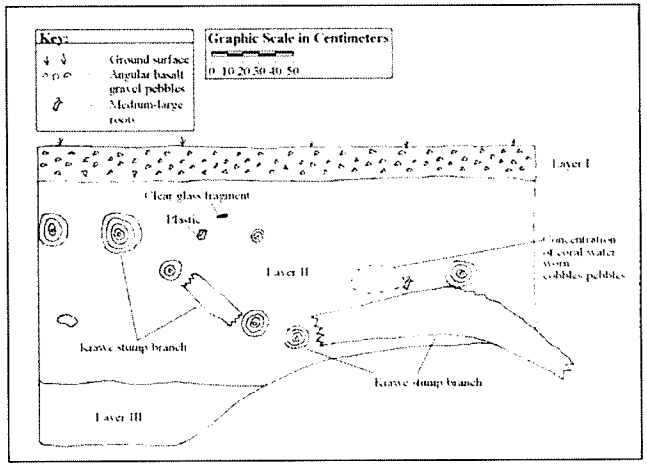
Overview of the east face wall of BT-15, view to east



Profile map of the east face wall of BT-15



Overview of the west face wall of BT-16, view to west



Profile map of the west face wall of BT-16

APPENDIX B.

Traffic Impact Assessment Report, Prepared by Phillip Rowell

Phillip Rowell and Associates
47-273 'D' Hui Iwa Street Kaneohe, Hawaii 96744 Phone: (808) 239-8206 FAX: (808) 239-4175 Email:prowell@hawiiantel.net

March 29, 2010

Mr. Mike Munekiyo
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Maui, HI 96793

Re: **Traffic Impact Assessment Report**
Proposed Ka Lima O Maui Housing Project
95 Mahalani Street
Wailuku, Maui, Hawaii

Dear Mike:

Phillip Rowell and Associates have completed the following Traffic Impact Assessment Report (TIAR) for a proposed housing project in Wailuku. The following report is presented in the following format:

A. Project Location and Description
B. Purpose and Objective of Study
C. Methodology
D. Description of Existing Streets and Intersection Controls
E. Existing Peak Hour Traffic Volumes
F. Level-of-Service Concept
G. Existing Levels-of-Service
H. Background Traffic Projections
I. Project Trip Generation
J. Background Plus Project Traffic Projections
K. Impact Analysis of Background Plus Project Conditions
L. Mitigation
M. Summary and Conclusions

A. Project Location and Description

The proposed project is located at 95 Mahalani Street in Wailuku.

The proposed project is the construction of 16 apartments and 3,600 square feet of office space, and 3,600 square feet of storage and garage space, as well as the renovation on an existing 2,500 square foot office building.

Access and egress will be via the existing driveway serving the J. Walter Cameron Center, which is along the west side of Mahalani Street.

A TMK map indicating the location of the project and a preliminary site plan is provided as Attachment A.

B. Purpose and Objective of Study

1. Quantify and describe the traffic related characteristics of the proposed project.

2. Identify potential deficiencies adjacent to the project that will impact traffic operations in the vicinity of the proposed project.

C. Methodology

1. *Define the Study Area*

The first step in defining the study area was to estimate the number of peak hour trips that the proposed project will generate. It was estimated that the project will generate 14 trips during the morning peak hour and 16 trips during the afternoon peak hour. This implies that the scope of the traffic assessment could be limited to an "access location and design review" analysis as described by the Institute of Transportation Engineers[1].

- Kaahumanu Avenue at Mahalani Street and Kanaloa Avenue
- Mahalani Street at Project Drive

2. *Analyze Existing Traffic Conditions*

Existing traffic volumes at the study intersections were estimated from manual traffic counts performed at the intersections on Thursday, January 14, 2010. A level-of-service analysis was performed using the methodology described in the *Highway Capacity Manual*[2] to quantify existing traffic operating conditions.

3. *Estimate Horizon Year Background Traffic Projections*

Background traffic conditions are defined as future traffic conditions <u>without</u> the proposed project. The design horizon year does not necessarily represent the project completion date of the project. It is a date for which future background traffic projections were estimated. For this project, we have used a design, or horizon, year of 2012. Horizon year background traffic conditions were estimated using a background traffic growth factor and adding traffic generated by other known projects in the area that may be completed before 2012.

4. *Estimate Project-Related Traffic Characteristics*

The number peak-hour trips that the proposed project will generate was estimated using standard trip generation procedures outlined in the *Trip Generation Handbook*[3] and data provided in *Trip Generation*[4]. These trips were distributed and assigned based on existing traffic approach and

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[1] Institute of Transportation Engineers, *Transportation and Land Development*, 2002, Washington, D.C., page 3-6

[2] Transportation Research Road, Highway Capacity Manual, 2000, Washington, D.C.

[3] *Trip Generation Handbook*, Institute of Transportation Engineers, Washington, D.C., 1998

[4] *Trip Generation*, Institute of Transportation Engineers, Washington, D.C., 2003

departure patterns of traffic currently using the project driveway and the intersection of Kaahumanu Avenue at Mahalani Street.

5. *Analyze Project Related Traffic Impacts*

The project-related traffic was then superimposed on background traffic volumes. The traffic impacts of the project were assessed by analyzing changes of the levels-of-service. The purpose of this analysis was to identify potential operational deficiencies at the project driveway.

D. Description of Existing Streets and Intersection Controls

A schematic drawing indicating the study intersections, lane configurations and right-of-way controls is provided as Attachment B.

Mahalani Street is a four-lane, two-way roadway with a north-south orientation in the vicinity of the project. The intersection of Mahalani Street at the project drive is an unsignalized T- intersection. Separate left and right turn lanes are provided along the Project Drive approach to Mahalani Street. There is no separate left turn lane for traffic turning left from Mahalani Street into the Project Drive

The intersection of Kaahumanu Avenue at Mahalani Street and Kanaloa Avenue is a signalized intersection. There are separate left turn lanes and deceleration/right turn lanes along each approach. The left turns from Kaahumanu Avenue to Mahalani Street and Kanaloa Avenue are protected. The northbound and southbound approaches have separate phases (split phasing).

E. Existing Peak Hour Traffic Volumes

Existing peak hour traffic volumes were determined from manual traffic counts performed at the study intersections. The counts are summarized on Attachment C and the traffic count summary worksheets are attached. The counts were performed on Thursday, January 14, 2010.

1. The traffic counts include buses, trucks and other large vehicles. Mopeds and bicycles are not included.

2. The traffic counts include traffic generated by the existing 2,500 square foot office building on the subject property

3. Pedestrian activity was negligible.

F. Level-of-Service Concept

"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 1. 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.*[5]

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.

Table 1 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	<20.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	20.1-35.0
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	35.1-55.0
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	55.1-80.0
F	Total breakdown with stop-and-go operation	>1.001	>80.0

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

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 2 summarizes the definitions for level-of-service and the corresponding delay.

[5] Institute of Transportation Engineers, *Transportation Impact Analyses for Site Development: A Recommended Practice*, 2006, page 60

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

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	<10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	See note (2) below	>50.1

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(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.

G. Existing Levels-of-Service

The results of the level-of-service analysis of the intersection of Kaahumanu Avenue at Mahalani Street are summarized in Table 3. Based on the level-of-service, the intersection operates at Level-of-Service C during the morning peak hour and Level-of-Service D during the afternoon peak hour.

Table 3 Existing (2010) Levels-of-Service - Kaahumanu Avenue at Mahalani Street

	AM Peak Hour			PM Peak Hour		
	7:15 AM to 8:15 AM			4:15 PM to 5:15 PM		
Approach and Movement	V/C	Delay	LOS	V/C	Delay	LOS
Overall Intersection	0.67	34.4	C	0.80	40.3	D
Eastbound Left	0.63	60.7	E	0.75	78.7	E
Eastbound Thru	0.77	39.1	D	0.90	44.1	D
Eastbound Right	0.10	27.3	C	0.03	21.2	C
Westbound Left	0.77	55.6	E	0.80	81.9	F
Westbound Thru	0.88	39.6	D	0.72	36.4	D
Westbound Right	0.17	0.2	A	0.19	0.3	A
Northbound Left	0.15	46.3	D	0.30	60.1	E
Northbound Thru	0.34	49.8	D	0.71	75.3	E
Northbound Right	0.25	0.4	A	0.39	0.7	A
Southbound Left	0.49	49.5	D	0.69	74.4	E
Southbound Left & Thru	0.50	49.4	D	0.71	75.3	E
Southbound Right	0.13	0.2	A	0.06	0.1	A

NOTES:
1. Level-of-Service analysis is based on traffic counts performed Thursday, January 14, 2010.
2. V/C denotes ratio of volume to capacity. V/C ratio is not calculated for unsignalized intersections.
3. Delay is in seconds per vehicle.
4. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.
5. See Attachment D for Level-of-Service Calculation Worksheets.

The results of the level-of-service analysis of the intersection of Mahalani Street at the Project Drive is summarized in Table 4. The left turns from the driveway to eastbound Mahalani Street operate at Level-of-Service C. Right turns from the driveway and left turns into the driveway from Mahalani Street operate at Level-of-Service A. This implies that left turns into the Project Drive from Mahalani Street do not have an adverse impact of traffic flow along Mahalani Street.

Table 4 Existing (2010) Levels-of-Service - Mahakani Street at Project Drive

Approach and Movement	AM Peak Hour 7:15 AM to 7:15 AM		PM Peak Hour 3:30 PM to 4:30 PM	
	Delay	LOS	Delay	LOS
Eastbound Left	18.9	C	18.0	C
Eastbound Right	9.8	A	9.6	A
Northbound Left & Thr	2.8	A	1.1	A

NOTES:
1. Level-of-Service analysis is based on traffic counts performed Thursday, January 14, 2010.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in Highway Capacity Manual. LOS is based on delay.
4. See Attachment D for Level-of-Service Calculation Worksheets.

H. Background Traffic Projections

2012 background traffic projections are defined as future background traffic conditions without the proposed project. 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. This growth factor also accounts for smaller development projects in the area for which a traffic impact study is not available or are not identified as a related project during the data collection process. The second component is estimated traffic that will be generated by other development projects (related projects) in the vicinity of the proposed project.

Background Traffic Growth

The *Maui Long Range Transportation Plan*[6] concluded that traffic in Maui would increase an average of 1.6% per year from 1990 to 2020. This growth rate was used to estimate the background growth between 2010 and 2012, which is the design year for this project. The growth factor was calculated to be 1.0323 using the following formula::

$$F = (1 + i)^n$$

where F = Growth Factor
i = Average annual growth rate, or 0.016
n = Growth period in years

Related Projects

The second component in estimating background traffic volumes is traffic generated by other proposed projects in the vicinity. Related projects are defined as those projects that are under construction or have been approved for construction and would significantly impact traffic in the study area. Related projects may be development projects or roadway improvements.

One related project was identified that may be completed before 2012. This project is the expansion of the Maui Family YMCA, which is located along east side of Kanaloa Avenue approximately on-half mile north of Kaahumanu Avenue. The traffic projections were obtained from the project's TIAR[7].

[6] Kaku Associates, *Maui Long Range Land Transportation Plan*, October 1996

[7] Phillip Rowell and Associates, *TIAR for Maui Family YMCA Expansion*, June 19, 2007

The Kahului Town Center and the Kane Street Mixed Use Project were not included. These project will not be completed until after 2014.

The estimated background traffic projections for 2012 are shown in Attachment E.

I. Project Trip Generation

Future traffic volumes generated by a project are typically estimated using the methodology described in the *Trip Generation Handbook*[8] and data provided in *Trip Generation*[9]. This method uses trip generation rates to estimate the number of trips that the project will generate during the peak hours of the project and along the adjacent street.

The proposed project will consist of 16 apartments, 3,600 square feet of office space, and 3,600 square feet of storage and garage space and the renovation of an existing 2,500 square foot office building. Trip generation rates based on the number of apartment units are provided in *Trip Generation* and were used to estimated the number of trips generated by the apartments.

Trips generation rates for single-tenant office buildings were used to estimated the trips generated by the office building. The rates are based on thousand gross square feet of floor area. The trip generation calculations are summarized in Table 5. As shown, the proposed project will generate 7 inbound and 7 outbound trips during the morning peak hour. During the afternoon peak hour, the project will generate 8 inbound and 8 outbound trips.

Table 5 Trip Generation Calculations for Proposed Project

		Apartment (LU Code 220)			Office Space (LU Code 715)			
Time Period	Direction	Rate or %(1)	Units	Trips	Rate or %(2)	Units	Trips	Total
Weekday	Total	6.72	16	108	11.57	3.600	42	150
AM Peak Hour	Total	0.51		8	1.80		6	14
	In	20%		2	89%		5	7
	Out	80%		6	11%		1	7
PM Peak Hour	Total	0.62		10	1.73		6	16
	In	65%		7	15%		1	8
	Out	35%		3	85%		5	8

-NOTES:
(1) Institute of Transportation Engineers, *Trip Generation*, Seventh Edition, 2003, p 305 - 308
(2) Institute of Transportation Engineers, *Trip Generation*, Seventh Edition, 2003, p 1177 - 1179

These trips were distributed and assigned based on existing traffic approach and departure patterns of traffic currently using the project driveway and the intersection of Kaahumanu Avenue at Mahalani Street. The project's trip distribution and the resulting project trip assignments are shown in Attachment F.

[8] Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., 1998, p. 7-12

[9] Institute of Transportation Engineers, *Trip Generation, 7th Edition,* Washington, D.C., 2003

J. Background Plus Project Projections

Background plus project traffic projections were estimated by superimposing the peak hourly traffic generated by the proposed project on the background (without project) peak hour traffic projections. This assumes that the peak hourly trips generated by the project coincide with the peak hour of the adjacent street. This represents a worse-case condition as it assumes that the peak hours of all the intersection approaches and the peak hour of the study project coincide. The traffic projection calculations are shown as Tables 6 and 7. The resulting background plus project peak hour traffic projections are shown in Attachment G.

