JOHN WAIHEE
GOVERNOR

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

POSTED

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

NOV 19 1992

Mr. Brian Choy
Director
Office of Environmental
Quality Control
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

Dear Mr. Choy:

Subject: Maui Community College
New Buildings S and J
D.A.G.S. Job No. 15-31-4953
TMK: 3-8-7:40, 125, Kahului, Maui, Hawaii

In accordance with the requirements of Chapter 343, Hawaii Revised Statutes, and Chapter 200 of Title 11, Administrative Rules, a Draft Environmental Assessment has been prepared for the subject project.

As the proposing agency, we believe that there will be no significant impacts as a result of the project and anticipate the filing of a negative declaration. One copy of the OEQC Bulletin Publication Form and four copies of the Draft Environmental Assessment will be submitted to your office under separate cover. We respectfully request that notice of the Draft Environmental Assessment be published in the December 8, 1992 OEQC Bulletin.

If there are any questions, please contact Mr. Eric Nishimoto at 586-0468.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

EN/lc

196

1993-01-13-MA-FEA-Maui Community College
Bldg "J" and "S"

JAN 23 1993

FILE COPY

Maui Community College Buildings "J" and "S"

Final Environmental Assessment and Negative Declaration

Prepared for:

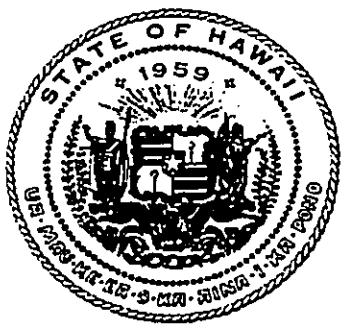
January 1993

Michael T. Munekiyo Consulting, Inc.

Maui Community College
Buildings "J" and "S"

Final Environmental Assessment and Negative Declaration

Prepared for:



January 1993

Michael T. Munekiyo Consulting, Inc.

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Preface

The State of Hawaii, Department of Accounting and General Services, proposes to construct two new buildings, designated as Buildings "J" and "S", parking lot expansion and a new retention basin drainage system, for Maui Community College (TMK 3-8-07:40, 125) located in Kahului, Maui, Hawaii. Pursuant to Chapter 343, Hawaii Revised Statutes, and Chapter 200, of Title 11, Administrative Rules, Environmental Impact Statement Rules, this Final Environmental Assessment documents the project's technical characteristics and environmental impacts, and advances findings and conclusions relative to the significance of the project.

Final Environmental Assessment and Negative Declaration
Summary

Applicant and Landowner

The Applicant for the proposed project is the State of Hawaii, Department of Accounting and General Services. The landowner of the affected property is the University of Hawaii.

Contact Person

For further information, contact Eric Nishimoto, State of Hawaii, Department of Accounting and General Services, Kalanimoku Building, 1151 Punchbowl Street, Honolulu, Hawaii 96813, or at telephone (808) 586-0468.

Property Location and Description

The proposed project involves lands near the periphery of the Maui Community College (MCC) Campus, in Kahului, Maui, Hawaii (TMK 3-8-7:40 and 125).

Lands to the north and northeast of the campus are occupied by the Maui Community Arts and Cultural Center, Kahului Beach Road, Kahului Harbor, and Pacific Ocean. Lands to the east of the campus, are occupied by the Harbor Lights Condominium complex. Kaahumanu Avenue forms the southern border of the MCC campus. Kaahumanu Shopping Center and the Kahului residential area lie beyond Kaahumanu Avenue. To the west of the MCC campus, lies the War Memorial Center and Baldwin High School.

Proposed Action

The proposed project involves the construction of two new structures on the MCC campus, Buildings "J" and "S", as well as the expansion of existing main parking lot and a new retention basin.

Building "J" is proposed to be located on the west side of the MCC campus, adjacent to the existing library. Building "J" would be 2 stories and 60 feet in height, containing approximately 35,000 square feet of building area. The building would contain a lecture

hall, 7 classrooms, a multi-purpose room, faculty office spaces, workrooms and storage spaces.

Building "S" is proposed to be located in the northeast section of campus on a portion of an existing main parking lot. It is proposed to be 2 stories and 66 feet in height, containing approximately 33,000 square feet of building area. Building "S" would provide space for 6 classrooms, 3 computer labs, a desktop publishing room, reading room, office spaces, and administrative and storage spaces.

The existing 397 stall main parking lot, which is located north of the existing Student Center Building, will be expanded to the northeast. Approximately 171 parking stalls would be displaced by the construction of Building "S" and the parking lot expansion. With restriping and expansion of the parking lot, a total of approximately 640 parking stalls are proposed to meet parking needs generated by increased floor area and to comply with County of Maui parking requirements.

An off-site retention basin is being proposed on an adjacent property (TMK 3-8-07:125). This will consist of a four feet deep pond with two feet of freeboard, approximately 140 feet wide and 900 feet long.

Determination

Construction of the proposed project will involve short-term environmental impacts typically associated with construction activities. These include air quality and noise impacts. Dust control measures such as watering or sprinkling will be undertaken to minimize dust. Construction activities are also anticipated to be limited to daylight hours. Impacts generated from construction activities are not considered adverse.

From a long-term perspective, the proposed project is not anticipated to result in adverse environmental impacts. The sites for Buildings "J" and "S" have already been extensively modified. No significant archaeological or historic sites were found. There are no known rare/threatened species of flora and fauna at the project site.

Impacts to the local economy are anticipated to be positive involving support for construction-related employment in the short-term. After completion of construction, the project will provide liberal arts, vocational and technical training to benefit the local employment market.

With regard to traffic, there are a number of proposed new roadways in the region which provide alternative travel routes in the Wailuku-Kahului area. This relieves much of the traffic congestion on Kaahumanu Avenue in the project vicinity. In addition, there are a number of intersection improvements and site access recommendations designed to mitigate increases in traffic due to the project. With the implementation of these recommendations, the proposed project should not have any significant impact on traffic in the vicinity of the project.

With regard to drainage improvements, the proposed project involves the construction of a retention basin which collects runoff and controls discharge into Kahului Harbor. The ultimate discharge rate would not exceed existing discharge levels.

The project is also not anticipated to have adverse impacts upon medical, police and fire protection services as well as other infrastructure systems.

In light of the foregoing findings, it is concluded that the proposed action will not result in any significant impacts. Thus, this Final Environmental Assessment is being filed as a negative declaration.

Chapter 1

Project Overview

I. PROJECT OVERVIEW

A. PROPERTY LOCATION, BACKGROUND AND LAND OWNERSHIP

The applicant, the State of Hawaii, Department of Accounting and General Services (DAGS), proposes to construct two new buildings, designated as Buildings "J" and "S", on the Maui Community College (MCC) campus (TMK 3-8-07:40) located in Kahului, Maui, Hawaii. Along with these two new buildings, DAGS proposes to construct an extension of the existing parking lot on the northeastern portion of the campus and a retention basin drainage system on an abutting property (TMK 3-8-07:125). See Figure 1.

The history of MCC dates back to 1931, when it was called Maui Vocational School, and offered courses in carpentry, auto mechanics and machine shop. In 1950-51, the physical plant expanded and new programs were added. In 1958, the school changed its name to Maui Technical School.

In 1964, the State Legislature established the statewide community college system as part of the University of Hawaii. In 1966, the school's name was changed to Maui Community College. Course offerings were broadened to include vocational, technical as well as liberal arts classes. Currently, MCC services approximately 2,800 full and part-time students housed in 32 buildings.

In the long-term, MCC's master plan anticipates future expansion of facilities and programs. This expansion could provide for additional classroom space to accommodate as many as 5,000 full-time equivalent students by the year 2000.

The MCC site (TMK 3-8-07:40), as well as lands on which the retention basin are proposed to be located (TMK 3-8-07:125), are owned by the University of Hawaii.

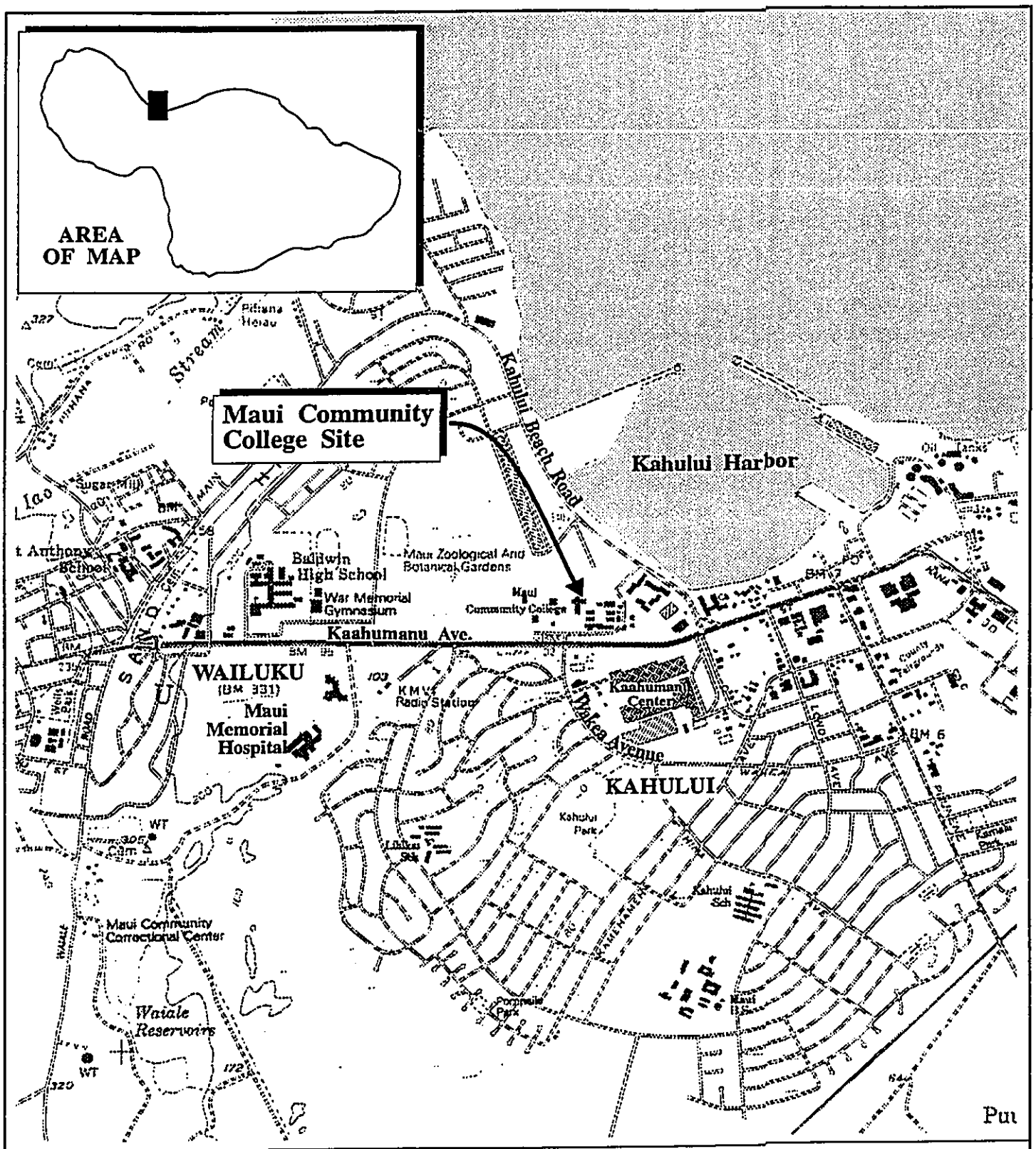

Figure 1 Maui Community College Buildings "J" and "S"