Table 6 Traffic Projection Calculations - Kaahumanu Avenue at Mahalani Street & Kanaloa Avenue

Approach and Movement		Existing (2010)		2010 to 2012 Background Growth		Related Projects' Trips		2012 Background		Project Trips		2012 Background Plus Project	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
North	Rt	160	78	5	3	15	20	180	101			180	101
	Th	104	69	3	2	15	20	122	91	1	1	123	92
	Lt	149	254	5	8	25	35	179	297			179	297
East	Rt	166	270	5	9	30	45	201	324			201	324
	Th	1179	994	38	32			1217	1026			1217	1026
	Lt	378	210	12	7			390	217	3	4	393	221
South	Rt	310	508	10	16			320	524	5	4	325	528
	Th	68	157	2	5	30	20	100	182	1	2	101	184
	Lt	15	59	0	2			15	61	0	1	15	62
West	Rt	91	28	3	1			94	29	1	1	95	30
	Th	779	1311	25	42			804	1353			804	1353
	Lt	69	126	2	4	25	20	96	150			96	150
Totals		3468	4064	110	131	140	160	3718	4355	11	13	3729	4368

Table 7 Traffic Projection Calculations - Mahalani Street at Project Driveway

Approach and Movement		Existing (2010)		2010 to 2012 Background Growth		Related Projects' Trips		2012 Background		Project Trips		2012 Background Plus Project	
		AM	PM	AM	PM			AM	PM	AM	PM	AM	PM
North	Rt	143	36	5	1			148	37	5	6	153	43
	Th	237	236	8	8	15	20	260	264			260	264
South	Th	411	504	13	16	30	20	454	540			454	540
	Lt	44	14	1	0			45	14	2	2	47	16
West	Rt	6	18	0	1			6	19	1	1	7	20
	Lt	29	92	2	8			31	100	6	7	37	107
Totals		870	900	29	34			944	974	14	16	958	990

K. Traffic Impact Analysis

1. The *Highway Capacity Software* (HCS) package was used to perform the level-of-service analysis.

2. The intersection lane configurations are unchanged.

3. As the *Highway Capacity Manual* defines level-of-service by delay, we have used the same definitions.

The results of the level-of-service analysis of the intersection of Kaahumanu Avenue at Mahalani Street are summarized in Table 8. Shown are the peak hour volume-to-capacity ratios, average vehicle delays and levels-of-service of the overall intersection and all lane groups. The intersection will operate at Level-of-Service D during both peak hours, without and with project generated traffic. The volume-to-capacity ratio of the intersection increased 0.01 during the morning peak hour and 0.3 second during the afternoon peak hour. This implies that project generated traffic will have a negligible impact on the level-of-service of the intersection. All volume-to-capacity ratios are 1.00 or less, even though several lane groups will operate at Level-of-Service E or F. Project generated traffic did not change the level-of-service of any lane group.

Table 8 2012 Levels-of-Service - Kaahumanu Avenue at Mahalani Street

Approach and Movement	AM Peak Hour						PM Peak Hour					
	Without Project			With Project			Without Project			With Project		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Overall Intersection	0.74	36.4	D	0.75	36.4	D	0.87	44.0	D	0.87	44.3	D
Eastbound Left	0.76	71.3	E	0.76	71.3	E	0.79	81.9	F	0.80	82.3	F
Eastbound Thru	0.75	38.0	D	0.75	38.1	D	0.91	44.5	D	0.91	44.7	D
Eastbound Right	0.10	26.8	C	0.10	26.8	C	0.03	20.7	C	0.03	20.8	C
Westbound Left	0.79	58.8	E	0.79	58.9	E	0.83	86.5	F	0.84	88.4	F
Westbound Thru	0.89	41.3	D	0.89	41.3	D	0.75	38.7	D	0.75	38.6	D
Westbound Right	0.21	0.3	A	0.21	0.3	A	0.23	0.3	A	0.23	0.3	A
Northbound Left	0.15	49.8	D	0.15	49.8	D	0.31	62.6	E	0.32	62.8	E
Northbound Thru	0.53	58.7	E	0.53	58.8	E	0.84	90.4	F	0.85	91.9	F
Northbound Right	0.25	0.4	A	0.26	0.4	A	0.40	0.8	A	0.40	0.8	A
Southbound Left	0.62	58.1	E	0.62	58.1	E	0.85	92.9	F	0.85	92.9	F
Southbound Left & Thru	0.63	58.0	E	0.63	58.1	E	0.87	95.1	F	0.88	95.7	F
Southbound Right	0.15	0.2	A	0.15	0.2	A	0.07	0.1	A	0.07	0.1	A

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.
4. See Attachments H & I for Level-of-Service Calculation Worksheets.

The results of the level-of-service of the intersection of Mahalani Street at the Project Drive is summarized in Table 9. Shown are the average vehicle delays and levels-of-service of the controlled lane groups. Delays and levels-of-service are not calculated for uncontrolled lane groups or the overall intersections. Also, volume-to-capacity ratios are not calculated for unsignalized intersections. The level-of-service analysis indicates that left turns from the Project Drive will operate at Level-of-Service C. Right turns from the Project Drive and left turns from Mahalani Drive into the Project Drive will operate at Level-of-Service A, without and with project generated traffic. The northbound left turn and through movement lane group will operate at Level-of-Service A without and with project generated traffic. The average vehicle delay increases 0.1 second during the morning peak hour and 0.2 second during the afternoon peak hour. This implies that project generated traffic will have a minimal impact on traffic operations along Mahalani Street.

Table 9 2012 Levels-of-Service - Mahalani Street at Project Drive

	AM Peak Hour				PM Peak Hour			
	Without Project		With Project		Without Project		With Project	
Approach and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Eastbound Left	20.9	C	22.4	C	20.4	C	21.6	C
Eastbound Right	9.9	A	9.9	A	9.7	A	9.8	A
Northbound Left & Thru	2.7	A	2.8	A	1.0	A	1.2	A

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.
4. See Attachment H & I for Level-of-Service Calculation Worksheets.

L. Mitigation

We have used the Institute of Transportation Engineers standard that a Level-of-Service D is the minimum acceptable level-of-service and that the criteria is applicable to the overall intersection.[10] It is generally accepted that side street approaches and minor movements, such as left turn lanes may operate at Level-of-Service E or F for short periods if the volume-to-capacity ratio indicates a higher Level-of-Service as this implies that the long delay and therefore the low level-of-service is a result of the traffic signal cycle length rather than a lane deficiency [11]. "Level-of-Service E is sometimes tolerated for minor movements such as left turns when there are no feasible mitigating measures or if it helps maintain the main through movements at acceptable levels-of-service."

Based on this criteria, no mitigation is required at the study intersections as a result of project generated traffic.

M. Summary and Conclusions

The conclusions of the traffic impact assessment are:

1. The proposed project is located at 95 Mahalani Street in Wailuku and will consist of 16 apartments, 3,600 square feet of office space and 3,600 square feet of storage and garage space and the renovation of an existing 2,500 square foot office building. Access and egress will be via the existing driveway serving the J. Walter Cameron Center, which is along the west side of Mahalani.

2. It was estimated that the project will generate 14 trips during the morning peak hour and 16 trips during the afternoon peak hour. This implies that the scope of the traffic assessment could be limited to an "access location and design review" analysis as described by the Institute of Transportation Engineers[12]. Therefore, the intersections of Kaahumanu Avenue at Mahalani Street and Kanaloa Avenue and Mahalani Street at Project Drive were analyzed.

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[10] Institute of Traffic Engineers *Transportation Impact Analyses for Site Development, A Recommended Practice,* Washington, D.C., 2006, p 60.

[11] Transportation Research Board, *Highway Capacity Manual*, Washington, D.C., 2000, p 16-35.

[12] Institute of Transportation Engineers, *Transportation and Land Development*, 2002, Washington, D.C., page 3-6

3. The level-of-service analysis concluded that the intersection Kaahumanu Avenue at Mahalani Street will operate at Level-of-Service D during both peak hours, without and with project generated traffic. The volume-to-capacity ratio of the intersection increased 0.01 during the morning peak hour and 0.3 second during the afternoon peak hour. This implies that project generated traffic will have a negligible impact on the level-of-service of the intersection. All volume-to-capacity ratios are 1.00 or less, even though several lane groups will operate at Level-of-Service E or F. Project generated traffic did not change the level-of-service of any lane group. As the overall intersection will operate at Level-of-Service D and all volume-to-capacity ratios are 1.00 or less, no mitigation is recommended.

4. The level-of-service analysis concluded that left turns from the Project Drive onto Mahalani Street will operate at Level-of-Service C. Right turns from the Project Drive and left turns from Mahalani Drive into the Project Drive will operate at Level-of-Service A, without and with project generated traffic. The northbound left turn and through movement lane group will operate at Level-of-Service A without and with project generated traffic. The average vehicle delay increases 0.1 second during the morning peak hour and 0.2 second during the afternoon peak hour. This implies that project generated traffic will have a minimal impact on traffic operations along Mahalani Street. Since all movements will operate at Level-of-Service C, or better, and there is no change in the level-of-service as a result of project generated traffic, no mitigation is recommended.

Respectfully submitted,
PHILLIP ROWELL AND ASSOCIATES

Phillip J. Rowell, P.E.
Principal

List of Attachments

Attachment A Project Location and Site Plan

Attachment B Existing Lane Configurations and Right-of-Way Controls

Attachment C Existing Peak Hour Traffic Volumes

Attachment D Level-of-Service Calculation Worksheets for Existing (2010) Conditions

Attachment E 2012 Background Peak Hour Traffic Projections

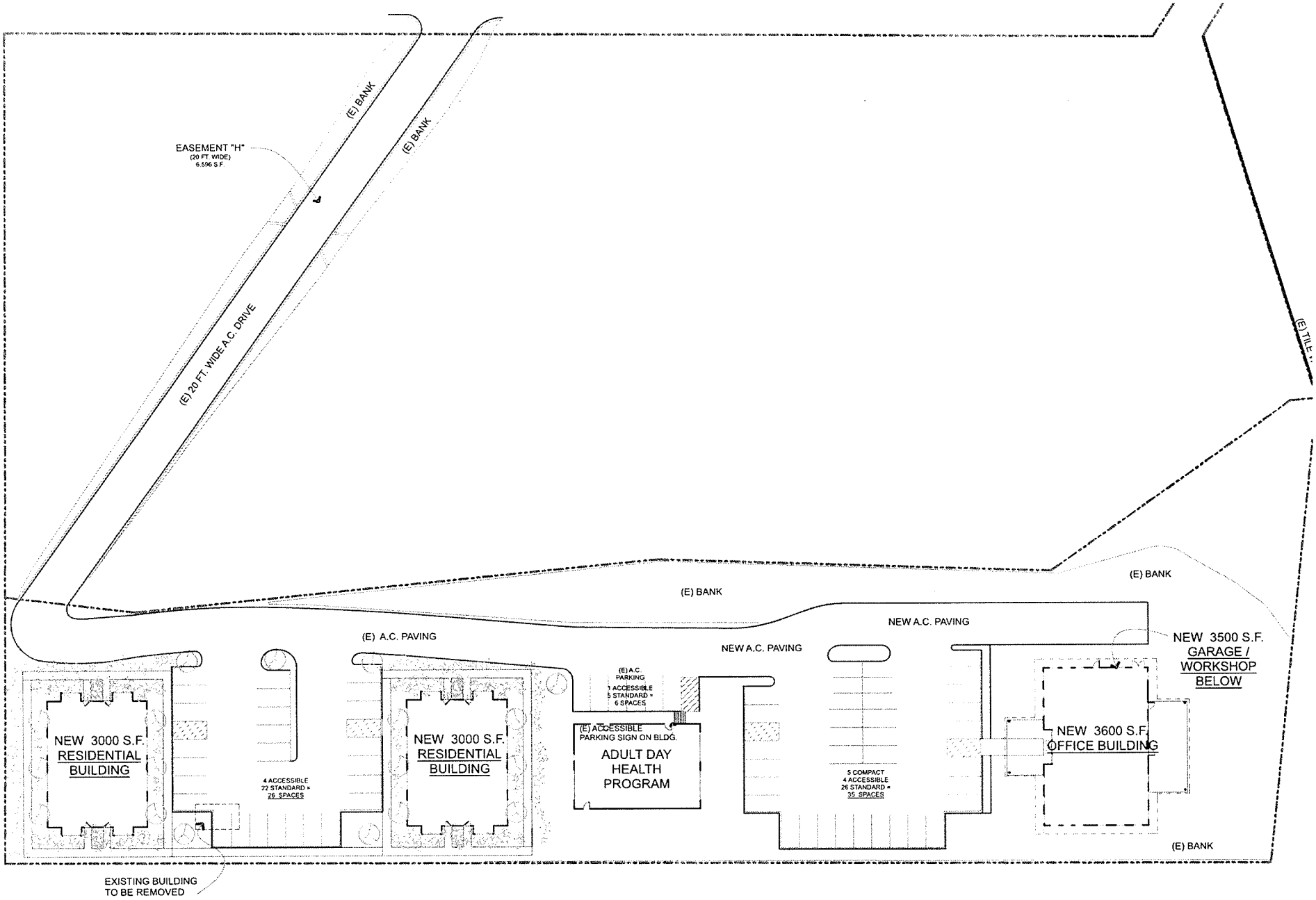
Attachment F Project Trip Distributions and Peak Hour Trip Assignments

Attachment G 2012 Background Plus Project Peak Hour Traffic Projections

Attachment H Level-of-Service Calculation Worksheets for 2012 Background Conditions

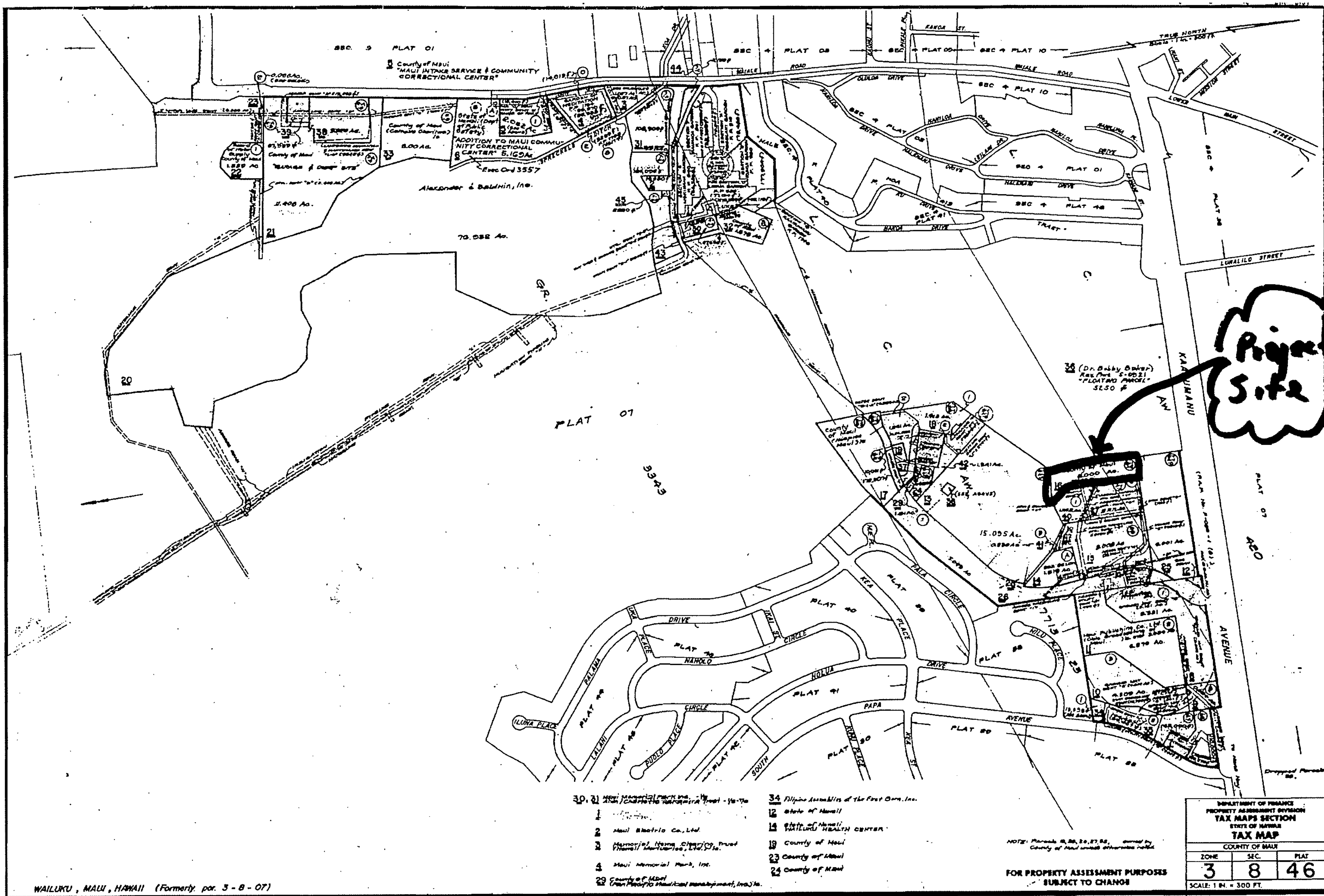
Attachment I Level-of-Service Calculation Worksheets for 2012 Background Plus Project Conditions

Attachment A
Project Location and Site Plan

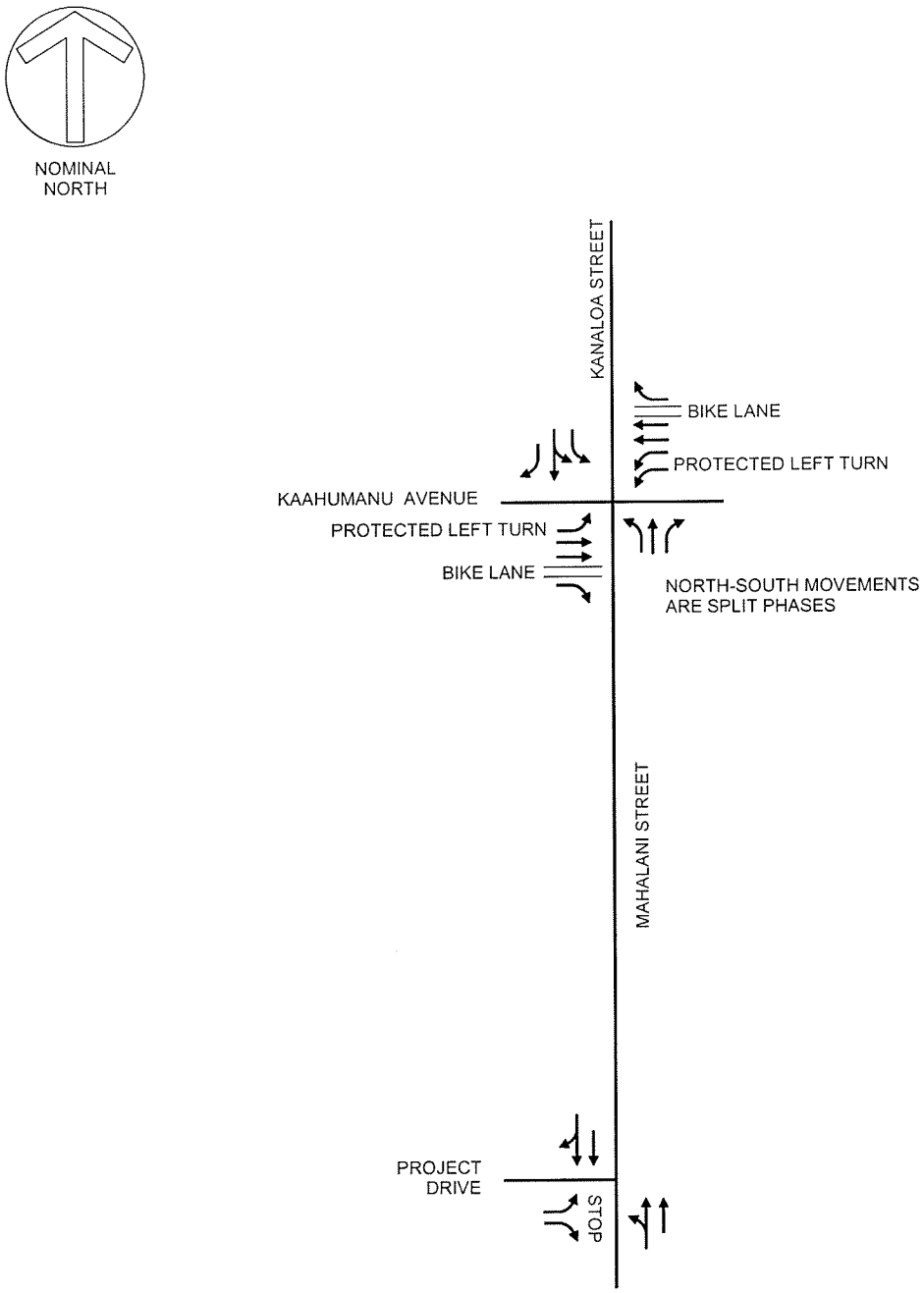


KA LIMA O MAUI
WAILUKU, MAUI
2/2/10

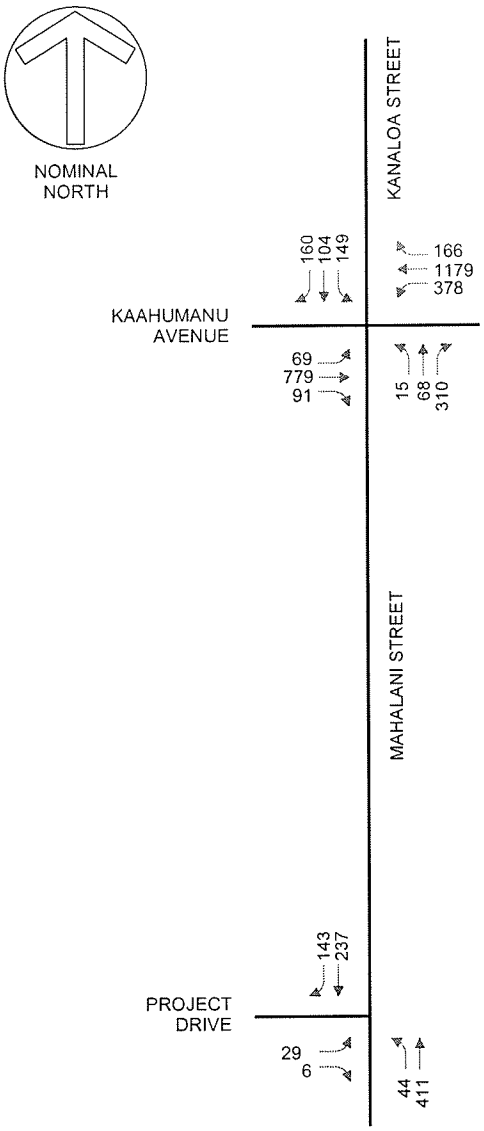
SITE PLAN
SCALE: 1" = 60'



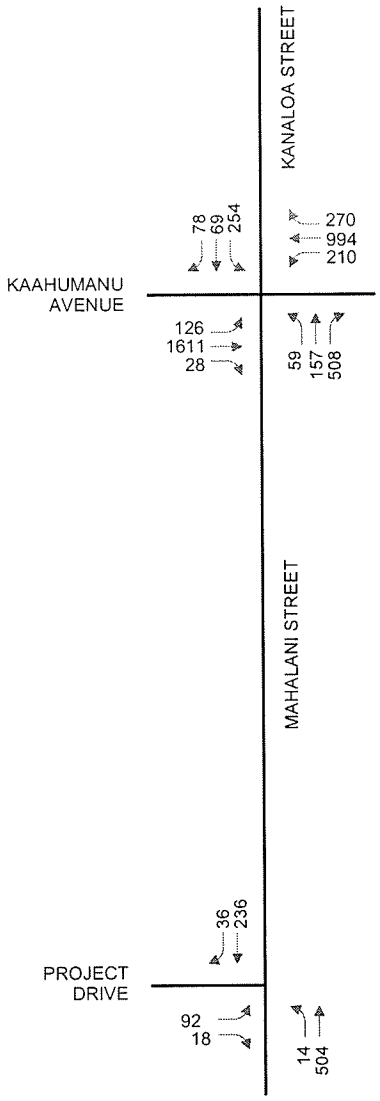
Project Site
KAAHUMANU
AVENUE
PLAT 07
420
SEC 4 PLAT 10
SEC 4 PLAT 01
SEC 4 PLAT 03
SEC 9 PLAT 01
County of Maui "MAUI INTAKE SERVICE & COMMUNITY CORRECTIONAL CENTER"
"ADDITION TO MAUI COMMUNITY CORRECTIONAL CENTER" 5.169 Ac.
Exec Ord 3557
Alexander & Baldwin, Inc.
70.532 Ac.
11.406 Ac.
8.00 Ac.
GR.
PLAT 07
3343
C.
L.
AW
38 (Dr. Bobby Baker) Rel. Parl. 5-0021 "FLOATING PARCEL" 5250 sf
15.055 Ac.
7713
WAILUKU, MAUI, HAWAII (Formerly por. 3-8-07)
30, 31 Maui Memorial Park Inc.
2 Maui Electric Co., Ltd.
3 Memorial Home Cemetery Trust
4 Maui Memorial Park, Inc.
34 Filipino Assemblies of the First Born, Inc.
12 State of Hawaii
14 State of Hawaii WAILUKU HEALTH CENTER
19 County of Maui
23 County of Maui
24 County of Maui
FOR PROPERTY ASSESSMENT PURPOSES SUBJECT TO CHANGE
DEPARTMENT OF FINANCE
PROPERTY ASSESSMENT DIVISION
TAX MAPS SECTION
STATE OF HAWAII
TAX MAP
COUNTY OF MAUI
ZONE 3
SEC. 8
PLAT 46
SCALE: 1 IN. = 300 FT.



Attachment B
EXISTING LANE CONFIGURATIONS
AND RIGHT-OF-WAY CONTROLS



EXISTING (2010)
AM PEAK HOUR VOLUMES



EXISTING (2010)
PM PEAK HOUR VOLUMES

NOTE:
TRAFFIC COUNTS WERE PERFORMED ON
THURSDAY, JANUARY 14, 2010.

Attachment C
EXISTING (2010) PEAK HOUR TRAFFIC VOLUMES

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Ka Lima O Maui
INTERSECTION: Mahalani Street at Driveway
DAY & DATE: Thursday, January 14, 2010
START TIME: 7:00 am
END TIME: 9:00 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	7:00 am	2		0	13	53						90	2	160
2	7:15 am	1		0	25	46						90	9	171
3	7:30 am	1		6	45	68						125	9	254
4	7:45 am	3		17	41	55						120	10	246
5	8:00 am	1		6	32	68						76	16	199
6	8:15 am	1		5	37	48						72	4	167
7	8:30 am	3		7	16	54						78	4	162
8	8:45 am	2		7	14	53						50	5	131
9	9:00 am													0
10	9:15 am													0
11	9:30 am													0
12	9:45 am													0
13	10:00 am													0
14	10:15 am													0
	Maximum:	3		17	45	68						125	16	254

Hourly Volume of Each Movement

7:00 am	8:00 am	7	0	23	124	222	0	0	0	0	0	425	30	831
7:15 am	**8:15 am**	**6**	**0**	**29**	**143**	**237**	**0**	**0**	**0**	**0**	**0**	**411**	**44**	**870**
7:30 am	8:30 am	6	0	34	155	239	0	0	0	0	0	393	39	866
7:45 am	8:45 am	8	0	35	126	225	0	0	0	0	0	346	34	774
8:00 am	9:00 am	7	0	25	99	223	0	0	0	0	0	276	29	659
8:15 am	9:15 am	6	0	19	67	155	0	0	0	0	0	200	13	460
8:30 am	9:30 am	5	0	14	30	107	0	0	0	0	0	128	9	293
8:45 am	9:45 am	2	0	7	14	53	0	0	0	0	0	50	5	131
9:00 am	10:00 am	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 am	10:15 am	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 am	10:30 am	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Volume		6	0	29	143	237	0	0	0	0	0	411	44	870
Per Cent of Approach		17%	0%	7%	38%	100%	0%	0%	0%	0%	0%	31%	5%	
Peak Hour Factor:		0.5	0	0.43	0.79	0.87	0	0	0	0	0	0.82	0.69	0.86

Total Arrivals	35	380	0	455
Total Departures	187	440	0	243
Total	222	820	0	698

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Ka Lima O Maui
INTERSECTION: Mahalani Street at Driveway
DAY & DATE: Thursday, January 14, 2010
START TIME: 3:30 pm
END TIME: 5:30 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:30 pm	3		11	8	62						141	2	227
2	3:45 pm	3		20	10	66						106	6	211
3	4:00 pm	2		26	8	49						120	3	208
4	4:15 pm	10		35	10	59						137	3	254
5	4:30 pm	9		25	7	62						90	1	194
6	4:45 pm	4		23	5	62						82	1	177
7	5:00 pm	3		17	6	64						85	2	177
8	5:15 pm	2		13	3	54						71	1	144
9	5:30 pm													0
10	5:45 pm													0
11	6:00 pm													0
12	6:15 pm													0
13	6:30 pm													0
14	6:45 pm													0
	Maximum:	10		35	10	66						141	6	254