Regional Location Map

1000 0 4000 Feet

2000

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B. PROPOSED ACTION

1. Project Need

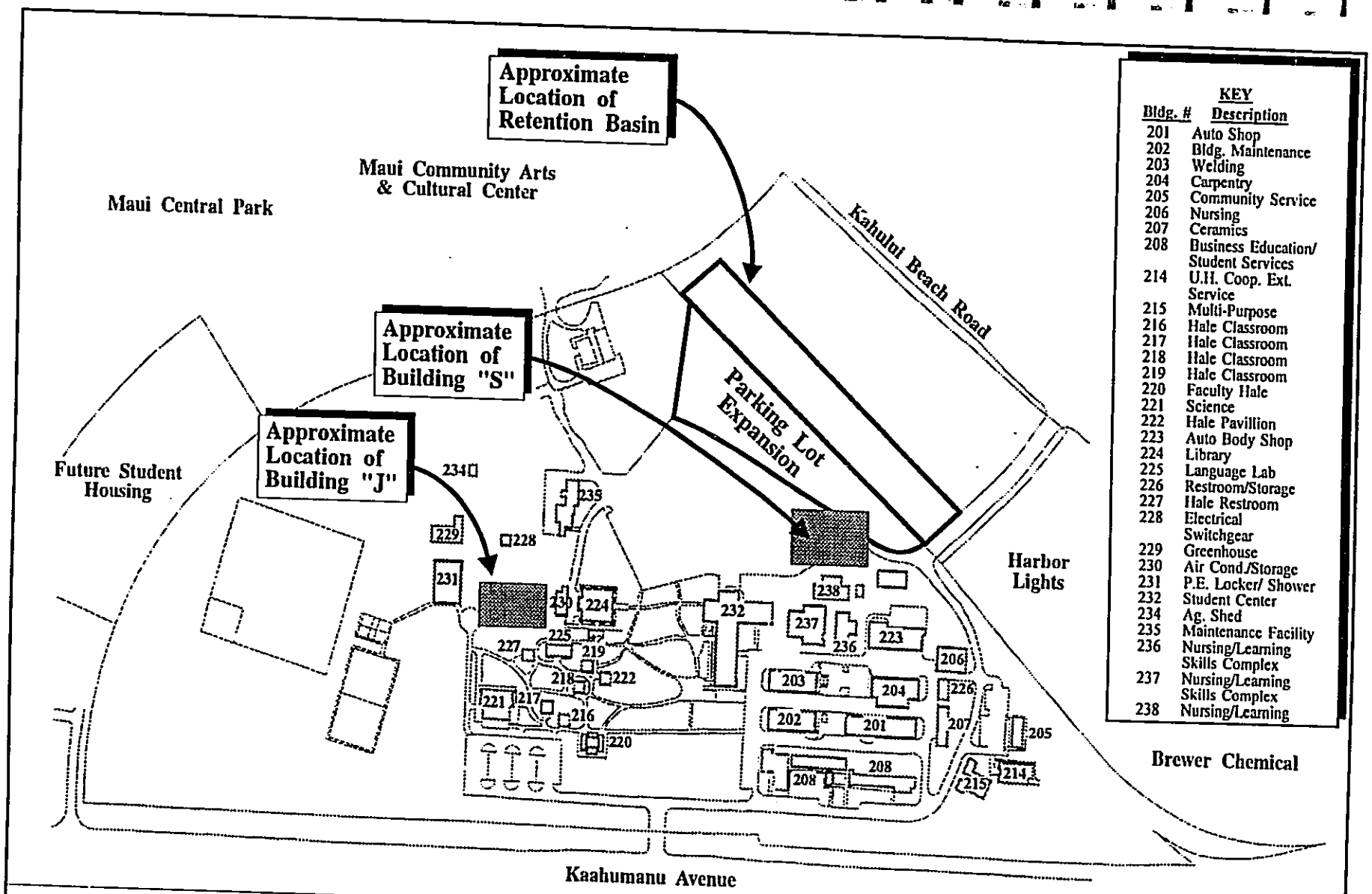
At its present enrollment, the MCC campus exceeds capacity. During the past three years, student population has increased by approximately 35 percent. Many faculty members do not have offices of their own or must use storerooms and closets for office space. Moreover, classes which might otherwise be offered are commonly not made available for students because of lack of classroom and lecture hall space. The proposed Buildings "J" and "S" are necessary in order to help meet the increase in student population as well as faculty needs.

2. Proposed Improvements

Building "J", is proposed to be located on the west side of the MCC campus adjacent to the existing library. Building "J" would be 2 stories and 60 feet in height, containing approximately 35,000 square feet of building area. Building "J" contains a lecture hall, 7 classrooms, a multi-purpose room, faculty office spaces, workrooms and storage spaces. See Figure 2.

Building "S" is proposed to be located in the northeast section of campus. It is proposed to be 2 stories and 66 feet in height, containing approximately 33,000 square feet of building area. Building "S" would provide space for 6 classrooms, 3 computer labs, a desktop publishing room, reading room, office spaces, and administrative and storage spaces.

The existing 397 stall main parking lot, which is located north of the existing Student Center Building, will be expanded to the northeast. Approximately 171 parking stalls will be displaced by the construction



KEY

Bldg. #	Description
201	Auto Shop
202	Bldg. Maintenance
203	Welding
204	Carpentry
205	Community Service
206	Nursing
207	Ceramics
208	Business Education/ Student Services
214	U.H. Coop. Ext. Service
215	Multi-Purpose
216	Hale Classroom
217	Hale Classroom
218	Hale Classroom
219	Hale Classroom
220	Faculty Hale
221	Science
222	Hale Pavillion
223	Auto Body Shop
224	Library
225	Language Lab
226	Restroom/Storage
227	Hale Restroom
228	Electrical Switchgear
229	Greenhouse
230	Air Cond./Storage
231	P.E. Locker/ Shower
232	Student Center
234	Ag. Shed
235	Maintenance Facility
236	Nursing/Learning Skills Complex
237	Nursing/Learning Skills Complex
238	Nursing/Learning

Figure 2 Maui Community College - Buildings "J" and "S"
Site Location Map

NOT TO SCALE

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of Building "S" and the parking lot expansion. With restriping and expansion of the parking lot, a total of approximately 640 parking stalls are proposed to meet parking needs generated by increased floor area and to comply with County of Maui parking requirements.

An off-site retention basin is being proposed on an adjacent property (TMK 3-8-07:125). This will consist of a four feet deep pond with two feet of freeboard, approximately 140 feet wide and 900 feet long.

The total cost of all improvements for the project is estimated to be $21.6 million. Assuming all applicable permits are obtained, construction is projected to start in July 1993 and be completed by January 1995.

Chapter II

Description of the Existing Environment

II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

MCC is located in the heart of Kahului, the Island of Maui's center of commerce. Kahului 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 suppliers. The region is considered Central Maui's commercial retailing center with the Kaahumanu Center, the Maui Mall and the Kahului Shopping Center, located within a mile of MCC.

MCC, the only Community College on Maui, is also centrally located in Kahului.

Surrounding this commercial core is an expansive residential area comprised principally of single-family residential units. Residential uses encompass the area extending from Maui Memorial Hospital to Puunene Avenue.

Building "J" is proposed to be located in the western portion of the MCC campus between the existing library and physical education locker/shower rooms.

Building "S", the parking lot extension and retention basin would be located in the northeast portion of campus. A portion of the parking lot extension and the retention basin extend into vacant lands

vegetated by koa haole, kiawe, and various exotic shrubs. These improvements would be adjacent to an existing access road which connects MCC's existing parking lot with Kahului Beach Road. Kahului Harbor and the Pacific Ocean borders the Kahului Beach Road. Lands to the southeast of the access road are occupied by the Harbor Lights Condominium. To the northwest of the site is the Maui Community Arts and Cultural Center Project which is currently under construction.

2. ***Climate***

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.

Average temperatures at the project site (based on temperatures recorded at Kahului Airport) range from lows in the 60°s to highs in the 80°s. August is historically the warmest month, while January and February are the coolest. Rainfall at the project site averages approximately 20 inches per year. Winds in the Kahului region are predominantly out of the north-northeast and northeast.

3. ***Topography and Soil Characteristics***

The project site is located on Maui's flat central isthmus ranging in elevations from 8 to 40 feet. The high point, along the west side of campus, near Kaahumanu Avenue, gently slopes down to the northeast side of campus. There are no significant topographical constraints within the project site.

Underlying the proposed site and surrounding lands are soils belonging to the Pulehu-Ewa-Jaucas association. See Figure 3. This soil association is characteristically deep and well-drained and located on alluvial fans and in basins. The soil type specific to the project site is of the Puuone Series' Puuone Sand classification (PZUE). See Figure 4. PZUE soils predominate in the Kahului region and is typified by a sandy surface layer underlain by cemented sand. Naturally occurring vegetation on this series include bermuda grass, kiawe, and lantana.

4. *Flood and Tsunami Hazard*

The sites for Buildings "J" and "S" are designated Zone "C" by the Flood Insurance Rate Map. See Figure 5. Zone "C" is an area of minimal flooding. Most of the area for the extension of the parking lot is also designated as Zone C. However, portions of the parking lot extension and the retention basin, are designated as Zone "A-4" (areas inundated by the 100-year flood with a base flood elevation of 17 feet above mean sea level). The makai portion of the retention basin is designated as Zone "V23" (areas inundated by the 100-year coastal flood with velocity hazards and a base flood elevation of 17-18 feet above mean sea level).[1]

5. *Flora and Fauna*

Surrounding the project site to the south and east is the urbanized center of Kahului. Areas of the MCC campus that encompass the projects are characteristic of the urban nature of Kahului. Lands on campus are landscaped with palm trees and other shade trees, ground cover, and other exotic vegetation. Lands north and west of

[1] Base flood elevations for Zones "A-4" and "V23" were confirmed by Steven Yamamoto of the Corps of Engineers (telephone conversation, November 23, 1992).