Hourly Volume of Each Movement

3:30 pm	**4:30 pm**	**18**	**0**	**92**	**36**	**236**	**0**	**0**	**0**	**0**	**0**	**504**	**14**	**900**
3:45 pm	4:45 pm	24	0	106	35	236	0	0	0	0	0	453	13	867
4:00 pm	5:00 pm	25	0	109	30	232	0	0	0	0	0	429	8	833
4:15 pm	5:15 pm	26	0	100	28	247	0	0	0	0	0	394	7	802
4:30 pm	5:30 pm	18	0	78	21	242	0	0	0	0	0	328	5	692
4:45 pm	5:45 pm	9	0	53	14	180	0	0	0	0	0	238	4	498
5:00 pm	6:00 pm	5	0	30	9	118	0	0	0	0	0	156	3	321
5:15 pm	6:15 pm	2	0	13	3	54	0	0	0	0	0	71	1	144
5:30 pm	6:30 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 pm	6:45 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 pm	7:00 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Volume		18	0	92	36	236	0	0	0	0	0	504	14	900
Per Cent of Approach		16%	0%	25%	13%	100%	0%	0%	0%	0%	0%	36%	2%	
Peak Hour Factor:		0.45	0	0.66	0.9	0.89	0	0	0	0	0	0.89	0.58	0.89

Total Arrivals	110	272	0	518
Total Departures	50	596	0	254
Total	160	868	0	772

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Ka Lima O Maui
INTERSECTION: Mahalani Street at Driveway
DAY & DATE: Thursday, January 14, 2010
START TIME: 6:30 am
END TIME: 8:30 am

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	6:30 am	34	31	30	52	101	47	34	23	1	5	74	16	448
2	6:45 am	41	33	70	78	179	105	60	53	3	4	117	32	775
3	7:00 am	50	23	79	20	197	79	81	20	1	5	144	7	706
4	7:15 am	35	24	34	26	262	65	70	15	2	17	174	7	731
5	7:30 am	45	27	47	66	313	109	86	19	1	24	232	18	987
6	7:45 am	50	34	46	44	310	101	95	24	10	38	205	28	985
7	8:00 am	30	19	22	30	294	103	59	10	2	12	168	16	765
8	8:15 am	29	22	18	19	221	75	54	14	5	15	155	14	641
9	8:30 am	18	21	14	18	231	70	75	13	9	16	167	10	662
10	8:45 am	18	17	13	14	233	68	77	8	11	12	185	14	670
11	9:00 am													0
12	9:15 am													0
13	9:30 am													0
14	9:45 am													0
	Maximum:	50	34	79	78	313	109	95	53	11	38	232	32	987

Hourly Volume of Each Movement

6:30 am	7:30 am	160	111	213	176	739	296	245	111	7	31	509	62	2660
6:45 am	7:45 am	171	107	230	190	951	358	297	107	7	50	667	64	3199
7:00 am	8:00 am	180	108	206	156	1082	354	332	78	14	84	755	60	3409
7:15 am	**8:15 am**	**160**	**104**	**149**	**166**	**1179**	**378**	**310**	**68**	**15**	**91**	**779**	**69**	**3468**
7:30 am	8:30 am	154	102	133	159	1138	388	294	67	18	89	760	76	3378
7:45 am	8:45 am	127	96	100	111	1056	349	283	61	26	81	695	68	3053
8:00 am	9:00 am	95	79	67	81	979	316	265	45	27	55	675	54	2738
8:15 am	9:15 am	65	60	45	51	685	213	206	35	25	43	507	38	1973
8:30 am	9:30 am	36	38	27	32	464	138	152	21	20	28	352	24	1332
8:45 am	9:45 am	18	17	13	14	233	68	77	8	11	12	185	14	670
9:00 am	10:00 am	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Volume		160	104	149	166	1179	378	310	68	15	91	779	69	3468
Per Cent of Approach		39%	25%	10%	10%	63%	50%	79%	39%	2%	10%	18%	2%	
Peak Hour Factor:		0.8	0.76	0.47	0.53	0.94	0.87	0.82	0.32	0.34	0.6	0.84	0.54	0.88

Total Arrivals	413	1723	393	939
Total Departures	303	1238	573	1354
Total	716	2961	966	2293

TRAFFIC COUNT SUMMARY WORKSHEET

PROJECT: Ka Lima O Maui
INTERSECTION: Mahalani Street at Driveway
DAY & DATE: Thursday, January 14, 2010
START TIME: 3:30 pm
END TIME: 5:30 pm

15-Minute Volumes Beginning at:

		North Approach			East Approach			South Approach			West Approach			
Interval	Start Time	1	2	3	4	5	6	7	8	9	10	11	12	Totals
1	3:30 pm	26	21	43	43	265	59	161	27	9	13	254	22	943
2	3:45 pm	11	16	52	57	242	54	139	28	10	18	282	16	925
3	4:00 pm	18	13	48	59	225	53	124	49	25	8	282	28	932
4	4:15 pm	22	13	59	60	267	56	124	35	17	6	303	25	987
5	4:30 pm	21	19	55	66	235	63	149	50	20	11	335	32	1056
6	4:45 pm	18	17	65	71	235	33	120	34	14	7	371	29	1014
7	5:00 pm	17	20	75	73	212	58	115	38	8	4	302	40	962
8	5:15 pm	23	10	80	56	202	40	81	32	8	3	273	37	845
9	5:30 pm	32	15	49	67	165	36	89	26	5	5	215	28	732
10	5:45 pm	31	12	65	43	192	41	85	11	6	4	161	24	675
11	6:00 pm													0
12	6:15 pm													0
13	6:30 pm													0
14	6:45 pm													0
	Maximum:	32	21	80	73	267	63	161	50	25	18	371	40	1056

Hourly Volume of Each Movement

3:30 pm	4:30 pm	77	63	202	219	999	222	548	139	61	45	1121	91	3787
3:45 pm	4:45 pm	72	61	214	242	969	226	536	162	72	43	1202	101	3900
4:00 pm	5:00 pm	79	62	227	256	962	205	517	168	76	32	1291	114	3989
4:15 pm	**5:15 pm**	**78**	**69**	**254**	**270**	**949**	**210**	**508**	**157**	**59**	**28**	**1311**	**126**	**4019**
4:30 pm	5:30 pm	79	66	275	266	884	194	465	154	50	25	1281	138	3877
4:45 pm	5:45 pm	90	62	269	267	814	167	405	130	35	19	1161	134	3553
5:00 pm	6:00 pm	103	57	269	239	771	175	370	107	27	16	951	129	3214
5:15 pm	6:15 pm	86	37	194	166	559	117	255	69	19	12	649	89	2252
5:30 pm	6:30 pm	63	27	114	110	357	77	174	37	11	9	376	52	1407
5:45 pm	6:45 pm	31	12	65	43	192	41	85	11	6	4	161	24	675
6:00 pm	7:00 pm	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Volume		78	69	254	270	949	210	508	157	59	28	1311	126	4019
Per Cent of Approach		19%	12%	17%	19%	57%	24%	70%	64%	4%	2%	24%	3%	
Peak Hour Factor:		0.61	0.82	0.79	0.92	0.89	0.83	0.79	0.79	0.59	0.39	0.88	0.79	0.95

Total Arrivals	401	1429	724	1465
Total Departures	553	2073	307	1086
Total	954	3502	1031	2551

Attachment D
Level-of-Service Calculation Worksheets for Existing (2010) Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1704	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1704	1538
Volume (vph)	69	779	91	378	1179	166	15	68	310	149	104	160
Peak-hour factor, PHF	0.62	0.84	0.60	0.87	0.94	0.63	0.38	0.71	0.82	0.79	0.76	0.80
Adj. Flow (vph)	111	927	152	434	1254	263	39	96	378	189	137	200
RTOR Reduction (vph)	0	0	99	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	111	927	53	434	1254	263	39	96	378	159	167	200
Turn Type	Prot		Perm	Prot		Free	Split		Free	Split		Free
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			Free			Free			Free
Actuated Green, G (s)	12.6	43.2	43.2	20.9	51.5	123.8	19.3	19.3	123.8	24.4	24.4	123.8
Effective Green, g (s)	12.6	43.2	43.2	20.9	51.5	123.8	19.3	19.3	123.8	24.4	24.4	123.8
Actuated g/C Ratio	0.10	0.35	0.35	0.17	0.42	1.00	0.16	0.16	1.00	0.20	0.20	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	175	1200	537	563	1430	1538	268	282	1538	322	336	1538
v/s Ratio Prot	0.06	0.27		c0.13	c0.36		0.02	c0.05		0.10	c0.10	
v/s Ratio Perm			0.10			0.17			0.25			0.13
v/c Ratio	0.63	0.77	0.10	0.77	0.88	0.17	0.15	0.34	0.25	0.49	0.50	0.13
Uniform Delay, d1	53.4	35.9	27.2	49.2	33.2	0.0	45.1	46.6	0.0	44.2	44.2	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	3.2	0.1	6.5	6.4	0.2	1.1	3.3	0.4	5.3	5.2	0.2
Delay (s)	60.7	39.1	27.3	55.6	39.6	0.2	46.3	49.8	0.4	49.5	49.4	0.2
Level of Service	E	D	C	E	D	A	D	D	A	D	D	A
Approach Delay (s)		39.6			37.9			13.1			30.7	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	34.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	123.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	29	6	44	411	237	143
Peak Hour Factor	0.43	0.50	0.69	0.82	0.87	0.80
Hourly flow rate (vph)	67	12	64	501	272	179
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)					1200	
pX, platoon unblocked						
vC, conflicting volume	740	226	451			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	740	226	451			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	98	94			
cM capacity (veh/h)	326	768	1085			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	67	12	231	334	182	270
Volume Left	67	0	64	0	0	0
Volume Right	0	12	0	0	0	179
cSH	326	768	1085	1700	1700	1700
Volume to Capacity	0.21	0.02	0.06	0.20	0.11	0.16
Queue Length (ft)	19	1	5	0	0	0
Control Delay (s)	18.9	9.8	2.8	0.0	0.0	0.0
Lane LOS	C	A	A			
Approach Delay (s)	17.5		1.1		0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1670	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (perm)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1670	1538
Volume (vph)	126	1311	28	210	994	270	59	157	508	254	69	78
Peak-hour factor, PHF	0.78	0.88	0.64	0.83	0.89	0.92	0.74	0.78	0.85	0.85	0.86	0.89
Adj. Flow (vph)	162	1490	44	253	1117	293	80	201	598	299	80	88
RTOR Reduction (vph)	0	0	22	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	162	1490	22	253	1117	293	80	201	598	185	194	88
Turn Type	Prot		Perm	Prot		Free	Split		Free	Split		Free
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			Free			Free			Free
Actuated Green, G (s)	19.4	74.0	74.0	14.6	69.2	154.2	24.3	24.3	154.2	25.3	25.3	154.2
Effective Green, g (s)	19.4	74.0	74.0	14.6	69.2	154.2	24.3	24.3	154.2	25.3	25.3	154.2
Actuated g/C Ratio	0.13	0.48	0.48	0.09	0.45	1.00	0.16	0.16	1.00	0.16	0.16	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	216	1650	738	316	1543	1538	271	285	1538	268	274	1538
v/s Ratio Prot	c0.09	c0.43		0.08	0.32		0.05	c0.11		0.11	c0.12	
v/s Ratio Perm			0.03			0.19			0.39			0.06
v/c Ratio	0.75	0.90	0.03	0.80	0.72	0.19	0.30	0.71	0.39	0.69	0.71	0.06
Uniform Delay, d1	65.1	36.8	21.2	68.4	34.7	0.0	57.4	61.6	0.0	60.8	61.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.6	7.3	0.0	13.5	1.7	0.3	2.8	13.7	0.7	13.6	14.4	0.1
Delay (s)	78.7	44.1	21.2	81.9	36.4	0.3	60.1	75.3	0.7	74.4	75.3	0.1
Level of Service	E	D	C	F	D	A	E	E	A	E	E	A
Approach Delay (s)		46.8			37.0			23.2			60.8	
Approach LOS		D			D			C			E	

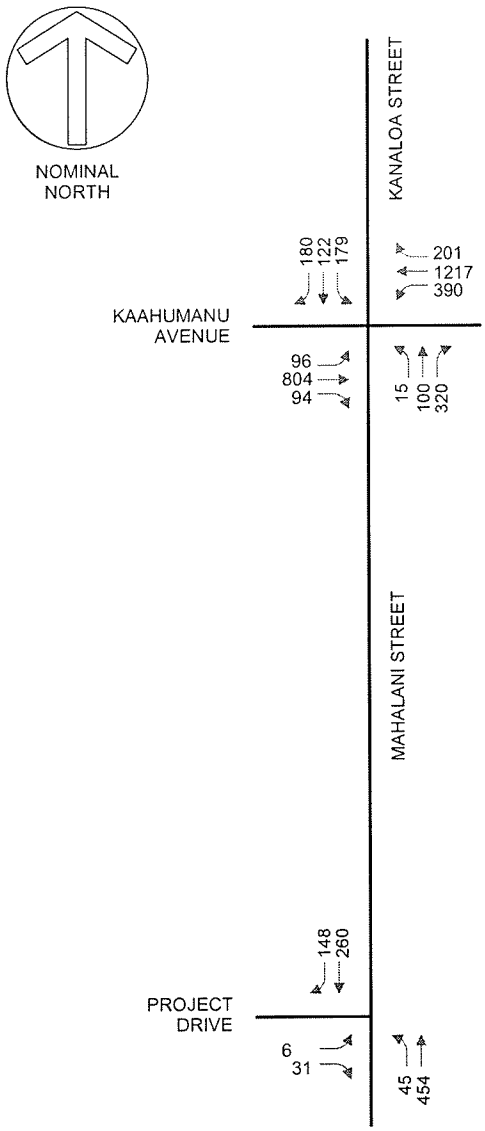
Intersection Summary			
HCM Average Control Delay	40.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	154.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