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

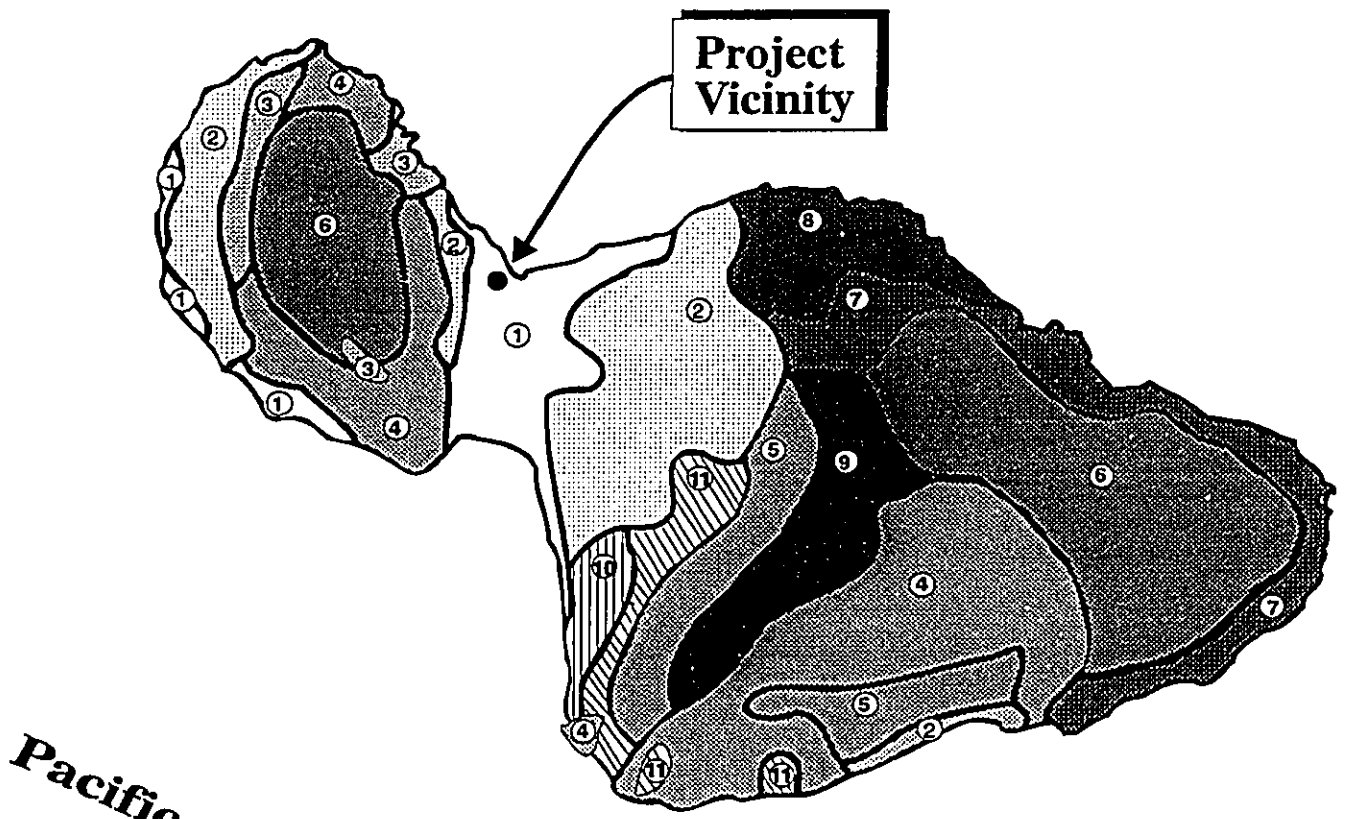
⑦ Hana-Makaalae-Kailua association

⑧ Pauwela-Haiku association

⑨ Laumaia-Kaipoipoi-Olinda association

⑩ Keawakapu-Makena association

⑪ Kamaole-Oanapuka association



Map Source: USDA Soil Conservation Service

Figure 3

Maui Community College
Buildings "J" and "S"
Soil Association Map

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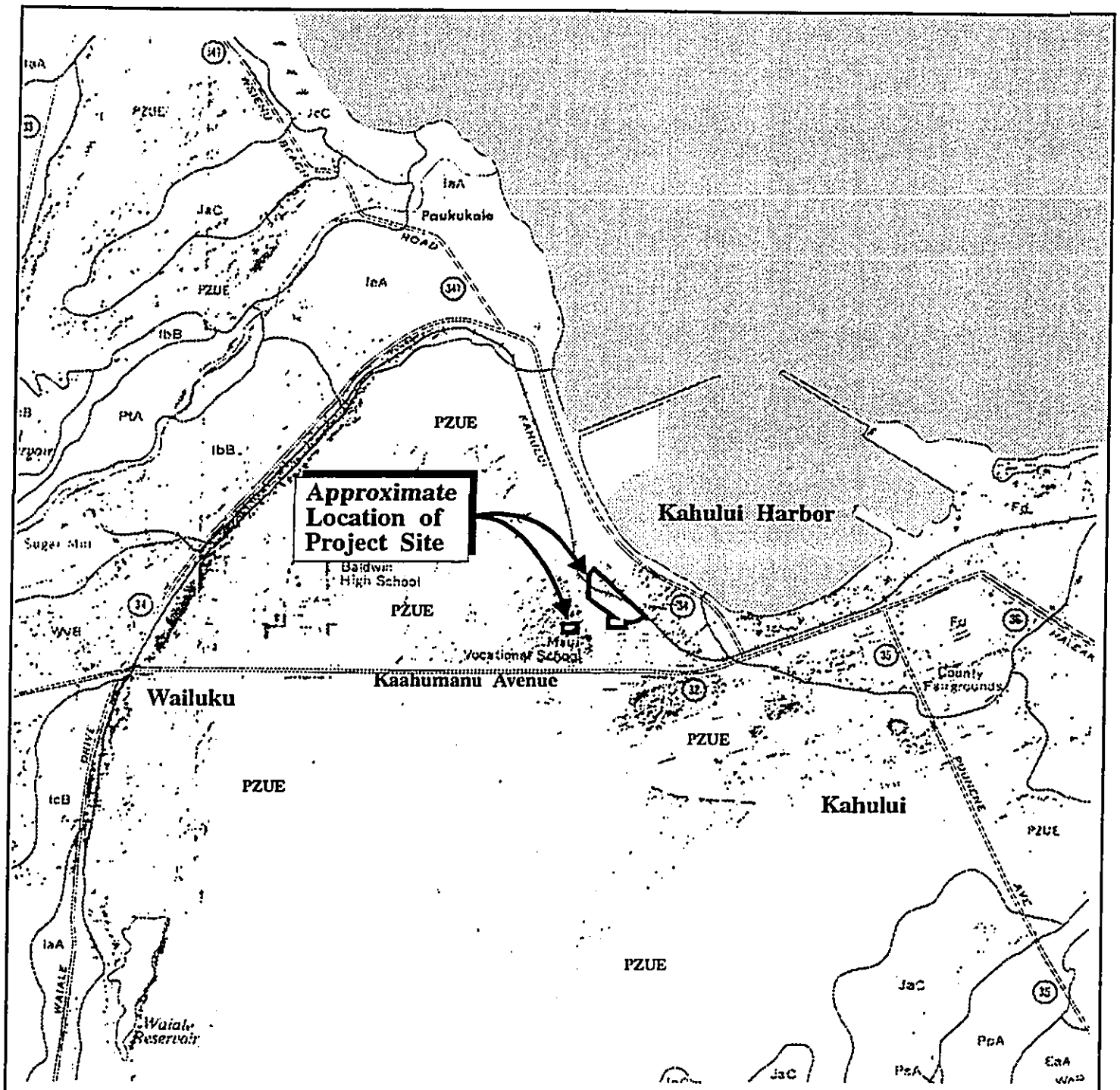

Figure 4

Maui Community College
Buildings "J" and "S"
Soil Classification

0 1000 2000 4000 Feet

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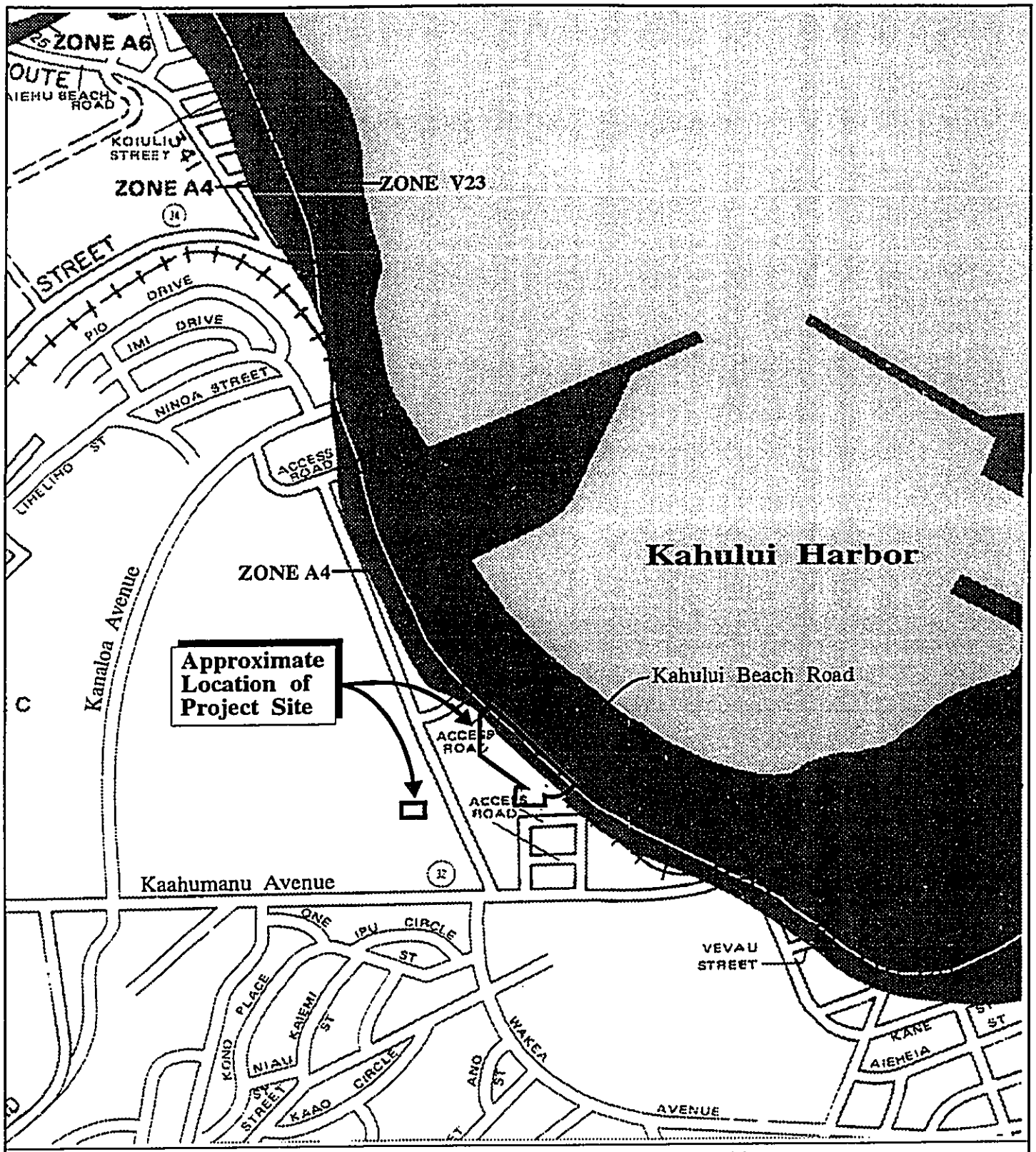

Figure 5

Maui Community College Buildings "J" and "S"

Flood Insurance Rate Map

0 500 1000 2000 Feet

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Prepared for: State of Hawaii, Dept. of Accounting and General Services

the parking lot extension and the retention basin contain koa haole, kiawe, bermuda grass, fingergrass and lowland shrubs. There are no known rare, endangered or threatened species of plants within the project sites.

Fauna and avifauna are also characteristic of urban areas. Fauna typically found in the vicinity include mongoose, rats, dogs and cats. Avifauna typically include mynas, several types of doves, and house sparrows. There are no rare or endangered species of fauna or avifauna found at the project site.

6. ***Archaeological Resources***

An archaeological inventory survey was conducted for the area of the proposed parking lot which extends beyond the existing parking area and the area of the proposed retention basin. See Appendix A.

The study notes that the expansion area contains considerable quantities of refuse as well as remains of various poured, concrete floors and foundations of buildings which were associated with the 18th U.S.M.C. Service Battalion camp during World War II. The study also found other structural and concrete floor slabs which form a horseshoe-shaped flower bed and sidewalk. The property exhibits considerable signs of surface and subsurface disturbance from earthmoving equipment. Landfill materials have also been freely deposited on the site. Other materials occupying the site include discarded construction material and equipment, rusted automobiles and parts, and household litter.

The study included a surface observation walkover by archaeological personnel. In addition, 22 backhoe test trenches were excavated,

recorded and mapped. No recognizable features or identifiable pre-contact Hawaiian artifacts were recovered from any of the trenches.

7. *Air Quality*

Air quality in the Wailuku-Kahului region is considered good as point sources (e.g., Maui Electric Power Plant, HC&S Mill) and non-point sources (e.g., automobile emissions) of emission are not significant to generate high concentration 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 to the southeast of the Kahului residential core.

8. *Noise*

Traffic noise is the predominant source of background noise in the vicinity of the projects. To the east, the Kahului Harbor activity can also add to the background noise levels in the surrounding region.

9. *Visual Resources*

Scenic resources to the west of MCC include Iao Valley and the West Maui Mountain Range. Looking southeast, Haleakala is clearly visible. To the northeast, lies the Kahului Harbor and the Pacific Ocean. South of MCC, the Kahului commercial center is visible.

B. *SOCIO-ECONOMIC ENVIRONMENT*

1. *Population*

The population of the County of Maui has exhibited relatively strong growth over the past decade with the 1990 population estimated to be 100,374, a 41.7% increase over the 1980 population of 70,847. Growth in the County is expected to continue, with resident

population projections to the years 2000 and 2010, estimated to be 123,900 and 145,200, respectively (DBED,1990).

The Wailuku-Kahului Community Plan region follows the Countywide pattern of population growth, with the region's 1990 population of 32,816 expected to rise to 40,119 by the year 2000 and to 47,597 by the year 2010 (Community Resources, Inc., 1992).

2. *Economy*

As noted previously, the Kahului region is the Island's center of commerce. Combined with neighboring Wailuku, the region's economic character encompasses a broad range of commercial, service, and governmental activities. In addition, the region is surrounded by significant agricultural acreages which include sugar cane fields, pineapple fields, and macadamia nut orchards. The vast expanse of agricultural land, managed by Hawaiian Commercial & Sugar (HC&S) and Wailuku Agribusiness Company, is considered a key component of the local economy.

C. *PUBLIC SERVICES*

1. *Recreational Facilities*

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 and the War Memorial Complex. MCC is in close proximity to the Kahului Community Center, the County's Kanaha Beach Park and Iao Valley State Park.

2. ***Police and Fire Protection***

Police protection for the Wailuku-Kahului region is provided by the County Police Department headquartered at the Wailuku Station, approximately 0.8 mile from MCC. The region is served by the Department's Central Maui patrol.

Fire prevention, suppression, and protection services for the Wailuku-Kahului region is provided by the County Department of Fire Control's Wailuku Station, located in Wailuku Town, approximately 1.8 miles from MCC. In addition, the Department has constructed a new Kahului Station (located on Dairy Road). Portions of the MCC campus are within the 2.0 mile service radius of the Kahului Station.

3. ***Solid Waste***

Single-family residential solid waste collection service is provided by the County of Maui on a once-a-week basis. Residential solid waste collected by County crews are disposed at the County's 55-acre Central Maui Landfill, located four miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies. Refuse collection for MCC is provided by a private collection company.

4. ***Health Care***

Maui Memorial Hospital, the only major medical facility on the Island, services the Wailuku-Kahului region. Acute, general and emergency care services are provided by the 145-bed facility. In addition, numerous privately operated medical/dental clinics and offices are located in the area to serve the region's residents.

5. Schools

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 Lihikai and Kahului Schools (Grades K-6), Maui Waena Intermediate School (Grades 7-8), and Maui High School (Grades 9-12). Existing facilities in the Wailuku area include Wailuku Elementary School (Grades K-5), Iao Intermediate School (Grades 6-8), and Baldwin High School (Grades 9-12). MCC, a branch of the University of Hawaii, serves as the Island's only Community College.

D. INFRASTRUCTURE

1. Roadways

The Wailuku-Kahului region is served by a roadway network which includes arterial, collector and local roads. Major roadways include Kaahumanu Avenue, the principal linkage between Wailuku and Kahului, Lower Main/Kahului Beach Road, Hana Highway, and Puunene Avenue.

Access to MCC is provided by a primary entry at the four-way signalized intersection of Kaahumanu Avenue and Wakea Avenue. Kaihee Place provides a secondary access to the campus from Kahului Beach Road.

2. Wastewater

Domestic wastewater generated in the Wailuku-Kahului region is conveyed to the County's Wailuku-Kahului Wastewater Reclamation Facility located one-half mile south of Kahului Harbor. The design capacity of the facility is 6.0 million gallons per day (MGD). Average

daily flow currently processed through the plant is approximately 5.3 MGD.

The MCC campus is currently serviced by two separate sewer lines. Wastewater from the west side of campus discharges into a 30-inch sewer trunk line which bisects the campus from its Waiehu border to the area near the intersection of Kaahumanu and Wakea Avenues. Wastewater from the east side of campus gravity flows into an on-campus sewage pump station (SPS) which is then pumped to an existing 24-inch line which extends from Kaahumanu Avenue along Kane Street.