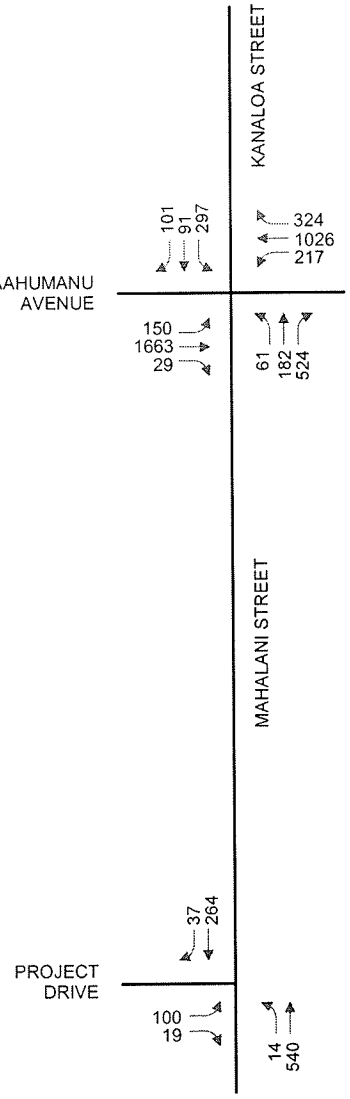
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	92	18	14	504	236	36
Peak Hour Factor	0.66	0.25	0.58	0.92	0.90	0.90
Hourly flow rate (vph)	139	72	24	548	262	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)					1200	
pX, platoon unblocked						
vC, conflicting volume	604	151	302			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	604	151	302			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	66	92	98			
cM capacity (veh/h)	414	859	1234			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	139	72	207	365	175	127
Volume Left	139	0	24	0	0	0
Volume Right	0	72	0	0	0	40
cSH	414	859	1234	1700	1700	1700
Volume to Capacity	0.34	0.08	0.02	0.21	0.10	0.07
Queue Length (ft)	36	7	1	0	0	0
Control Delay (s)	18.0	9.6	1.1	0.0	0.0	0.0
Lane LOS	C	A	A			
Approach Delay (s)	15.1		0.4		0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		

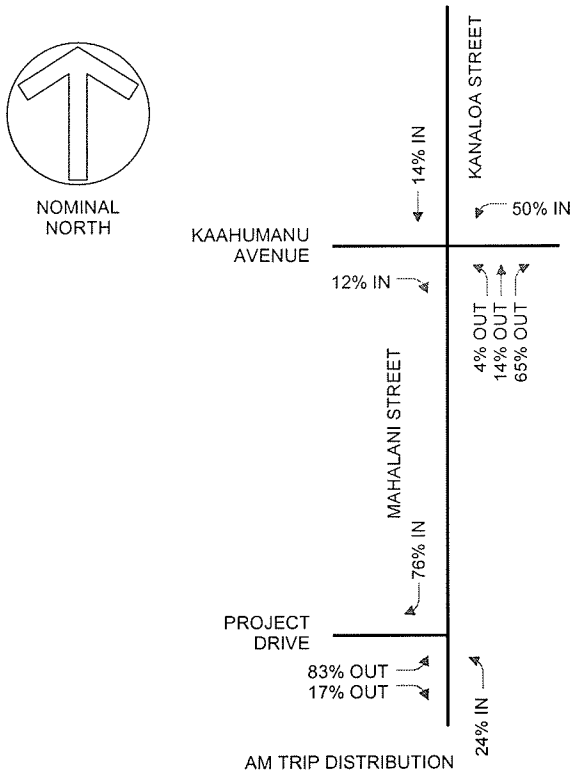


AM PEAK HOUR



PM PEAK HOUR

Attachment E
2012 BACKGROUND PEAK HOUR TRAFFIC PROJECTIONS



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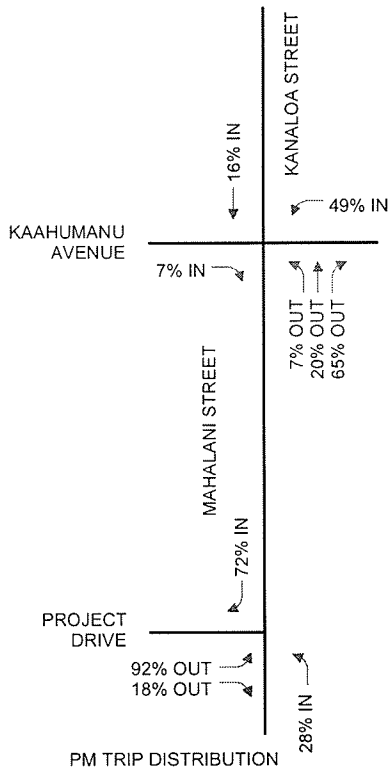

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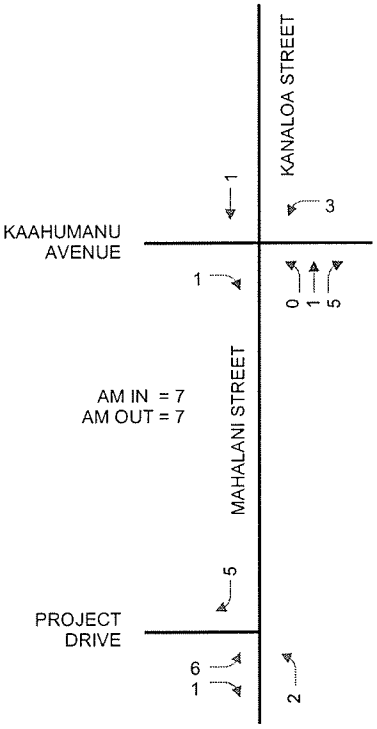
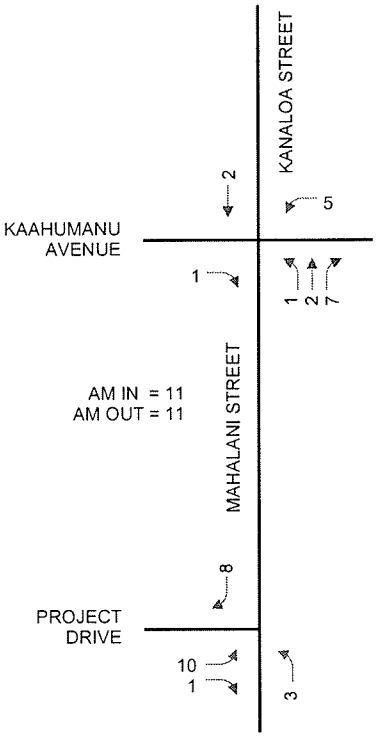
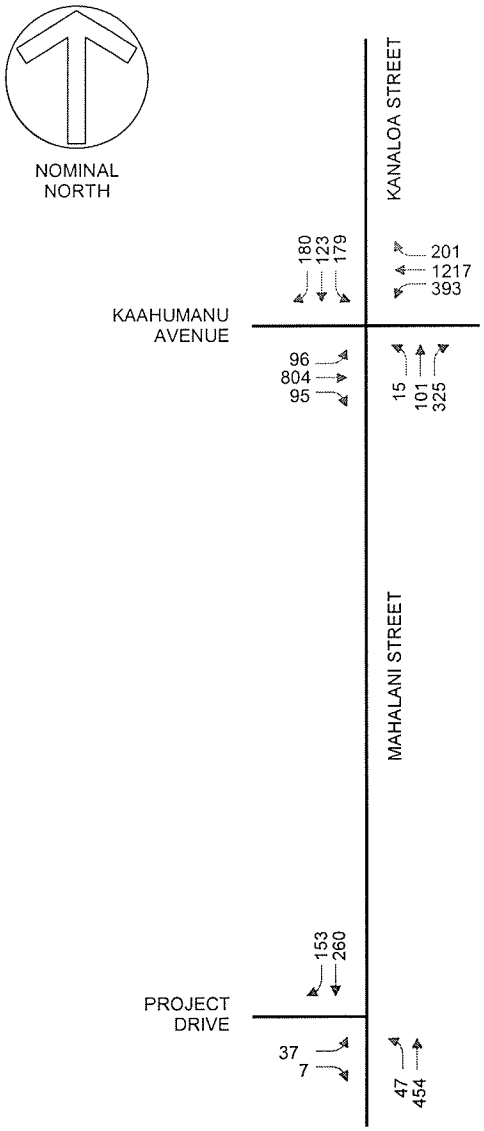


AM TRIP ASSIGNMENTS



PM TRIP ASSIGNMENTS

Attachment F
PROJECT TRIP DISTRIBUTIONS AND
PEAK HOUR TRIP ASSIGNMENTS



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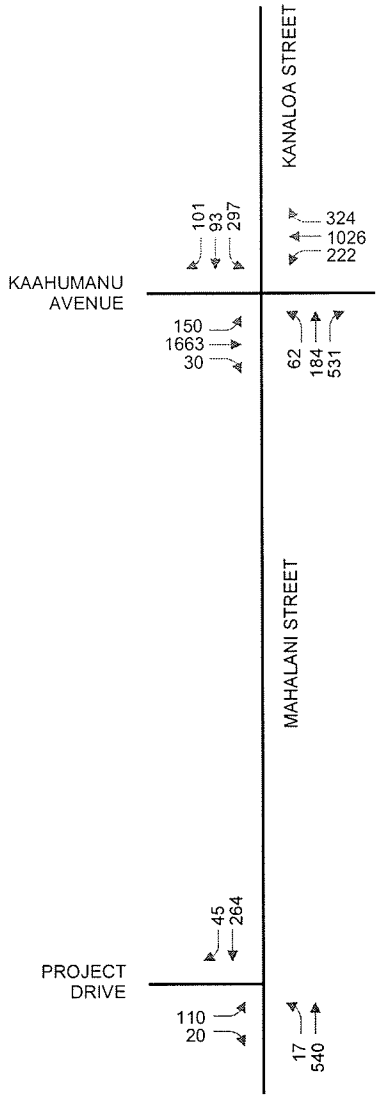

PM PEAK HOUR

Attachment G

2012 BACKGROUND PLUS PROJECT PEAK HOUR TRAFFIC PROJECTIONS

Attachment H
Level-of-Service Calculation Worksheets for 2012 Background Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1703	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1703	1538
Volume (vph)	96	804	94	390	1217	201	15	100	320	179	122	180
Peak-hour factor, PHF	0.62	0.84	0.60	0.87	0.94	0.63	0.38	0.71	0.82	0.79	0.76	0.80
Adj. Flow (vph)	155	957	157	448	1295	319	39	141	390	227	161	225
RTOR Reduction (vph)	0	0	98	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	155	957	59	448	1295	319	39	141	390	189	199	225
Turn Type	Prot		Perm	Prot		Free	Split		Free	Split		Free
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			Free			Free			Free
Actuated Green, G (s)	15.4	48.6	48.6	22.3	55.5	130.4	19.2	19.2	130.4	24.3	24.3	130.4
Effective Green, g (s)	15.4	48.6	48.6	22.3	55.5	130.4	19.2	19.2	130.4	24.3	24.3	130.4
Actuated g/C Ratio	0.12	0.37	0.37	0.17	0.43	1.00	0.15	0.15	1.00	0.19	0.19	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	203	1281	573	570	1463	1538	253	267	1538	304	317	1538
v/s Ratio Prot	0.09	0.28		c0.13	c0.38		0.02	c0.08		0.12	c0.12	
v/s Ratio Perm			0.10			0.21			0.25			0.15
v/c Ratio	0.76	0.75	0.10	0.79	0.89	0.21	0.15	0.53	0.25	0.62	0.63	0.15
Uniform Delay, d1	55.7	35.6	26.7	51.8	34.5	0.0	48.5	51.4	0.0	48.8	48.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.6	2.4	0.1	7.0	6.8	0.3	1.3	7.3	0.4	9.2	9.1	0.2
Delay (s)	71.3	38.0	26.8	58.8	41.3	0.3	49.8	58.7	0.4	58.1	58.0	0.2
Level of Service	E	D	C	E	D	A	D	E	A	E	E	A
Approach Delay (s)		40.7			38.8			18.2			36.8	
Approach LOS		D			D			B			D	

Intersection Summary			
HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	130.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	31	6	45	454	260	148
Peak Hour Factor	0.43	0.50	0.69	0.82	0.87	0.80
Hourly flow rate (vph)	72	12	65	554	299	185
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)					1200	
pX, platoon unblocked						
vC, conflicting volume	799	242	484			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	799	242	484			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	98	94			
cM capacity (veh/h)	297	750	1054			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	72	12	250	369	199	285
Volume Left	72	0	65	0	0	0
Volume Right	0	12	0	0	0	185
cSH	297	750	1054	1700	1700	1700
Volume to Capacity	0.24	0.02	0.06	0.22	0.12	0.17
Queue Length (ft)	23	1	5	0	0	0
Control Delay (s)	20.9	9.9	2.7	0.0	0.0	0.0
Lane LOS	C	A	A			
Approach Delay (s)	19.4		1.1		0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1673	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (perm)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1673	1538
Volume (vph)	150	1663	29	217	1026	324	61	182	524	297	91	101
Peak-hour factor, PHF	0.78	0.88	0.64	0.83	0.89	0.92	0.74	0.78	0.85	0.85	0.86	0.89
Adj. Flow (vph)	192	1890	45	261	1153	352	82	233	616	349	106	113
RTOR Reduction (vph)	0	0	16	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	192	1890	29	261	1153	352	82	233	616	222	233	113
Turn Type	Prot		Perm	Prot		Free	Split		Free	Split		Free
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			Free			Free			Free
Actuated Green, G (s)	24.3	100.0	100.0	15.0	90.7	180.0	24.0	24.0	180.0	25.0	25.0	180.0
Effective Green, g (s)	24.3	100.0	100.0	15.0	90.7	180.0	24.0	24.0	180.0	25.0	25.0	180.0
Actuated g/C Ratio	0.14	0.56	0.56	0.08	0.50	1.00	0.13	0.13	1.00	0.14	0.14	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	1910	854	278	1732	1538	229	241	1538	227	232	1538
v/s Ratio Prot	0.11	c0.55		c0.08	0.34		0.05	c0.13		0.14	c0.14	
v/s Ratio Perm			0.03			0.23			0.40			0.07
v/c Ratio	0.83	0.99	0.03	0.94	0.67	0.23	0.36	0.97	0.40	0.98	1.00	0.07
Uniform Delay, d1	75.8	39.5	18.1	82.0	33.3	0.0	71.0	77.6	0.0	77.2	77.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.9	17.9	0.0	37.4	1.0	0.3	4.3	50.0	0.8	54.3	60.2	0.1
Delay (s)	96.7	57.4	18.1	119.5	34.3	0.3	75.3	127.6	0.8	131.6	137.7	0.1
Level of Service	F	E	B	F	C	A	E	F	A	F	F	A
Approach Delay (s)		60.1			40.1			39.1			107.9	
Approach LOS		E			D			D			F	