3. ***Water***

The Wailuku-Kahului region is served by the Board of Water Supply's (BWS) domestic water system. Water drawn from the Iao Aquifer System is conveyed to this region for distribution and consumption. The Iao Aquifer, which serves the Central Maui region, has an estimated sustainable yield of 20 MGD. Recent estimates place the monthly average withdrawal from the aquifer at over 18 MGD.

Water service to MCC is provided via a 12-inch waterline located along Kaahumanu Avenue, and a 16-inch waterline that crosses through the campus originating from the Waiehu Heights reservoir.

4. ***Drainage***

The majority of on-site runoff sheet flows across the MCC campus towards Kahului Harbor and under Kahului Beach Road via two off-site drainage ditches and drainline systems. An existing 72-inch by 44-inch pipe, which collects approximately 16 acres of off-site drainage from Kaahumanu Avenue, crosses the campus and outlets

into an onsite drainage ditch which connects to the existing off-site ditch and drainline system which flows into Kahului Harbor.

Chapter III

Potential Impacts and Mitigation Measures

III. POTENTIAL IMPACTS AND MITIGATION MEASURES

A. PHYSICAL ENVIRONMENT

1. Surrounding Uses

The proposed Buildings "J" and "S" contain classrooms which are compatible to uses within the MCC campus. The project is also compatible with surrounding land uses close to MCC, such as the Kaahumanu Center, Haleakala Dairy, the Maui Land and Pineapple Company cannery, Harbor Lights Condominium, and the single-family residential area adjacent to Wakea Street.

2. Flora and Fauna

There are no known significant habitats or rare, endangered or threatened species of flora and fauna located within the project sites. The proposed project is therefore not considered an adverse impact upon these environmental features.

3. Archaeological Resources

The existing sites of Building "J" and "S" are already part of the MCC campus and have been extensively modified.

An archaeological inventory survey done for the area of parking lot extension and retention basin indicates the extreme land disturbance from previous construction projects on the parcel. Historic references note the unused, barren nature of the land in the vicinity of the study parcel in early historic times. See Appendix A. No cultural features or early artifacts were discovered during the survey. However, remains from the 18th U.S.M.C. Service Battalion camp from World War II were found. It is noted that the U.S.M.C. camp was constructed in 1944, making it less than 50 years old. The

survey concludes that it is very unlikely that significant archaeological materials are present on the property.

Should human osteological material be encountered during construction activities, applicable procedures to ensure compliance with Chapter 6E, HRS, will be followed.

4. ***Air Quality***

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

The proposed redevelopment provides additional classroom space which will result in a larger volume of traffic flowing in and out of MCC during school hours. However, since MCC-related traffic represents a relatively small portion of overall traffic activity in the Kahului region, the proposed project is not anticipated to be detrimental to local air quality.

5. ***Noise***

As with air quality, ambient noise conditions will be impacted by construction activities. Heavy construction equipment, such as bulldozers, front end loaders, and materials-carrying trucks and trailers, would be the dominant source of noise during the site construction period. Impact tools such as jack hammers and hand-held pneumatic tools are also a major source of noise. To aid in the mitigation of construction noise impacts upon surrounding uses,

construction activities will be conducted during the daylight hours only.

On a long term basis, the project will not generate adverse noise conditions.

6. *Visual Resources*

The addition of the two new buildings to MCC, along with the parking lot expansion and drainage improvements will enhance the visual character of the site and its immediate environs. The project is located mauka of Kahului Beach Road and will not encroach into view corridors along the shoreline.

B. *SOCIO-ECONOMIC ENVIRONMENT*

1. *Population and Local Economy*

On a short-term basis, the project will support construction and construction-related employment.

On a long-term basis, the project will supply the facilities to provide upper-level educational classes, as well as vocational and technical training to students which will benefit the local employment market. Since MCC has been the fastest-growing community college in the State, the proposed project will help to fill student needs and the demands of the market place.

2. *Police, Fire, and Medical Services*

Medical, police and fire protection services are not expected to be adversely impacted by the proposed project. The project will not extend existing service area limits for emergency services.

3. *Solid Waste*

A solid waste management plan will be developed in coordination with the Solid Waste Division of the County Department of Public Works for the disposal of clearing and grubbing material from the site during construction.

Once completed, the proposed project will be served by a private refuse collection company. Solid waste generated from the project will be disposed at the County's Central Maui Landfill.

C. *INFRASTRUCTURE*

1. *Traffic*

A traffic impact analysis report was done for the project. See Appendix B. The report analyzes traffic conditions at full build-out of MCC's master plan of 5,000 full-time equivalent students by the year 2000.

The projected increase in student enrollment is expected to generate 353 vehicles during the AM peak hour of traffic, 342 vehicles entering and 11 vehicles exiting. During the projected PM peak hour of traffic, the increase in student enrollment is expected to generate 264 vehicles, 198 vehicles entering and 66 vehicles exiting.

The report notes that there are a number of proposed highway improvements in the Wailuku-Kahului area which provide alternative travel routes. This relieves much of the traffic congestion on Kaahumanu Avenue in the project vicinity. Roadway improvements include:

- The extension of Mahalani Street to Waiale Road.

- The construction of Maui Lani Parkway, a new roadway between Kaahumanu Avenue and Kuihelani Highway.
- The extension of Kamehameha Avenue through the new Maui Lani Parkway.
- The extension of Onehee Avenue to the new Maui Lani Parkway.
- The extension and widening of Waiale Road to Honoapiilani Highway.
- Roadway widening of Waiale Road between the Kahekili extension and the Mahalani Street extension.
- The Puunene Bypass Road between Mokulele Highway and Kuihelani Highway, connecting to the Maui Lani Parkway.

The highway capacity analysis performed for the study is based upon procedures presented in the "Highway Capacity Manual", Special Report 209, Transportation Research Board, 1985, and the "Highway Capacity Software", Federal Highway Administration.

Level of Service (LOS) is a quantitative and qualitative assessment on traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" being the best operating condition and LOS "F" the worst operating condition.

The total number of vehicles entering the intersection of Kaahumanu Avenue and Mahalani Street/Kanaloa Avenue would increase by approximately 4% over projected traffic demands without the proposed MCC expansion during the AM peak hour. During the PM peak hour, the increase would be approximately 3% without the project.

At the intersection of Kaahumanu Avenue and South Papa Avenue, the north bound approach of South Papa Avenue would operate at LOS "D" during the AM peak hour with the proposed project. Under projected conditions without the proposed project, this approach would operate at LOS "C". The approach would continue to operate at LOS "C" during the PM peak hour. The other traffic movements at this intersection would operate at satisfactory LOS during the AM and PM peak hours with the proposed project.

Vehicular traffic entering the MCC main entrance at the intersection of Kaahumanu Avenue and Wakea Avenue is expected to increase by 105 vehicles during the projected AM peak hour of traffic with the proposed project. During the PM peak hour, entering traffic would increase by 45 vehicles. Despite the increase in traffic entering MCC, the traffic movements at this intersection would operate at satisfactory LOS during the projected AM and PM peak hours.

The total number of vehicles entering the intersection of Kaahumanu Avenue and Kahului Beach Road/Kane Street is expected to increase by approximately 3% over projected conditions without the proposed project. During the PM peak hour, the increase is expected to be 2%.

Based on the analysis, the traffic impact analysis report recommends the following improvements:

A. Improvements to Mitigate Existing Roadway Deficiencies

1. Provide exclusive left-turn, through, and right-turn lanes on the north bound Mahalani Street approach at Kaahumanu Avenue.

2. Construct an exclusive left-turn lane, an optional left/through lane, and an exclusive right-turn lane on the north bound approach of Wakea Avenue at Kaahumanu Avenue.

B. Site Access Recommendations

1. Restrict access from Kaihee Place and utilize the new road connecting Kanaloa Avenue to Kahului Beach Road as the access to the faculty/student parking lot located north of the campus.

2. Provide an exclusive right-turn lane and an optional left/through lane on the south bound approach exiting the MCC campus at the intersection of Kaahumanu Avenue and South Papa Avenue

3. Provide an exclusive right-turn lane and an optional left/through lane on the south bound approach exiting the MCC campus at the intersection of Kaahumanu Avenue and Wakea Avenue.

4. Each of the campus parking lot driveways on the South Papa Avenue Extension should have exclusive left-turn and right-turn lanes for vehicles exiting the parking areas.

5. Left-turn lanes to the parking lot driveways should be constructed to maintain through traffic flow on the South Papa Avenue Extension.

With the implementation of roadway improvements and the construction of new roads providing alternative travel routes in the Wailuku-Kahului region, the proposed Maui Community College expansion should not have any significant impact on traffic in the vicinity of the project.

It is noted that traffic impacts and mitigation recommendations are based on 5,000 full-time students projected for the year 2000. Accordingly, the timing of improvements implementation and the pro-

rata distribution of costs associated with the improvements will be coordinated with the State of Hawaii, Department of Transportation.

2. ***Wastewater System***

The design capacity of the County's Kahului Wastewater Treatment Facility is 6.0 million gallons per day (MGD). The facility serves the Kahului, Wailuku, Paia, Kuau and Spreckelsville areas. Current wastewater flows treated by the Kahului facility is approximately 5.2 MGD, excluding groundwater and stormwater infiltration.

It should be noted that improvements are being undertaken at the Kahului Wastewater Treatment Facility to increase treatment capacity to 7.9 MGD. The additional capacity is scheduled to be available in 1993.

The proposed project is estimated to generate an average daily flow of approximately 18,300 gallons per day of wastewater. An allocation of capacity will be coordinated with the Department of Public Works as part of the building permit process.

3. ***Water System***

Water will be furnished by the domestic system servicing the area. The average daily demand for the project is estimated to be about 49,700 gallons per day.

4. ***Drainage and Erosion Control***

Drainage for the projects would involve two underground collection systems. Both systems will consist of inlets, catch basins, and underground piping which would discharge into the proposed retention basin.

The retention basin would consist of a four feet deep pond with two feet of freeboard, measuring approximately 140 feet by 900 feet in area. The basin is proposed to retain the difference in runoff volume between the existing on-site runoff and the on-site runoff generated by the proposed improvements. Existing on-site runoff for the MCC campus for a 10-year storm is approximately 91 cubic feet per second (CFS). With the proposed project, total run-off for the MCC campus is calculated at 146 CFS.

Off-site runoff, calculated at 26 CFS, will continue to pass through the campus to the retention basin.

Controlled flows from the retention basin would then be directed to Kahului Harbor. The ultimate discharge flow into Kahului Harbor will be limited to not exceed existing discharge levels.

Erosion control measures will be incorporated during the construction period to minimize soil loss. Dust will be minimized during construction by the implementation of water sprinkling.

All improvements will conform to County standards and be coordinated with the County of Maui, Department of Public Works. With installation of the proposed drainage improvements and implementation of erosion control measures, no adverse effects to adjacent and downstream properties are anticipated. See Appendix C.

5. Electrical and Telephone Systems

Electrical power requirements associated with the proposed project will be supplied by Maui Electric Company, Ltd.

GTE Hawaiian Telephone Company (HTCO) maintains overhead telephone lines which serve MCC. Additional telephone system requirements generated by the project will be met by HTCO.

Chapter IV

Relationship to Governmental Plans, Policies and Controls

IV. 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 major land use districts in which all lands in the State are placed. These districts are designated "Urban", "Rural", "Agricultural", and "Conservation". The subject parcel is within the "Urban" district. See Figure 6. The proposed action involves the use of the property for two new classroom buildings with attendant parking and drainage improvements. The proposed use of the property is consistent with "Urban" district provisions.

B. MAUI COUNTY GENERAL PLAN

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long-range development of the County. As stated in the Maui County Charter, "The purpose of the General Plan is to recognize and state the major problems and opportunities concerning the needs and the development of the County and the social, economic and environmental effects of such development and set forth the desired sequence, patterns and characteristics of future development".

The proposed action is in keeping with the General Plan's objectives:

1. To see that all developments are well designed and are in harmony with their surroundings.

2. To provide Maui residents with continually improving quality educational opportunities which can help them better understand themselves and their surroundings and help them realize their ambitions.

3. Improve the delivery of services by government agencies to all community plan areas.

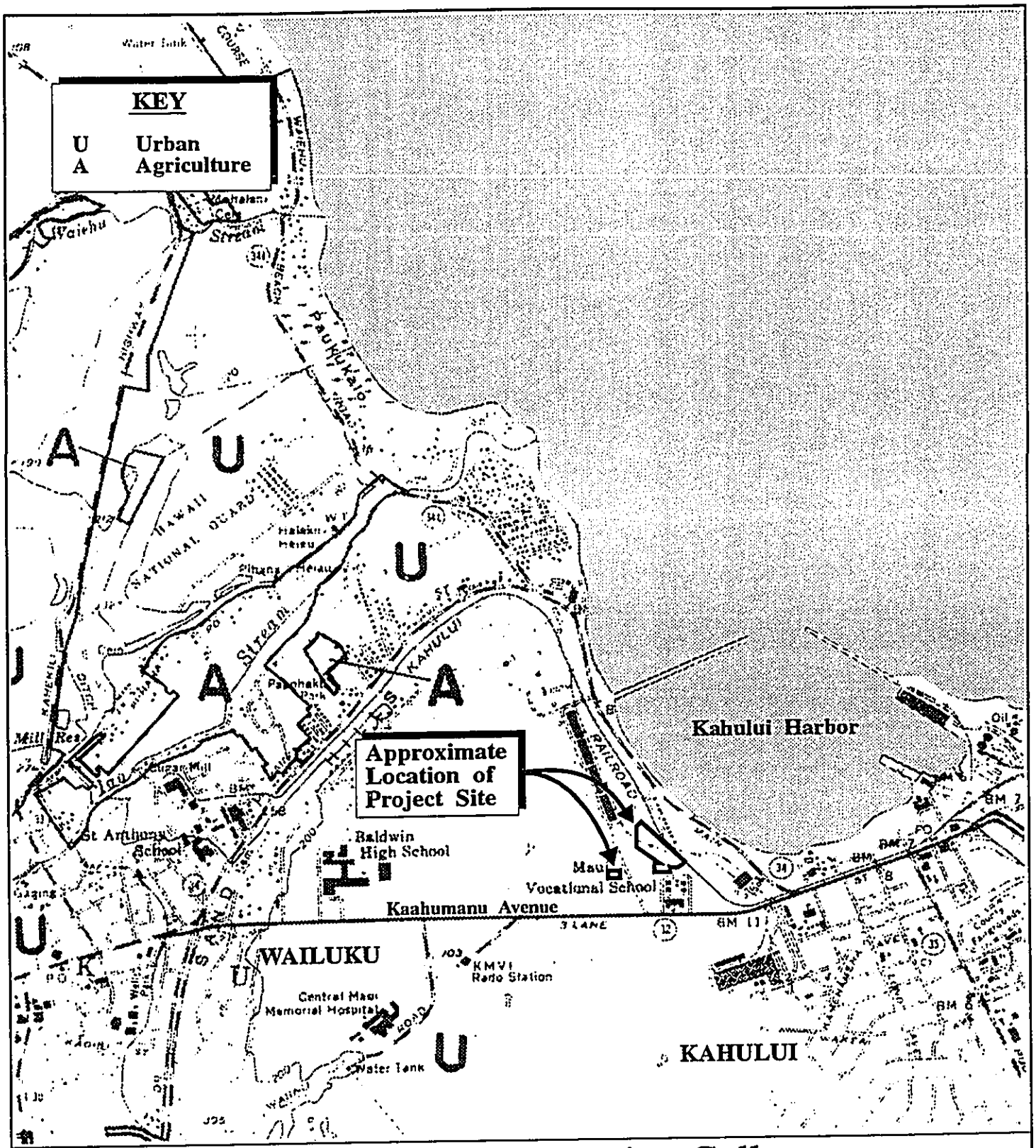

Figure 6

Maui Community College
Buildings "J" and "S"
State Land Use District Designations

Michael T. Munekiyo Consulting, Inc.
Prepared for: State of Hawaii, Dept. of Accounting and General Services

C. WAILUKU-KAHULUI COMMUNITY PLAN

The subject parcel is located in the Wailuku-Kahului Community Plan region which is one of nine 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.

Land use guidelines are set forth by the Wailuku-Kahului Community Plan Land Use Map. See Figure 7. The subject parcel is designated "Public/Quasi-Public" by the Community Plan.

The proposed project is consistent with the Wailuku-Kahului Community Plan.

D. SPECIAL MANAGEMENT AREA OBJECTIVES AND POLICIES

Pursuant to Chapter 205A, Hawaii Revised Statutes, and the Rules and Regulations of the Planning Commission of the County of Maui, projects located within the SMA are evaluated with respect to SMA objectives, policies and guidelines. This section addresses the project's relationship to applicable coastal zone management considerations, as set forth in Chapter 205A and the Rules and Regulations of the Planning Commission.

1. Recreational Resources

Objective: Provide coastal recreational resources accessible to the public.

Policies:

1. Improve coordination and funding of coastal recreation planning and management; and

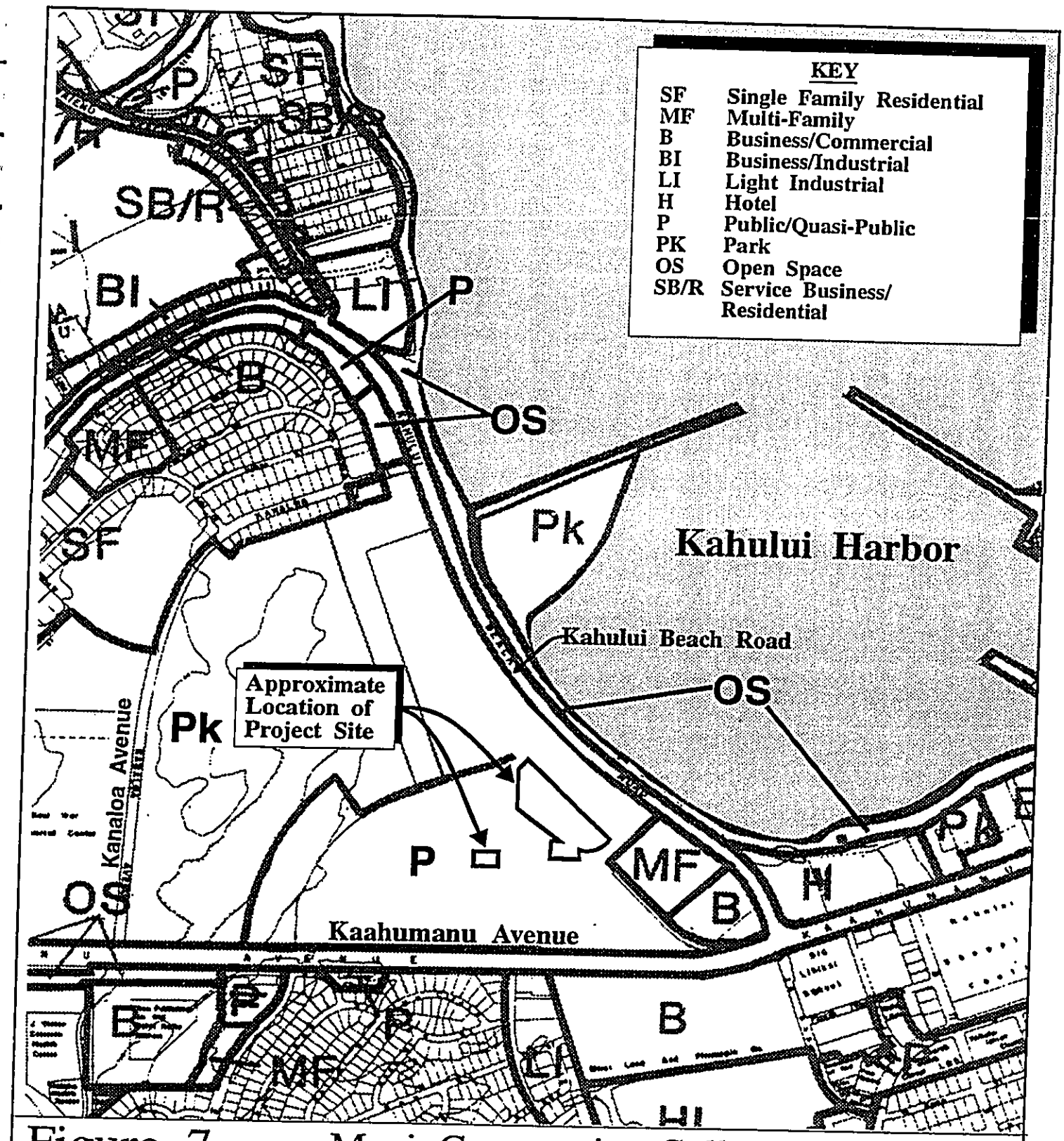

Figure 7 Maui Community College Buildings "J" and "S" Wailuku-Kahului Community Plan Land Use Designations

Michael T. Munekiyo Consulting, Inc.

Prepared for: State of Hawaii, Dept. of Accounting and General Services

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

   a. Protecting coastal resources uniquely suited for recreation activities that cannot be provided in other areas,

   b. Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites and sandy beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;

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

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

   e. Encouraging expanding public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value;

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

   g. Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits, and crediting such dedication against the requirements of Section 46-6 of the Hawaii Revised Statutes.

Response:

The proposed project will not affect coastal zone recreational opportunities. Accessibility to shoreline areas will not be impacted by the proposed action.

2. ***Historical/Cultural Resources***

Objective: Protect, preserve and where desirable, restore those natural and man-made historic and prehistoric resources in the coastal zone

management areas that are significant in Hawaiian and American history and culture.

Policies:

1. Identify and analyze significant archaeological resources;

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

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

Response:

The sites for Buildings "J" and "S" have already been extensively altered. An archaeological inventory survey for the area of the parking lot extension and retention basin did not find any pre-contact Hawaiian artifacts. Military camp remains from World War II have been reasonably well documented. The project is not anticipated to adversely affect significant historic or archaeological resources.

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:

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

2. Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural land forms and existing public views to and along the shoreline;

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

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

Response:

The proposed project will not adversely impact scenic or open space resources. The proposed project will not involve significant alteration to the existing topographic character of the site and will not significantly affect public views to the shoreline.

4. ***Coastal Ecosystems***

Objective:

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

Policies:

1. Improve the technical basis for natural resource management;

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

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

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

Response:

The completion of the proposed project will not significantly disrupt or impact coastal ecosystems. Appropriate soil erosion mitigation measures will be implemented during the construction of the project to minimize disruption of coastal water ecosystems. The proposed

retention basin also serves to collect and minimize runoff and siltation.

5. Economic Uses

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

Policies:

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

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

3. Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

   a. Utilization of presently designated locations is not feasible,

   b. Adverse environmental effects are minimized, and

   c. Important to the state's economy.

Response:

The proposed project is designed to accommodate an increase in student enrollment numbers. This growth will in turn increase the demand for additional instructors at MCC, which in turn will benefit the local employment market. Graduating students also provide an educated and trained workforce which are important to fulfill the demands of the marketplace and to the State's economy. This project will not generate any adverse economic impacts.

6. ***Coastal Hazards***

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

Policies:

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

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

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

4. Prevent coastal flooding from inland projects.

Response:

Buildings "J" and "S" are located in an area of minimal flooding. However, portions of the parking lot expansion and retention basin are located in Zone A4 which has a base flood elevation of 17 feet above mean sea level. Makai portions of the retention basin are located in Zone V23, which includes areas inundated by the 100-year coastal flood with velocity hazards and a base flood elevation of 17-18 feet above mean sea level. Storm runoff should be addressed through on-campus drainage improvements and the construction of the retention basin. This would control the discharge rate to not exceed existing discharge levels. The project is not anticipated to adversely impact downstream or adjacent properties.

7. ***Managing Development***

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

Policies:

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

2. Facilitate timely processing of application for development permits and resolve overlapping of conflicting permit requirements; and

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

Response:

Early consultation is provided through the process of preparing the Environmental Assessment. Public comments are also afforded during the review period of the Draft Environmental Assessment. The County's Special Management Area permitting process provides another avenue for review.

Applicable State and County requirements will be adhered to in the design and construction of the proposed project.

Chapter V

Findings and Conclusion

V. FINDINGS AND CONCLUSION

The proposed project would involve the construction of two new structures on the MCC campus, Buildings "J" and "S", as well as parking lot expansion and the construction of new retention basin.

Construction of the proposed project will involve short-term environmental impacts typically associated with construction activities. These include air quality and noise impacts. Dust control measures such as watering or sprinkling will be undertaken to minimize dust. Construction activities are also anticipated to be limited to daylight hours. Impacts generated from construction activities are not considered adverse.

From a long-term perspective, the proposed project is not anticipated to result in adverse environmental impacts. The sites for Buildings "J" and "S" have already been extensively modified. No significant archaeological or historic sites were found. There are no known rare/threatened species of flora and fauna at the project site.

Impacts to the local economy are anticipated to be positive involving support for construction-related employment in the short-term. After completion of construction, the project will provide liberal arts, vocational and technical training to benefit the local employment market.

With regard to traffic, there are a number of proposed new roadways in the region which provide alternative travel routes in the Wailuku-Kahului area. This relieves much of the traffic congestion on Kaahumanu Avenue in the project vicinity. In addition, there are a number of intersection improvements and site access recommendations designed to mitigate increases in traffic due to the project. With the implementation of these recommendations, the proposed project should not have any significant impact on traffic in the vicinity of the project.

With regard to drainage improvements, the proposed project involves the construction of a retention basin which collects runoff and controls discharge into Kahului Harbor. The ultimate discharge rate would not exceed existing discharge levels.

The project is also not anticipated to have adverse impacts upon medical, police and fire protection services as well as other infrastructure systems.

In light of the foregoing findings, it is concluded that the proposed action will not result in any significant impacts. Thus, this Environmental Assessment is being filed as a negative declaration.