Intersection Summary			
HCM Average Control Delay	55.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	100	19	14	540	264	37
Peak Hour Factor	0.66	0.25	0.58	0.92	0.90	0.90
Hourly flow rate (vph)	152	76	24	587	293	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)					1200	
pX, platoon unblocked						
vC, conflicting volume	656	167	334			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	656	167	334			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	61	91	98			
cM capacity (veh/h)	384	838	1200			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	152	76	220	391	196	139
Volume Left	152	0	24	0	0	0
Volume Right	0	76	0	0	0	41
cSH	384	838	1200	1700	1700	1700
Volume to Capacity	0.39	0.09	0.02	0.23	0.12	0.08
Queue Length (ft)	46	7	2	0	0	0
Control Delay (s)	20.4	9.7	1.0	0.0	0.0	0.0
Lane LOS	C	A	A			
Approach Delay (s)	16.8		0.4		0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment I
Level-of-Service Calculation Worksheets for 2012 Background Plus Project Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1703	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1703	1538
Volume (vph)	96	804	95	393	1217	201	15	101	325	179	123	180
Peak-hour factor, PHF	0.62	0.84	0.60	0.87	0.94	0.63	0.38	0.71	0.82	0.79	0.76	0.80
Adj. Flow (vph)	155	957	158	452	1295	319	39	142	396	227	162	225
RTOR Reduction (vph)	0	0	99	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	155	957	59	452	1295	319	39	142	396	189	200	225
Turn Type	Prot		Perm	Prot		Free	Split		Free	Split		Free
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			Free			Free			Free
Actuated Green, G (s)	15.4	48.5	48.5	22.4	55.5	130.4	19.2	19.2	130.4	24.3	24.3	130.4
Effective Green, g (s)	15.4	48.5	48.5	22.4	55.5	130.4	19.2	19.2	130.4	24.3	24.3	130.4
Actuated g/C Ratio	0.12	0.37	0.37	0.17	0.43	1.00	0.15	0.15	1.00	0.19	0.19	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	203	1279	572	573	1463	1538	253	267	1538	304	317	1538
v/s Ratio Prot	0.09	0.28		c0.14	c0.38		0.02	c0.08		0.12	c0.12	
v/s Ratio Perm			0.10			0.21			0.26			0.15
v/c Ratio	0.76	0.75	0.10	0.79	0.89	0.21	0.15	0.53	0.26	0.62	0.63	0.15
Uniform Delay, d1	55.7	35.6	26.7	51.7	34.5	0.0	48.5	51.4	0.0	48.8	48.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.6	2.4	0.1	7.1	6.8	0.3	1.3	7.4	0.4	9.2	9.2	0.2
Delay (s)	71.3	38.1	26.8	58.9	41.3	0.3	49.8	58.8	0.4	58.1	58.1	0.2
Level of Service	E	D	C	E	D	A	D	E	A	E	E	A
Approach Delay (s)		40.7			38.8			18.1			36.9	
Approach LOS		D			D			B			D	

Intersection Summary			
HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	130.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	37	7	47	454	260	153
Peak Hour Factor	0.43	0.50	0.69	0.82	0.87	0.80
Hourly flow rate (vph)	86	14	68	554	299	191
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)					1200	
pX, platoon unblocked						
vC, conflicting volume	808	245	490			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	808	245	490			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	71	98	94			
cM capacity (veh/h)	293	746	1049			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	86	14	253	369	199	291
Volume Left	86	0	68	0	0	0
Volume Right	0	14	0	0	0	191
cSH	293	746	1049	1700	1700	1700
Volume to Capacity	0.29	0.02	0.06	0.22	0.12	0.17
Queue Length (ft)	30	1	5	0	0	0
Control Delay (s)	22.4	9.9	2.8	0.0	0.0	0.0
Lane LOS	C	A	A			
Approach Delay (s)	20.6		1.1		0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1674	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (perm)	1719	3438	1538	3335	3438	1538	1719	1810	1538	1633	1674	1538
Volume (vph)	150	1663	30	222	1026	324	62	184	531	297	93	101
Peak-hour factor, PHF	0.78	0.88	0.64	0.85	0.89	0.92	0.74	0.79	0.85	0.85	0.86	0.89
Adj. Flow (vph)	192	1890	47	261	1153	352	84	233	625	349	108	113
RTOR Reduction (vph)	0	0	16	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	192	1890	31	261	1153	352	84	233	625	223	234	113
Turn Type	Prot		Perm	Prot		Free	Split		Free	Split		Free
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			Free			Free			Free
Actuated Green, G (s)	24.3	100.0	100.0	15.0	90.7	180.0	24.0	24.0	180.0	25.0	25.0	180.0
Effective Green, g (s)	24.3	100.0	100.0	15.0	90.7	180.0	24.0	24.0	180.0	25.0	25.0	180.0
Actuated g/C Ratio	0.14	0.56	0.56	0.08	0.50	1.00	0.13	0.13	1.00	0.14	0.14	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	1910	854	278	1732	1538	229	241	1538	227	233	1538
v/s Ratio Prot	0.11	c0.55		c0.08	0.34		0.05	c0.13		0.14	c0.14	
v/s Ratio Perm			0.03			0.23			0.41			0.07
v/c Ratio	0.83	0.99	0.04	0.94	0.67	0.23	0.37	0.97	0.41	0.98	1.00	0.07
Uniform Delay, d1	75.8	39.5	18.1	82.0	33.3	0.0	71.1	77.6	0.0	77.3	77.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.9	17.9	0.0	37.4	1.0	0.3	4.5	50.0	0.8	55.4	60.1	0.1
Delay (s)	96.7	57.4	18.2	119.5	34.3	0.3	75.6	127.6	0.8	132.7	137.6	0.1
Level of Service	F	E	B	F	C	A	E	F	A	F	F	A
Approach Delay (s)		60.1			40.1			38.8			108.4	
Approach LOS		E			D			D			F	

Intersection Summary			
HCM Average Control Delay	55.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	110	20	17	540	264	45
Peak Hour Factor	0.66	0.25	0.58	0.92	0.90	0.90
Hourly flow rate (vph)	167	80	29	587	293	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)					1200	
pX, platoon unblocked						
vC, conflicting volume	670	172	343			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	670	172	343			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	55	90	98			
cM capacity (veh/h)	374	833	1191			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	167	80	225	391	196	148
Volume Left	167	0	29	0	0	0
Volume Right	0	80	0	0	0	50
cSH	374	833	1191	1700	1700	1700
Volume to Capacity	0.45	0.10	0.02	0.23	0.12	0.09
Queue Length (ft)	56	8	2	0	0	0
Control Delay (s)	22.1	9.8	1.3	0.0	0.0	0.0
Lane LOS	C	A	A			
Approach Delay (s)	18.1		0.5		0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C.

Preliminary Engineering Report, Prepared by Otomo Engineering, Inc.

PRELIMINARY ENGINEERING REPORT

FOR

KA LIMA O MAUI AFFORDABLE HOUSING PROJECT

Wailuku, Maui, Hawaii

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Prepared for:

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TABLE OF CONTENTS

1.0 INTRODUCTION

2.0 EXISTING INFRASTRUCTURE

2.1 ROADWAYS

2.2 DRAINAGE

2.3 SEWER

2.4 WATER

2.5 ELECTRIC AND TELEPHONE

3.0 ANTICIPATED INFRASTRUCTURE IMPROVEMENTS

3.1 ROADWAYS

3.2 DRAINAGE

3.3 SEWER

3.4 WATER

3.5 ELECTRIC AND TELEPHONE

EXHIBITS

1 LOCATION MAP

2 VICINITY MAP

3 SOIL SURVEY MAP

4 FLOOD INSURANCE RATE MAP

APPENDICES

A HYDROLOGIC CALCULATIONS

B WATER DEMAND CALCULATIONS

C WASTEWATER CALCULATIONS

PRELIMINARY ENGINEERING REPORT
FOR
KA LIMA O MAUI AFFORDABLE HOUSING PROJECT
T.M.K.: (2) 3-8-046: 016

1.0 INTRODUCTION

The purpose of this report is to provide information on the existing infrastructure which will be servicing the proposed project. It will also evaluate the adequacy of the existing infrastructure and anticipated improvements which may be required for the proposed project.

The subject parcel is identified as T.M.K.: (2) 3-8-046: 016, which encompasses an area of approximately 2.00 acres. It is also Lot 3-B-2-B of the Recreational Complex Subdivision. The project site is bordered by the Police Station to the north, the MEO office and to the east, the Maui Memorial Hospital complex to the south, and Kaiser Permanente Maui Lani Clinic to the west. The existing Ka Lima O Maui facility consists of two buildings which are being used for their plant nursery operations.

The proposed project includes the construction of 16 one-bedroom apartments contained in two separate buildings. Each apartment building contains 4,400 square feet. The existing 2,500 square feet building will be renovated for use by Ka Lima O Maui's Medicaid Waiver Program. A new two-story building totaling 7,200 square feet will provide 3,600 square feet of office space and 3,600 square feet of storage and garage space. Related improvements include grading, retaining walls, utility connections, paved parking and landscaping.

2.0 EXISTING INFRASTRUCTURE

2.1 ROADWAYS

Kaahumanu Avenue is the major roadway linking Kahului and Wailuku. It is owned by the State of Hawaii. It is a four-lane, north-south roadway with a terminus in Wailuku town. At that point Kaahumanu Avenue turns into Main Street which is a two-lane roadway. At its terminus in Kahului, near the Maui Mall, Kaahumanu Avenue turns into Hana Highway.

Mahalani Street is a four-lane, two-way roadway with a north-south orientation in the vicinity of the project site. Mahalani Street turns into a two-lane roadway to the south of the project site. It is a County-owned roadway which connects Kaahumanu Avenue and Maui Lani Parkway. There is an existing driveway from

Mahalani Street which currently provides access to the Ka Lima O Maui facility through the J Walter Cameron Center.

2.2 DRAINAGE

The existing Ka Lima O Maui facilities are situated on the project site. The elevation of the project site ranges from approximately 129 feet above mean sea level at the southwest corner of the parcel to 89 feet above mean sea level at the northeast corner. The existing ground slopes down from the western property line, then flattens at the developed area, and slopes down toward the eastern property line. The average slope at the middle of the parcel is approximately 15.4%.

According to the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (August, 1972)," prepared by the United States Department of Agriculture Soil Conservation Service, the soils within the project site are classified as Puuone sand (PZUE). Puuone sand is characterized as having rapid permeability near the surface, slow runoff, and a moderate to severe wind erosion hazard.

It is estimated that the existing 50-year, 1-hour storm runoff from the project site is 4.74 cfs, with a generated storage volume of 2,561 cubic feet. There are no drainage facilities on the site. Presently, onsite runoff sheet flows across the project site in the west to east direction into the adjacent properties. There is an existing catch basin along the offsite access roadway located approximately 190 feet to the west of the project site. This catch basin does intercept some of the onsite runoff which sheet flows down the access road.

According to Panel Numbers 1500030391E and 1500030392E of the Flood Insurance Rate Map, dated September 25, 2009, prepared by the United States Federal Emergency Management Agency, the project site is situated in Flood Zone X. Flood Zone X represents areas to be outside of the 0.2% annual chance flood.

2.3 SEWER

Wastewater generated from the existing Ka Lima O Maui facility is conveyed to an existing 8-inch sewerline which traverses outside and parallel to the eastern boundary of the subject parcel. Wastewater collected from the project will be transported to the Kahului Wastewater Reclamation Facility in Naska.

The Kahului Wastewater Reclamation Facility has a capacity of 7.9 million gallons per day (mgd). As of March 2010, the average daily flow into the Kahului Wastewater Reclamation Facility is approximately 4.9 mgd. However, according to

the Wastewater Reclamation Division, County of Maui, the total allocation, including projects already permitted, is 6.95 mgd.

2.4 WATER

Domestic water and fire protection for the project area are serviced from the 3.0 million gallon Mokuhau tank and wells in Happy Valley, which is at elevation of 358 feet. There is an existing 12-inch waterline on Mahalani Street which provides domestic water and fire protection to the project site. Presently, there is a 1-1/2-inch water meter serving the existing Ka Lima O Maui facility. There is also an 8-inch fireline with one fire hydrant currently providing fire protection to the property. The existing water meter and detector meter is located along Mahalani Street.

As part of the building permit process, domestic water and fire flow calculations will be provided to determine the adequacy of the existing water system, in accordance with the rules of the Department of Water Supply.

2.5 ELECTRIC AND TELEPHONE

The existing electrical, telephone and cable TV distribution systems on Mahalani Street are located overhead. There are underground facilities from Mahalani Street traversing the offsite access roadway into the project site. An existing control panel is located along the northern property line which provides service to the existing Ka Lima O Maui facilities.

3.0 ANTICIPATED INFRASTRUCTURE IMPROVEMENTS

3.1 ROADWAYS

Access to the project site will continue to be along the paved offsite access roadway from Mahalani Street, which traverses through the J. Walter Cameron Center. The existing driveway will continued to be used for ingress and egress to the project.

The Traffic Impact Analysis Report, prepared by Phillip Rowell & Associates, dated March 29, 2010, concluded the following:

1. The proposed project is located at 95 Mahalani Street in Wailuku and will consist of 16 apartments, 3,600 square feet of office space and 3,600 square feet of storage and garage space and the renovation of an existing 2,500 square foot office building. Access and egress will be via the existing

driveway serving the J. Walter Cameron Center, which is along the west side of Mahalani Street.

2. It was estimated that the project will generate 14 trips during the morning peak hour and 16 trips during the afternoon peak hour. This implies that the scope of the traffic assessment could be limited to an "access location and design review " analysis as described by the Institute of Transportation Engineers. Therefore, the intersections of Kaahumanu Avenue at Mahalani Street and Kanaloa Avenue and Mahalani Street at Project Drive were analyzed.

3. The level-of-service analysis concluded that the intersection Kaahumanu Avenue at Mahalani Street will operate at Level-of-Service D during both peak hours, without and with the project generated traffic. The volume-to-capacity ratio of the intersection increased 0.01 second during the morning peak hour and 0.3 second during the afternoon peak hour. This implies that the project generated traffic will have a negligible impact on the level-of-service of the intersection. All volume-to-capacity ratios are 1.00 or less, even though several lane groups will operate at Level-of-Service E or F. Project generated traffic did not change the level-of-service of any lane group. As the overall intersection will operate at Level-of-Service D and all volume-to-capacity ratios are 1.00 or less, no mitigation is recommended.