Chapter VI

Agencies Contacted in the Preparation of the Environmental Assessment and Responses Received

VI. AGENCIES CONTACTED IN THE PREPARATION OF THE ENVIRONMENTAL ASSESSMENT AND RESPONSES RECEIVED

The following agencies were contacted during the preparation of the Environmental Assessment:

1. U.S. Army Corps of Engineers
   Pacific Ocean Division
   Building 230
   Fort Shafter, Hawaii 96858

2. Mr. David Nakagawa, Chief
   Sanitarian
   Department of Health
   54 High Street
   Wailuku, Hawaii 96793

3. Mr. Tom Arisumi, Division Chief
   Department of Health
   Environmental Management Division
   Five Waterfront Plaza, Suite 250
   500 Ala Moana Boulevard
   Honolulu, Hawaii 96813

4. Mr. Robert Siarot, Maui District Engineer
   Department of Transportation
   650 Palapala Drive
   Kahului, Hawaii 96732

5. Department of Land and Natural Resources
   State Historic Preservation District
   1325 L. Main Street, #108
   Wailuku, Hawaii 96793

6. Mr. Brian Miskae, Director
   Department of Planning
   250 South High Street
   Wailuku, Hawaii 96793

7. Mr. David Craddick, Director
   Department of Water Supply
   200 South High Street
   Wailuku, Hawaii 96793

8. Mr. Lloyd Lee
   Department of Public Works
   Division of Engineering
   200 South High Street
   Wailuku, HI 96793

9. Mr. Aaron Shinmoto
   Chief Staff Engineer
   Department of Public Works
   200 South High Street
   Wailuku, Hawaii 96793

10. Mr. Eassie Miller
    Department of Public Works
    Wastewater Reclamation Division
    200 South High Street
    Wailuku, Hawaii 96793

11. Mr. James Lawrence
    Kahului Town Association
    P. O. Box 156
    Kahului, Hawaii 96732

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

OCT 3 1 1992

REPLY TO
ATTENTION OF

October 28, 1992

Planning Division

Mr. Michael T. Munekiyo, AICP
Michael T. Munekiyo Consulting, Inc.
2035 Main Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Munekiyo:

Thank you for the opportunity to review and comment on the Proposed Construction of Maui Community College Buildings "S" and "J" (TMK 3-8-7: 40, 125). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. The project does not involve work in waters of the U.S.; therefore, a DA permit is not required.

b. According to the enclosed Federal Emergency Management Agency's Flood Insurance Rate Map, panel 150003-0190-C, dated September 6, 1989, the proposed project site is located in Zone C (areas of minimal flooding). The remainder of the parcels are located in Zone A4 (areas inundated by the 100-year flood with a base flood elevation of 34 feet above mean sea level) and Zone V23 (areas inundated by the 100-year coastal flood with velocity hazards and a base flood elevation of 18 to 34 feet above mean sea level).

Sincerely,

Kisuk Cheung, P.E.
Director of Engineering

Enclosure

CUSTOMER COPY

KEY TO MAP

Flood Boundary
ar Flood Boundary
ignations
ear Flood Boundary
Flood Boundary
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od Elevation in Feet
niform Within Zone**
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(EL 987)
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EXPLANATION OF ZONE DESIGNATIONS

EXPLANATION

Areas of 100-year flood; base flood elevations and flood hazard factors not determined.

Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.

Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.

Areas of 100-year flood; base flood elevations and flood hazard factors determined.

Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.

Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)

Areas of minimal flooding. (No shading)

Areas of undetermined, but possible, flood hazards.

Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.

Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

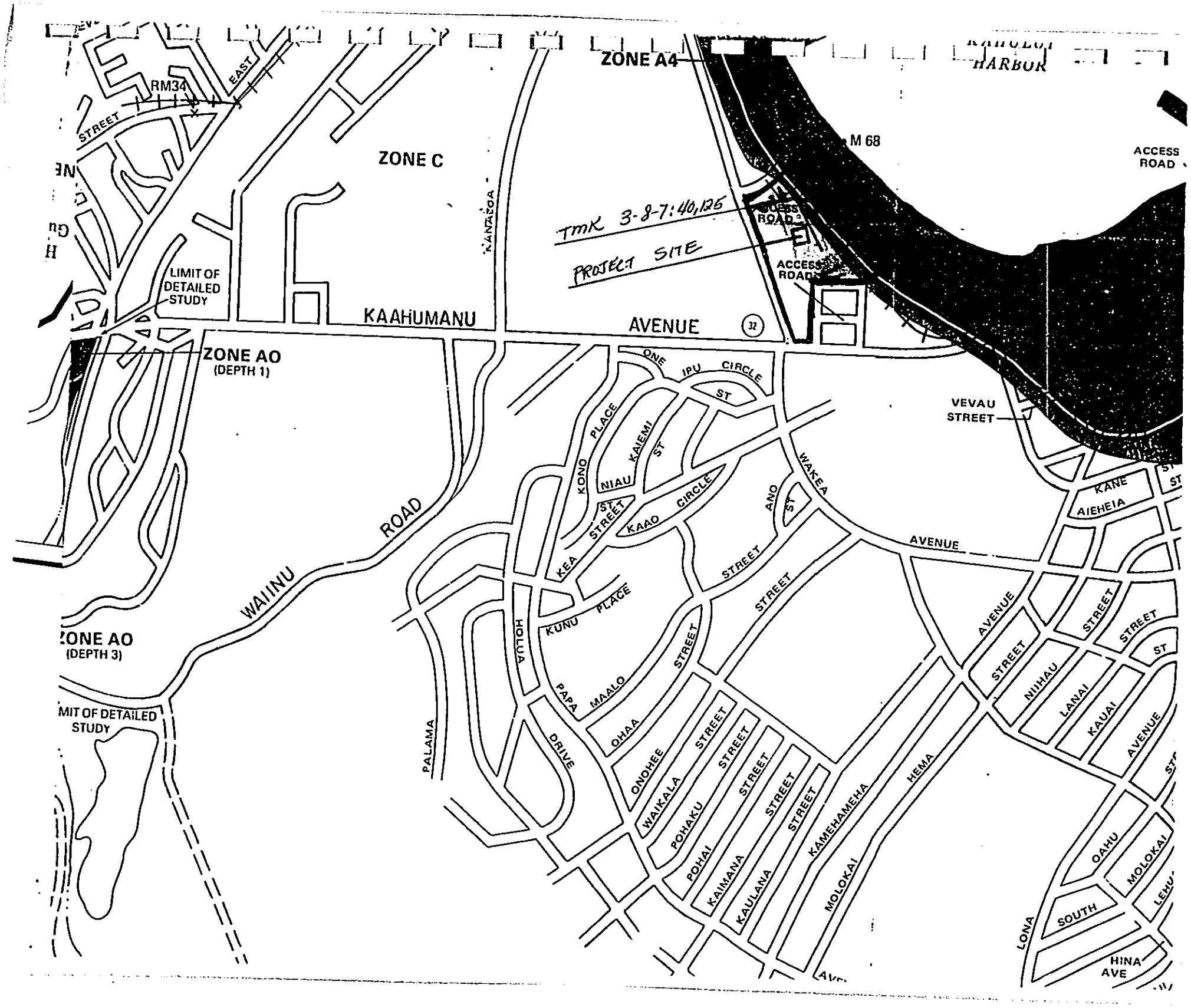
MAUI COUNTY, HAWAII

PANEL 190 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150003 0190 C

MAP REVISED:
SEPTEMBER 6, 1989

Federal Emergency Management Agency


ZONE A4
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RM34
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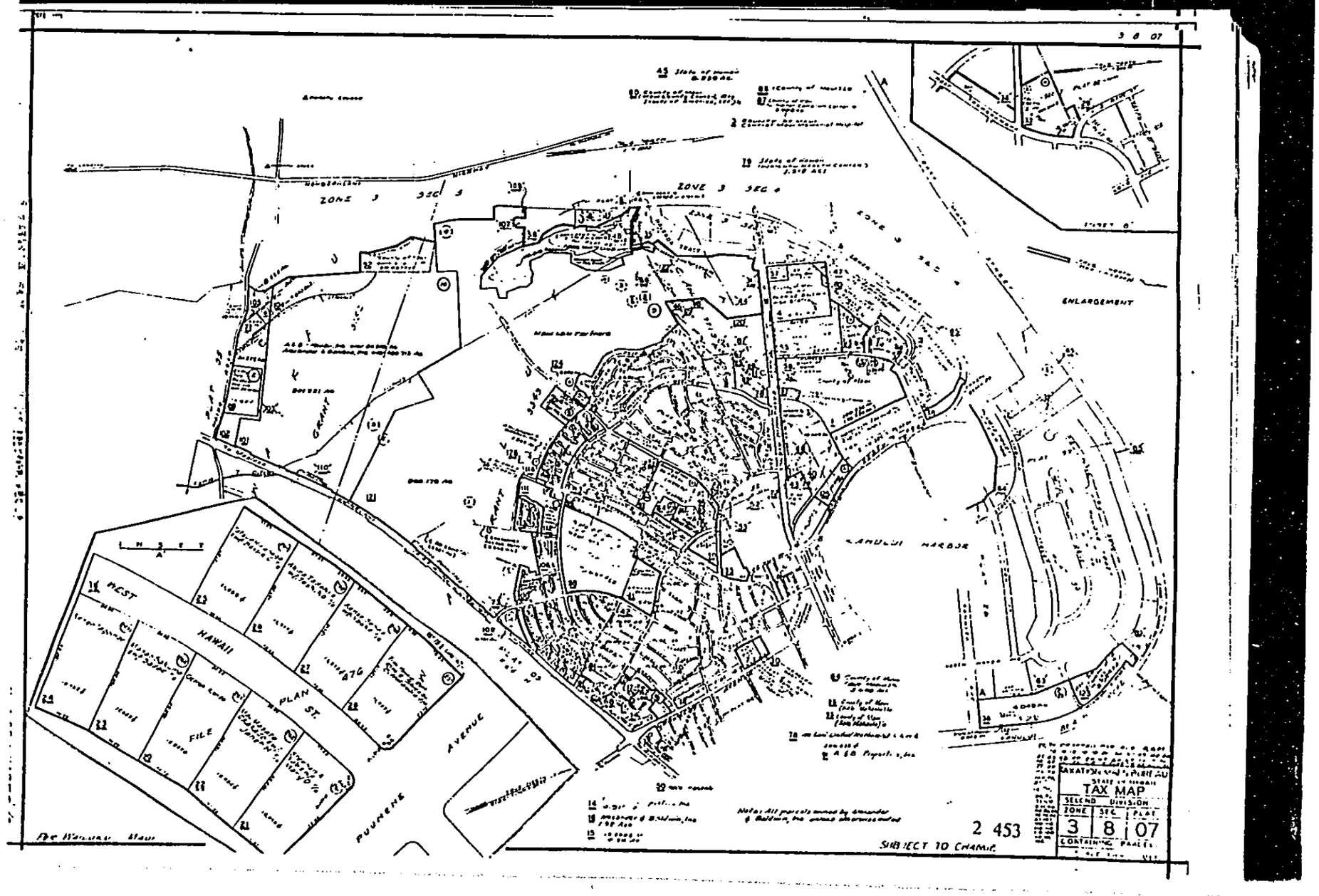
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HAWAII
PLAH ST.
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AVENUE
2 453
SUBJECT TO CHANGE
TAX MAP
SECOND DIVISION
ZONE 3
SEC. 8
PLAT 07

NOV 7 1992

JOHN WAIHEE
GOVERNOR OF HAWAII

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

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:

November 5, 1992

92-383/epo

Mr. Michael T. Munekiyo, A.I.C.P.
Michael T. Munekiyo Consulting, Inc.
2035 Main Street
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

Subject: Pre-Environmental Assessment
New Classrooms - "S" and "J"
Maui Community College
Kahului, Maui
TMK: 3-8-7: 125

Thank you for allowing us to review and comment on the subject project. We have no comments to offer at this time.

Due to preliminary plans being the sole source of discussion, we reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to the Department of Health.

Very truly yours,

JOHN C. LEWIN, M.D.
Director of Health

c: Maui District Health Office (D. Nakagawa)

OCT 3 0 1992

JOHN WAIHEE
GOVERNOR OF HAWAII

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

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

PAUL E. HOFFMAN, M.D., M.P.H.
DISTRICT HEALTH SERVICES ADMINISTRATOR (M.D.)

October 27, 1992

Mr. Michael T. Munekiyo, A.I.C.P.
Michael T. Munekiyo Consulting, Inc.
2035 Main Street
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

Subject: Proposed Construction of MCC Buildings "S" and "J"

Thank you for allowing us to review and comment on the subject proposal. We have the following comments:

Dust control and noise nuisance during construction should be properly monitored especially when classes are in session.

Should you have any questions on the above, please call me at 243-5255.

Sincerely,

David H. Nakagawa

DAVID H. NAKAGAWA
Environmental Health Program Supervisor

JOHN WAIHEE
GOVERNOR OF HAWAII

OCT 2 8 1992

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCE

DEPUTIES

JOHN P. KEPPELER, II
DONA L. HANAIKE

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HAWAII HISTORIC PLACES REVIEW BOARD
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

October 26, 1992

LOG NO.: 6612
DOC NO.: 9210AG17

Mr. Michael T. Munekiyo
2035 Main Street
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

SUBJECT: **Historic Preservation Review of the Proposed Construction of MCC Buildings "S" and "J" Kahului, Wailuku, Maui**
TMK: 3-8-07: 40

This is in reponse to your letter dated October 14, 1992, requesting our comments on Maui Community College's proposal to construct two classroom buildings, "S" and "J".

The location of the proposed Building "J" was previously inspected by our staff archaeologist and we sent you our comments in a letter dated February 12, 1992. We determined that the proposed building will have "no effect" on significant historic sites. No historic sites were identified and the ground appeared to have been previously disturbed by previous construction activities.