4. The level-of-service analysis concluded that left turns from the Project Drive onto Mahalani Street will operate at a Level-of-Service C. Right turns from the Project Drive and left turns from Mahalani Drive into the Project Drive will operate at a Level-of-Service A, without and with project generated traffic. The northbound left turn and through movement lane group will operate a Level-of-Service A without and with project generated traffic. The average vehicle delay increases 0.1 second during the morning peak hour and 0.2 second during the afternoon peak hour. This implies that project generated traffic will have a minimal impact on traffic operations along Mahalani Street. Since all movements will operate at Level-of-Service C, or better, and there is no change in the level-of-service as a result of project generated traffic, no mitigation is recommended.

3.2 DRAINAGE

After the development of the proposed project, it is estimated that the 50-year, 1-hour storm runoff will be 7.80 cfs, a net increase of 3.06 cfs over the existing condition. The corresponding storage volume is 3,277 cubic feet, with an increase in storage volume of 716 cubic feet.

Grated inlet catch basins will collect a portion of the surface runoff from the project site within the paved parking lot and landscape areas and conveyed to onsite subsurface drainage systems. The subsurface drainage system will consist of a perforated drainline embedded in crushed rock which will be wrapped with a layer of filter fabric. Surface runoff entering the perforated pipe will be allowed to exfiltrate into the ground. Overflows from the subsurface drainage system will be released on the lower end of the project site and continue to flow down the access roadway as it is presently doing. The remainder of the onsite surface runoff from the project site will continue to sheet flow along its existing drainage pattern.

The drainage design criteria will be to minimize any alterations to the natural pattern of the existing onsite surface runoff and to mitigate the increase in runoff generated by the project for a 50-year, 1-hour storm. This is in accordance with Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui.

3.3 SEWER

The sewer system for the project will be connected to the existing 8-inch sewerline located to the east of the site. The anticipated average daily flow from the project is 4,900 gallons per day. The wastewater generated from the project will continue to be transported to the Kahului Wastewater Treatment Facility. According to the Wastewater Reclamation Division, the treatment plant has sufficient capacity to accommodate the additional wastewater generated from the project at this time.

3.4 WATER

It is anticipated that proposed development will require 11,358 gallons of water daily to meet the domestic demands. The existing 1-1/2-inch water meter

will be used for the project. Calculations will be prepared and submitted during the building permit process to validate the adequacy of the existing meter.

Additional fire hydrants will be installed as required to meet the requirements of the Fire Department. This determination will be made during the building permit phase.

3.5 ELECTRIC AND TELEPHONE

The proposed electrical, telephone and cable TV distribution systems to the subject project will be installed from the existing underground facilities currently servicing the project site. Upgrades to the facilities will be made as necessary during the building permit process. Within the project site, the electric and telephone systems will be installed in accordance with the utility companies rules and regulations.

APPENDIX A
HYDROLOGIC CALCULATIONS

Hydrologic Calculations

Purpose: Determine the increase in onsite surface runoff from the undeveloped portion of the project site based on a 50-year, 1-hour storm.

A. Determine the Runoff Coefficient (C):

ROOF AREAS:

Infiltration (Negligible)	= 0.20
Relief (Hilly)	= 0.06
Vegetal Cover (None)	= 0.07
Development Type (Roof)	= 0.55
	C= 0.88

PAVEMENT AREAS:

Infiltration (Negligible)	= 0.20
Relief Rolling)	= 0.03
Vegetal Cover (None)	= 0.07
Development Type (Pavement)	= 0.55
	C= 0.85

LANDSCAPE AREAS:

Infiltration (Medium)	= 0.07
Relief (Steep)	= 0.08
Vegetal Cover (Good)	= 0.03
Development Type (Landscape)	= 0.15
	C= 0.33

EXISTING CONDITIONS:

Paved Area = 0.30 Acres

Roof Area = 0.08 Acres

Landscaped Area = 1.62 acres

WEIGHTED C = 0.43

DEVELOPED CONDITIONS:

Paved Area = 0.85 Acres

Roof Area = 0.39 Acres

Landscaped Area = 0.76 acres

WEIGHTED C = 0.66

B. Determine the 50-year 1-hour rainfall:

i_{50} = 2.5 inches

Adjust for time of concentration to compute Rainfall Intensity (I):

Existing Condition:

T_c = 9 minutes

I = 5.52 inches/hour

Developed Condition:

T_c = 7 minutes

I = 5.91 inches/hour

C. Drainage Area (A) = 2.00 Acres

D. Compute the 50-year storm runoff volume (Q):

Q = CIA

Existing Conditions:

Q = (0.43)(5.52)(2.00)

= 4.74 cfs

Developed Conditions:

Q = (0.66)(5.91)(2.00)

= 7.80 cfs

The increase in runoff due to the development of the proposed development is 7.80 cfs - 4.74 cfs = 3.06 cfs. The existing runoff volume generated from a 50-year, 1-hour storm is 2,561 cubic feet and the developed runoff volume is 3,277 cubic feet, an increase of 716 cubic feet.

Hydrograph Plot

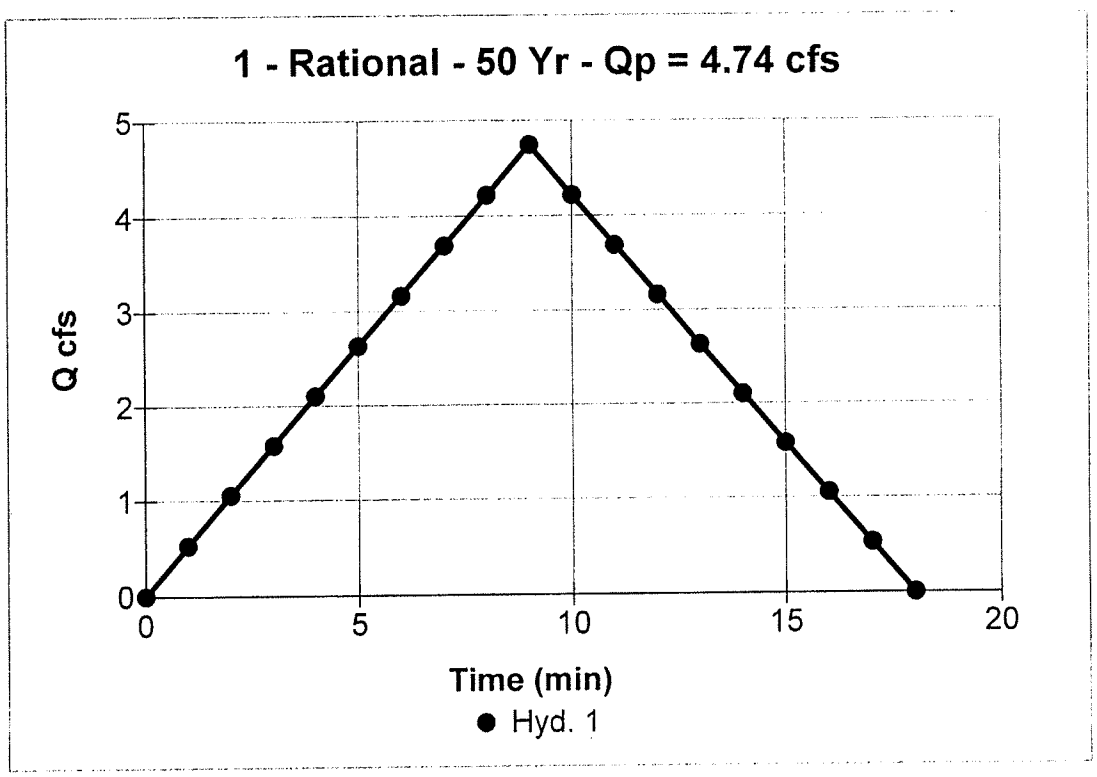
English

Hyd. No. 1

EXISTING CONDITION

Hydrograph type	= Rational	Peak discharge	= 4.74 cfs
Storm frequency	= 50 yrs	Time interval	= 1 min
Drainage area	= 2.0 ac	Runoff coeff.	= 0.43
Intensity	= 5.52 in	Time of conc. (Tc)	= 9 min
I-D-F Curve	= 2-5.IDF	Reced. limb factor	= 1

Total Volume = 2,561 cuft



Hydrograph Plot

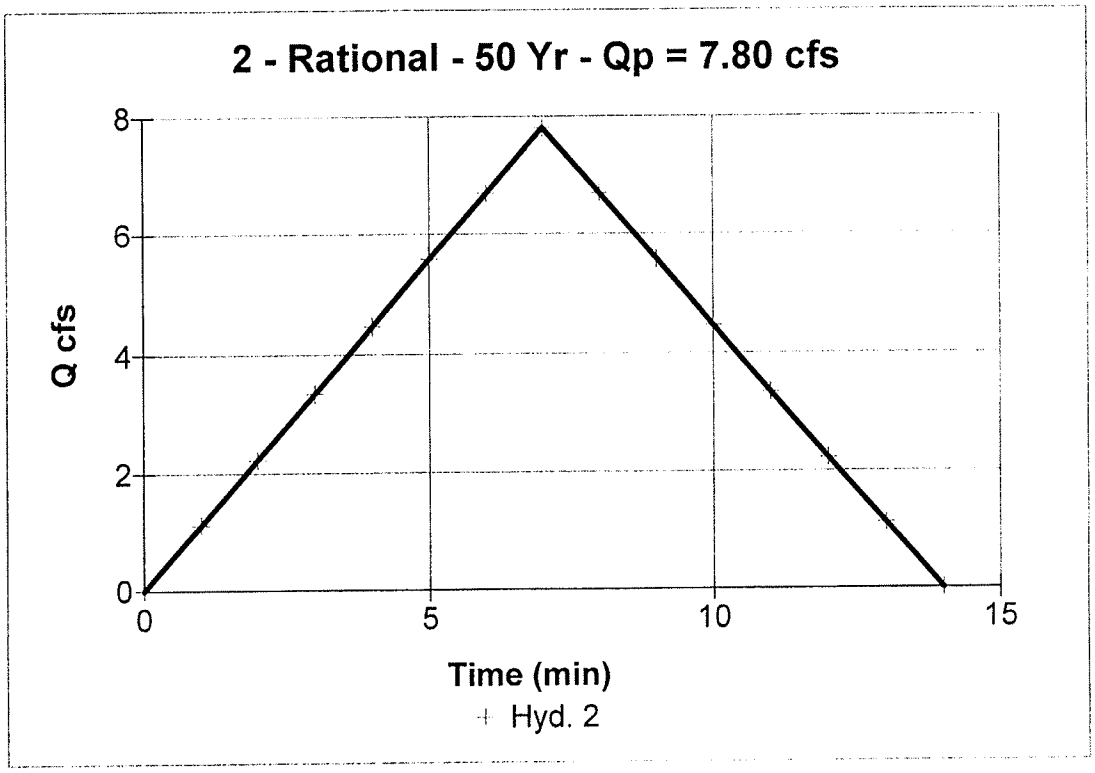
English

Hyd. No. 2

DEVELOPED CONDITION

Hydrograph type	= Rational	Peak discharge	= 7.80 cfs
Storm frequency	= 50 yrs	Time interval	= 1 min
Drainage area	= 2.0 ac	Runoff coeff.	= 0.66
Intensity	= 5.91 in	Time of conc. (Tc)	= 7 min
I-D-F Curve	= 2-5.IDF	Reced. limb factor	= 1

Total Volume = 3,277 cuft



APPENDIX B
WATER DEMAND CALCULATIONS

WATER DEMAND CALCULATIONS

Per 2002 Water System Standards:

Average Daily Demand (ADD) = 140 gallons per 1,000 square feet for Commercial/Industrial Mix

= 560 gallons per unit of 5,000 gallons per acre for Multi-Family low rise

ADD = (140)(9,700/1,000) = 1,358 gpd (Commercial/Industrial)

= (560)(16) = 8,960 gpd (Multi-Family low rise)

= (5,000) (2.00) = 10,000 gpd (Multi-Family low rise)

Average Daily Demand = 1,358 gpd + 10,000 gpd = 11,358 gpd

APPENDIX C
WASTEWATER CALCULATIONS

WASTEWATER CALCULATIONS

Per the 2000 Wastewater Flow Standards:

Wastewater Contribution for Office use is 20 gallons/employee/day
Wastewater Contribution for Industrial Shop is 25 gallons/employee/day
Wastewater Contribution for Apartment is 255 gallons per day/unit

Office Employees is 1 per 200 square feet of floor area
Total Office Area = 6,100 square feet, Total Employees = 31 Employees
Office Wastewater Contribution = (31)(20) = 620 gpd

Industrial Employees is 1 per 500 square feet of floor area
Industrial Area = 3,600 square feet, Total Employees = 8 Employees
Industrial Wastewater Contribution = (8)(25) = 200 gpd

There will be 16 apartment units.
Apartment Wastewater Contribution = (16)(255) = 4,080 gpd