The location of the proposed Building "S" is currently a parking lot. This area has also been extensively modified. It is not likely that historic sites are still present. Therefore, the proposed classroom will have "no effect" on historic sites.

Should you have any questions, please contact Ms. Annie Griffin at 587-0013.

Sincerely,

DON HIBBARD, Administrator
State Historic Preservation Division

AG:aal

OCT 2 3 1992

LINDA CROCKETT LINGLE
Mayor
GEORGE N. KAYA
Director
CHARLES JENCKS
Deputy Director
LLOYD P.C.W. LEE, P.E.
Chief Staff Engineer

AARON SHINMOTO, P.E.
Land Use and Codes Administration
EASSIE MILLER, P.E.
Wastewater Reclamation Division
RALPH NAGAMINE, P.E
Engineering Division
BRIAN HASHIRO, P.E.
Solid Waste Division
MELVIN HIPOLITO
Highways Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

October 20, 1992

Michael T. Munekiyo
Michael T. Munekiyo Consulting, Inc.
2035 Main Street
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

SUBJECT: **PROPOSED CONSTRUCTION OF MCC BUILDINGS "S" AND "J"**

This letter is in response to your letter of October 14, 1992. We wish to thank you for the opportunity to comment on the proposed project. We offer the following comments at this time:

1. The developer should be informed that the Wastewater Reclamation Division cannot insure that wastewater system capacity will be available for the project.

2. The developer may be asked to provide discussion and calculations (sewer impact study) to substantiate that the existing wastewater system is adequate to serve this project.

3. Wastewater contribution calculations are required before building permit is issued.

4. The developer may be assessed impact fees for treatment plant expansion costs.

5. The developer is required to fund any necessary off-site improvements to collection system and wastewater pump stations.

At the present time, capacity appears to be adequate and there are no major obstacles that we are aware of. If you have any questions or wish to discuss this matter further, please call Dave Taylor at 243-7428.

Sincerely,

Eassie Miller

Eassie Miller, Chief
Wastewater Reclamation Division

DT:gmd (CT93031)

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858-5440

December 3, 1992

REPLY TO
ATTENTION OF:

Planning Division

Mr. Michael T. Munekiyo, AICP
Michael T. Munekiyo Consulting, Inc.
2035 Main Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Munekiyo:

Thank you for the opportunity to review and comment on the Proposed Construction of Maui Community College Buildings "S" and "T" (TMK 3-8-7: 40, 125). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. The project does not involve work in waters of the U.S.; therefore, a DA permit is not required.

b. Please revise the flood hazard information to read: "According to the Federal Emergency Management Agency's Flood Insurance Rate Map, panel 150003-0190-C, dated September 6, 1989, the proposed project site is located in Zone C (areas of minimal flooding). The remainder of the parcels are located in Zone A4 (areas inundated by the 100-year flood with a base flood elevation of 17 feet above mean sea level) and Zone V23 (areas inundated by the 100-year coastal flood with velocity hazards and a base flood elevation of 17 to 18 feet above mean sea level)."

Sincerely,

Kisuk Cheung, P.E.
Director of Engineering

Enclosure

KEY TO MAP

Flood Boundary
ar Flood Boundary
ignations
ar Flood Boundary
Flood Boundary
ood Elevation Line
levation in Feet**
d Elevation in Feet
iform Within Zone**
ion Reference Mark
loundary
Mile

ZONE B

ZONE A

ZONE B

513

(EL 987)

RM7×

•M1.5

nced to the National Geodetic Vertical Datum of 1929

EXPLANATION OF ZONE DESIGNATIONS

EXPLANATION

Areas of 100-year flood; base flood elevations and flood hazard factors not determined.

Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.

Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.

Areas of 100-year flood; base flood elevations and flood hazard factors determined.

Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.

Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)

Areas of minimal flooding. (No shading)

Areas of undetermined, but possible, flood hazards.

Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.

Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

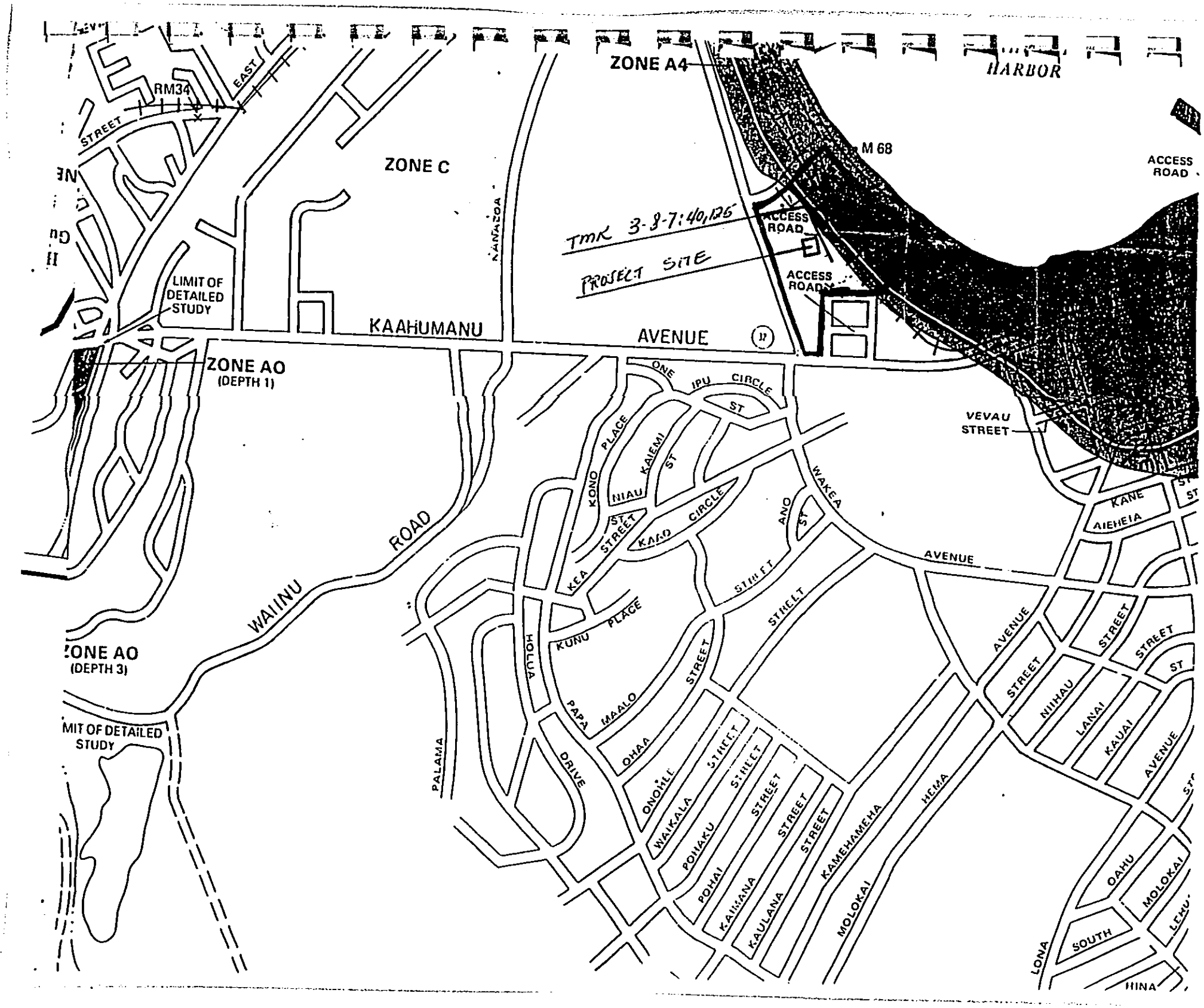
MAUI COUNTY, HAWAII

PANEL 190 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150003 0190 C

MAP REVISED:
SEPTEMBER 6, 1989

Federal Emergency Management Agency


ZONE A4
HARBOR
RM34
EAST
STREET
ZONE C
M 68
ACCESS ROAD
TMK 3-8-7:40,126
PROJECT SITE
ACCESS ROAD
ACCESS ROAD
LIMIT OF DETAILED STUDY
KAAHUMANU
AVENUE
ZONE AO
(DEPTH 1)
ONE IPU CIRCLE
ST
VEVAU STREET
KONO PLACE
KAIEMI ST
NIAU
ST STREET
KAAO CIRCLE
WAKEA
AVENUE
KANE
AIEHEIA
ROAD
WAIINU
ZONE AO
(DEPTH 3)
KEA STREET
KUNU PLACE
HOLUA
PALAMA
DRIVE
PAPA
MAALO
STREET
OHAA
ONOHILE STREET
WAIKALA STREET
POHAKU STREET
POHAI STREET
KAIMANA STREET
KAULANA STREET
KAMEHAMEHA
MOLOKAI
HEMA
AVENUE
STREET
NIIHAU
LANAI
KAUAI
OAHU
MOLOKAI
SOUTH
LONA
HINA

Chapter VII

Letters Received During Public Comment Period and Agency Responses

LINDA CROCKETT LINGLE
Mayor
GEORGE N. KAYA
Director
CHARLES JENCKS
Deputy Director
LLOYD P.C.W. LEE, P.E.
Chief Staff Engineer

AARON SHINMOTO, P.E.
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Wastewater Reclamation Division
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BRIAN HASHIRO, P.E.
Solid Waste Division
MELVIN HIPOLITO
Highways Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

December 24, 1992

Mr. Milton Arakawa
Michael T. Munekiyo Consulting Inc.
1823 Wells Street, Suite 3
Wailuku, HI 96793

Dear Mr. Arakawa:

SUBJECT: MAUI COMMUNITY COLLEGE BUILDINGS "S" and "J"

We have reviewed the above request and offer the following comments:

1. That the architect and owner are advised that part of the project is subject to possible tsunami and flood inundation. As such, said project must conform to Ordinance No. 1145, pertainng to flood hazard districts.

2. That a road widening lot be provided for the extension of Papa Avenue to future Maui Central Park Roadway to provide for a 60 foot wide right-of-way.

3. That final detailed drainage and erosion control master plans including, but limited to, hydrologic and hydraulic calculations and scheme for controlling erosion and disposal of runoff water be submitted to the Department of Public Works, Engineering Division for our review and approval. The master plans shall provide verification that the grading and all runoff water generated by the project will not have an adverse effect on the adjacent and downstream properties. In addition, the developer shall contribute his pro-rata share to drainage improvements to be determined by the County and the drainage master plans and provide drainage easements as necessary in accordance to these drainage master plans. An agreement to the above prepared for filing with the State's Bureau of Conveyances shall be submitted by the applicant.

4. That the applicant shall prepare and submit a FY 2010 Traffic Master for the entire MCC site for review and approval by the County, Department of Public Works; the

traffic master plan shall include the provision for the construction of the future Maui Central Park roadway and the extension of Papa Avenue from Kaahumanu Avenue to the new Central Park road, and address the construction of "onsite" and "offsite" traffic improvement recommendations.

5. That the applicant shall contribute his pro-rata share to traffic improvements to be determined by the County and traffic master plans. An agreement to the above prepared for filing with the State's Bureau of Conveyances shall be submitted by the developer.

6. That during the construction of this project, all construction employee parking shall be accommodated on the project site and not within the County road right-of-way.

7. Provide a water quality report including project mitigation measures (acceptable to the State Department of Health and Department of Public Works) which evaluates the quality of the storm water discharging into the ocean receiving waters. The report should include a discussion on sediment and nutrient loadings at all drainage outlets.

8. That a SMA permit is required for this development.

Please contact Lloyd Lee at 243-7745 if you have any further questions.

Very truly yours,

LLOYD P.C.W LEE
Engineering Division Chief

cc: DIR
LUCA
Planning Department

LL:kb(ED92-725)
Mauicomm.clg

JOHN WAIHEE
GOVERNOR

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

ROBERT P. TAKUSHI
COMPTROLLER

LLOYD I. UNEBASAMI
DEPUTY COMPTROLLER

LETTER NO. PM-1002.3

JAN 6 1993

Mr. Lloyd P.C.W. Lee
Engineering Division Chief
Department of Public Works
County of Maui
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Lee:

Subject: Maui Community College
Buildings "J" and "S"
D.A.G.S. Job Nos. 15-31-4953 & 15-31-5871

Thank you for your letter of December 24, 1992, offering comments on the proposed project. We would like to provide a response to your comments as follows:

1. We acknowledge that a portion of the project is subject to possible tsunami and flood inundation. Thus, we intend to conform with provisions of Ordinance No. 1145 pertaining to flood hazard districts.

2. Regarding the issues of Papa Avenue extension, completion of a traffic master plan to the year 2010, and contribution of a pro rata share of traffic improvements, it is noted that the extent of new building construction on the Maui Community College (MCC) campus and needed traffic improvements cannot be projected with a reasonable degree of accuracy at this time. Thus, the traffic report has been based on projections to the year 2000. It should be emphasized that as the MCC campus expands, future building plans and traffic improvements would be reviewed through the environmental review process. For Buildings "J" and "S", we acknowledge that an SMA permit is required and intend to

further discuss traffic concerns with you during this period.