Wastewater Contribution = 620 + 200 + 4,080 = 4,900 gpd

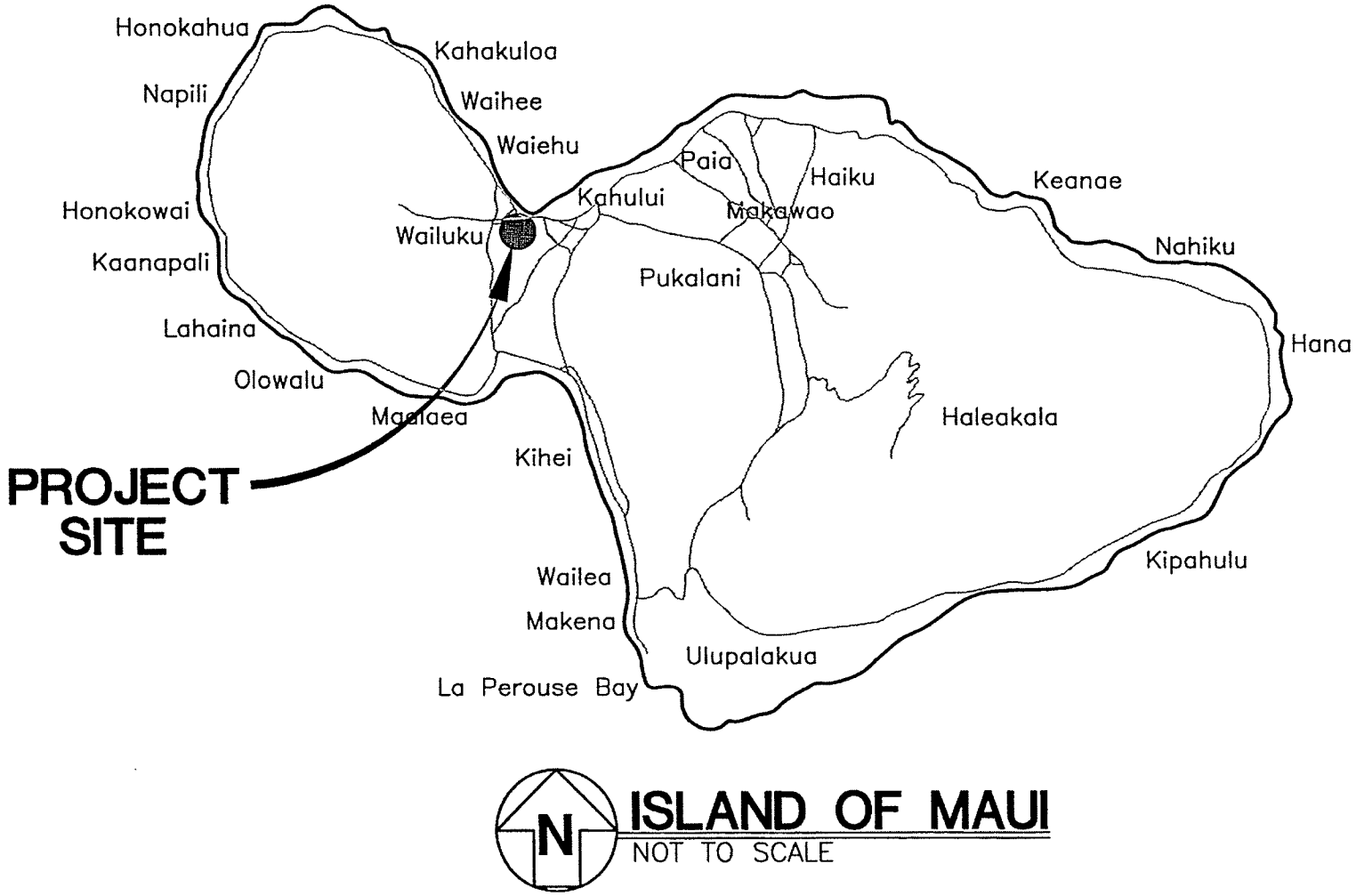
EXHIBITS

1 Location Map

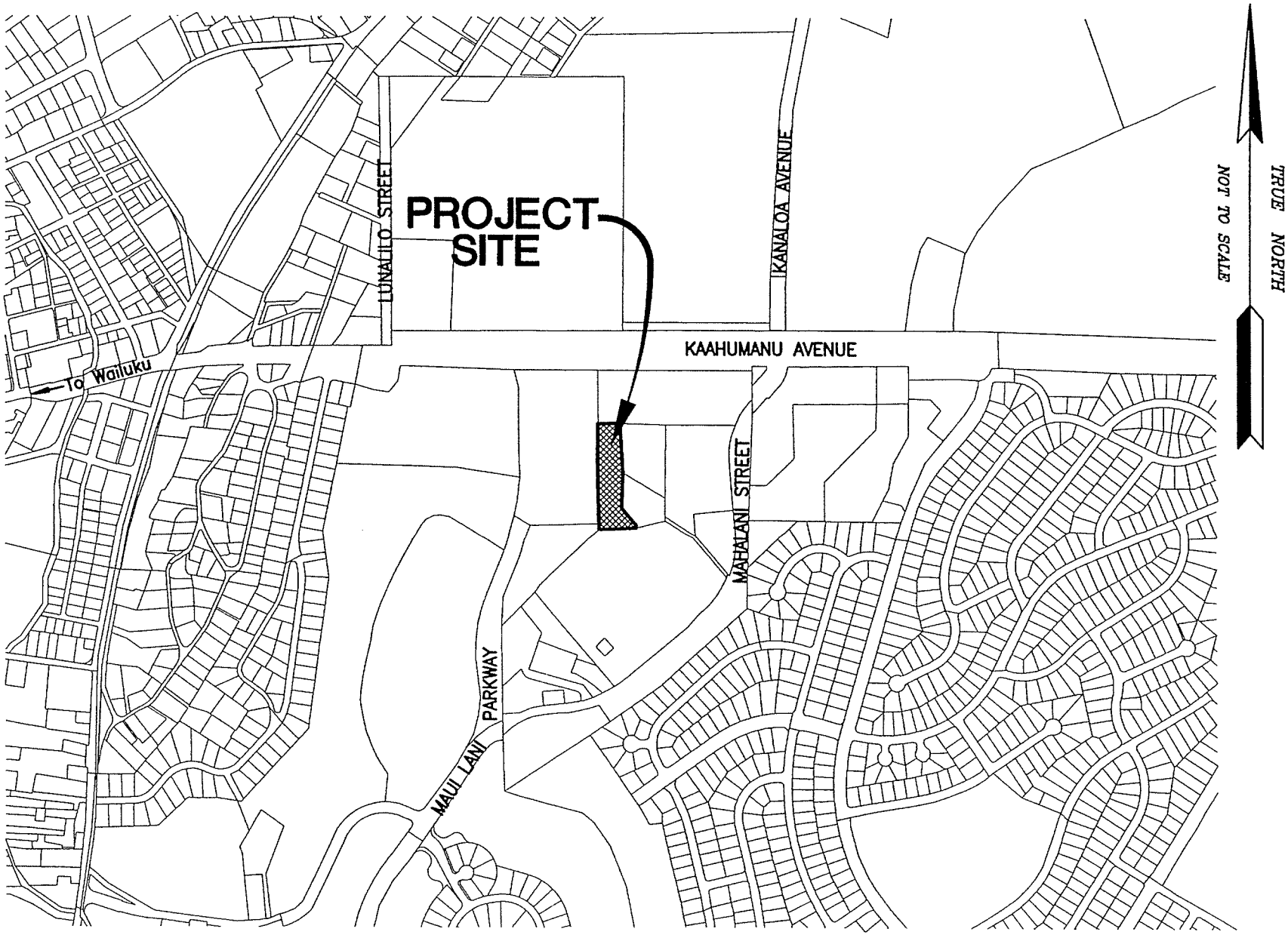
2 Vicinity Map

3 Soil Survey Map

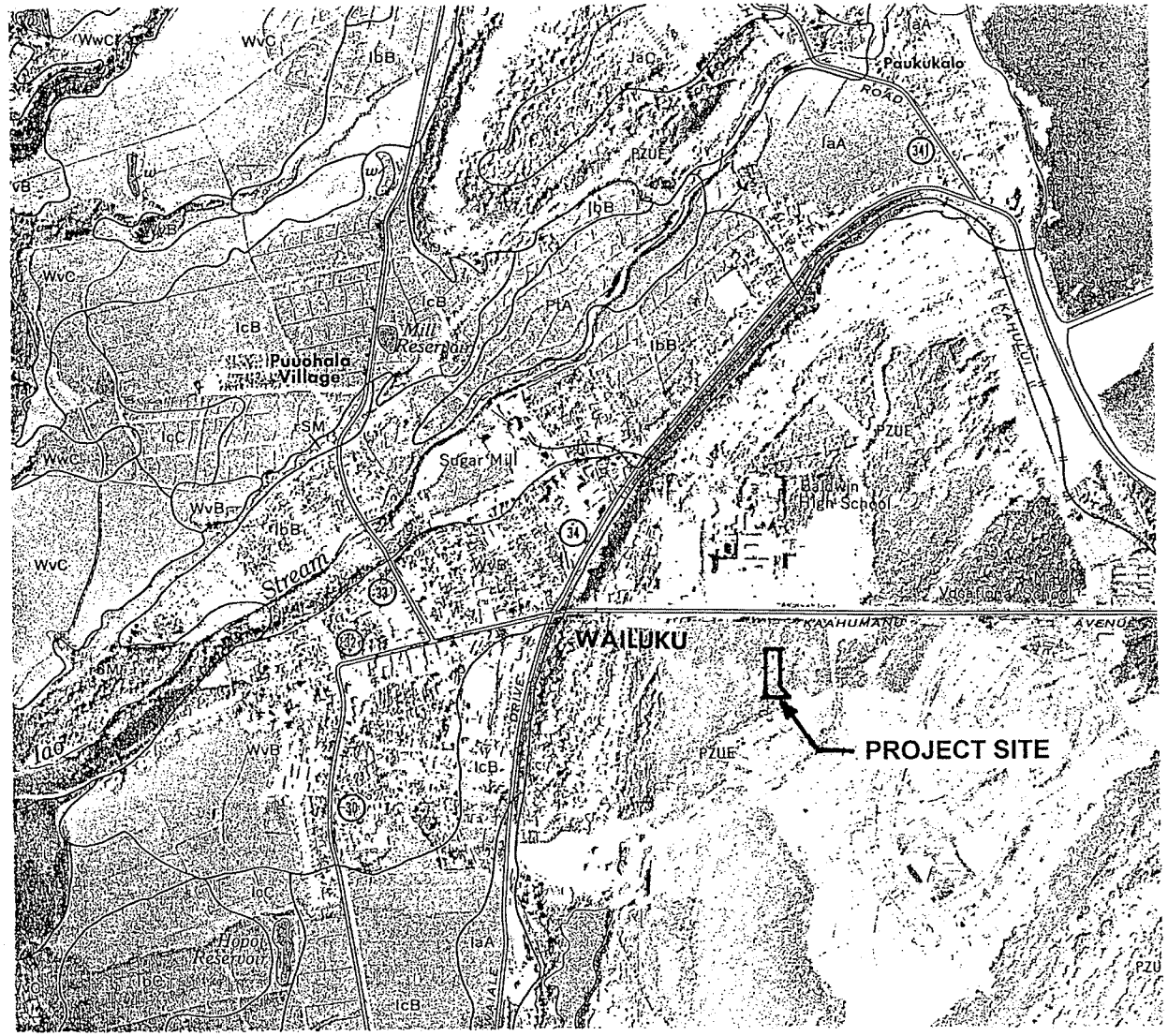
4 Flood Insurance Rate Map



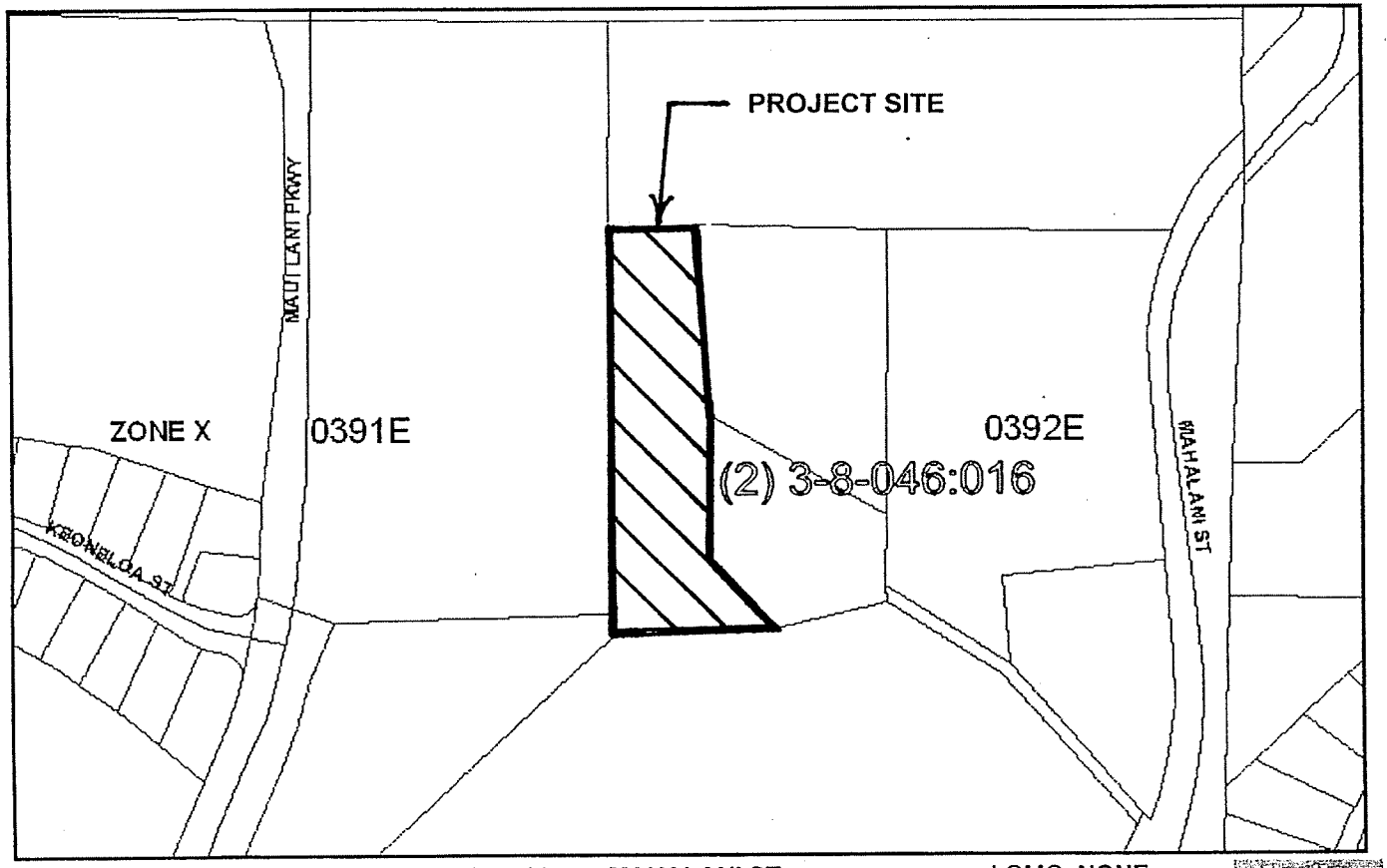
LOCATION MAP
EXHIBIT 1



VICINITY MAP
EXHIBIT 2



SOIL SURVEY MAP
EXHIBIT 3



County: **MAUI** TMK: **(2) 3-8-046:016** Address: **MAHALANI ST** LOMC: **NONE**

FLOOD INSURANCE
RATE MAP
EXHIBIT 4