3. Final detailed drainage and erosion control master plans will be submitted to the Department of Public Works for review. Our intent is to construct a project which has no adverse effect on adjacent and downstream properties, and will comply with all applicable ordinances and rules concerning this matter. We intend to further discuss the contribution of pro rata share to drainage improvements with you during the SMA permit process.

4. Our intent is to provide construction employee parking on the MCC campus site rather than on County rights-of-way.

5. Regarding water quality, necessary measures will be taken to comply with NPDES provisions, as required by law.

We appreciate the opportunity to respond to your comments. If you have any questions or desire further information, please contact Eric Nishimoto of our staff at 586-0468.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

EN/si

LINDA CROCKETT LINGLE
Mayor

BRIAN W. MISKAE
Planning Director

COUNTY OF MAUI
PLANNING DEPARTMENT
250 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

December 21, 1992

Milton Arakawa
Mike T. Munekiyo Consulting, Inc.
1823 Wells Street, Suite 3
Wailuku, Hawaii 96793

Dear Mr. Arakawa:

RE: Draft Environmental Assessment (EA) for Proposed New Buildings "S" and "J" at Maui Community College.

We have reviewed the draft EA and have no comments at this time.

A Special Management Area permit approval from the Maui Planning Commission is required. Please submit detailed site plans and elevations at time of filing.

Thank you for the opportunity to comment.

Very truly yours,

Brian Miskae, Director
Department of Planning

:se
cc: C. Suyama
B. Medeiros
K. Fairbanks

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCE

DEPUTIES

JOHN P. KEPPELER, II
DONA L. HANAIKE

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

January 5, 1993

LOG NO.: 6994
DOC NO.: 9212AG75

Mr. Milton Arakawa
Michael T. Munekiyo Consulting, Inc.
1823 Wells St., Suite 3
Wailuku, Maui, Hawaii 96793

Dear Mr. Arakawa:

SUBJECT: Historic Preservation Review of the Draft Environmental Assessment for the Maui Community College Buildings "S" and "J" Kahului, Wailuku, Maui
TMK: 3-8-07: 40

Thank you for the opportunity to comment on this document.

This EA indicates that no historic sites are present on the project area based on the findings of an archaeological survey and subsurface testing. Instead, evidence of previous land alteration activities was observed. We concur with the assessment that the proposed construction of these buildings will have "no effect" on historic sites. However, this determination is contingent upon the submission of a final report on the results of the survey. In general, we do not find preliminary reports acceptable for environmental documents. In this case, however, the findings are negative and there is sufficient information included in the report to enable us to review the adequacy of the study. The final report should be submitted to our office and used in the final EA.

Please contact Ms. Annie Griffin at 587-0013 if you have any questions about these comments.

Sincerely,

DON HIBBARD, Administrator
State Historic Preservation Division

AG:aal

JOHN WAIHEE
GOVERNOR

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

ROBERT P. TAKUSHI
COMPTROLLER

LLOYD I. UNEBASAMI
DEPUTY COMPTROLLER

LETTER NO. PM-1007.3

JAN 8 1993

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

Dear Mr. Hibbard:

Subject: Maui Community College
Buildings "J" and "S"
D.A.G.S. Job Nos. 15-31-5871 and 15-31-3831

Thank you for your letter of January 5, 1993, pertaining to the Draft Environmental Assessment for the subject project.

The final archaeological inventory survey for the subject project has been submitted to your office and is included in the Final Environmental Assessment.

We appreciate the opportunity to respond to your comments. If you have any questions, please call Eric Nishimoto of our staff at 586-0468.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

EN/si

References

REFERENCES

Community Resources, Inc. Maui County Community Plan Update Program Socio-Economic Forecast Report, March 1992.

County of Maui, The General Plan of the County of Maui, 1990 Update.

County of Maui, Wailuku-Kahului Community Plan, 1987.

State of Hawaii, Department of Business and Economic Development, Data Book, 1990.

Telephone Conversation with Steven Yamamoto, Corps of Engineers, November 23, 1992.

U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, 1972.

University of Hawaii, Department of Geography, Atlas of Hawaii, Second Edition, 1983.

Appendices

Appendix A

Archaeological Inventory Report

AN ARCHAEOLOGICAL INVENTORY SURVEY FOR THE PARKING LOT EXPANSION AND RETENTION BASIN ON MAUI COMMUNITY COLLEGE CAMPUS (TMK 3-8-07: 40 & 43), *AHUPUA'A* OF WAILUKU, DISTRICT OF WAILUKU, ISLAND OF MAUI

Prepared for:

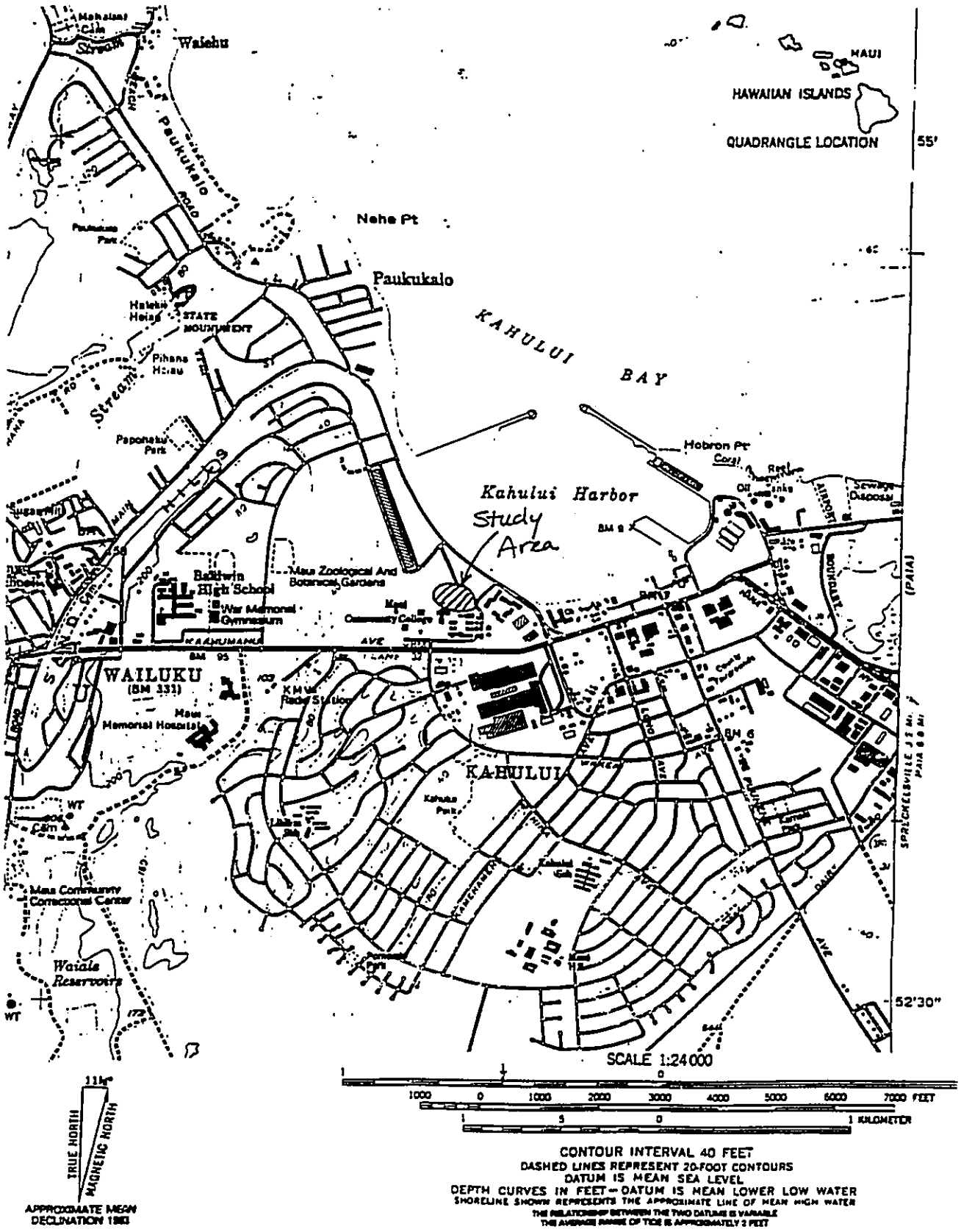
Gima, Yoshimori, Miyabara, Deguchi Inc.
Wailuku, Hawaii

Prepared by:

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

Walter M. Fredericksen
Demaris L. Fredericksen

December 1992



MAP 1 – Topograhic Map, U.S.G.S., Wailuku Quadrangle, Scale 1:24,000, 1983.

TABLE OF CONTENTS

LIST OF MAPS, FIGURES AND PHOTOGRAPHS

PHOTO 3 - Stone and concrete planter, or flower bed, near the poured concrete floors, 18th Service and Supply Battalion, USMC.

PHOTO 4 - Row of coconut trees along the road into the USMC Base, taken in 1946 after the tsunami. (Maui Historical Society Archives)

PHOTO 5 - Same line of trees, 1992.

PHOTO 6 - View of the makai side of the study parcel showing damage done during the 1946 tsunami. (Maui Historical Society Archives)

PHOTO 7 - Quonset Huts which were part of the USMC Base, with house displaced by the 1946 tsunami. (Maui Historical Society Archives)

PHOTO 8 - Backhoe testing in dense vegetation on subject parcel

INTRODUCTION

In early June, 1992, we were contacted by Gima, Yoshimori, Miyabara, Deguchi Inc. (GYA Inc.), regarding an archaeological inventory survey for a proposed State of Hawaii expansion of the University of Hawaii, Maui Community College Campus, at Kahului, Maui, Hawaii (D.A.G.S. Job No. 15-31-4953; GYA Project No. 91125.3). The proposed expansion plans include extension of the present, large automobile parking lot on the north side of the existing campus and construction of a large retention basin that will run along the north and east border of the extended parking lot area. Proposed construction of Buildings "J" and "S", while included in the overall construction project proposal, were not part of archaeological research task. This was determined through consultation with the SHPD and site-proposal maps, which show one of the proposed buildings slated for construction on the existing campus Parking Lot (Building "S"), and the other (Building "J") in an area already disturbed and surveyed.

Following an initial assessment of the project area, we submitted a proposal for the completion of the necessary archaeological inventory survey work. Our proposal included surface surveying, subsurface testing and preparation of a report on the findings of the survey. The proximity of the present parking lot and its attendant land disturbance during construction, coupled with military construction during the Second World War when the parcel was part of the United States Marine Corps, 18th Service Battalion camp, have contributed to the heavily disturbed nature of the site area.

Our proposal was submitted in June, 1992. It was accepted by October 6, 1992. Background research and fieldwork began in October and we submitted a preliminary report on findings of the survey November 4, 1992. Additional work in early/middle November was concluded, followed by preparation of the archaeological inventory survey report.

SURVEY AREA

The subject parcel comprises ca. 5 acres and is bordered on the north and east side by Kahului Beach Road and Kahului Harbor (Map 1). The south and east border is formed by the access road to the Harbor Lights Project and the west and north border lies adjacent to the Maui Community Arts and Cultural Center project. The harbor shoreline lies ca. 20 - 50 meters north of Kahului Beach Road. The land for the two projects is part of TMK: 3-8-07: 40 & 43 (Map 2), at "Owa and Kalua, Kahului, Wailuku, Maui, Hawaii", as stated on the topographic map prepared by Robert T. Tanaka, Civil Engineer, and is included in the present University of Hawaii, Maui Community College campus (Map 3). It is part of the former large ahupua'a of Wailuku.

NATURAL HISTORY

The entire University of Hawaii, Maui Community College campus is geologically part of the Kula series of lava flows. It lies in the interface area of dominant entisols made up of volcanic ash/beach sand derived soils and oxisols which are exceptionally stable lowland soils (University of Hawaii, 1983, pp. 39-41).

Puuone Sand (PZUE) soils are defined for sandhills near the ocean for Maui Island. A description includes the following-- "In a representative profile the surface layer is grayish-brown, calcareous sand about 20 inches thick. This is underlain by grayish-brown, cemented sand. The soil is moderately alkaline in the surface....Permeability is rapid above the cemented layer. Runoff is slow, and the hazard of wind erosion is moderate to severe." (Foote, 1972, p. 117)

Soil description ranges from primarily aeolian sand and some sand lenses with color variations, through various mixes of landfill, including crushed rock, beach pebbles and coral chunks. During the survey, soil types were described using Foote (Ibid.) and the Munsell system. Some recent humus soil has formed in surface zones from vegetative decay, but no thick deposits were observed in the test trenches excavated. Root penetration of the loose, sandy soils is intense throughout the survey area, with depths up to 40 cm. below surface dominated by a matrix of intermeshed roots of grasses and woody plants.

Considerable disturbance from previous land use of the parcel has obliterated any previous surface features that might have been present, with the exception of poured concrete

foundations associated with World War II military use. Large coastal dunes lie to the west and north of the subject parcel. Presently, low elevations with averages between 6 and 12 above mean sea level feet are typical. Portions of the area appear to have been part of a lowland swamp wetland. Evidences of earth-fill activities were discovered during the archaeological survey. It was also noted that the portion of the parcel bordering Harbor Lights Complex is still a wet swamp-like depression. The maximum elevation of the area at the extreme western border increases to ca. 24 feet.

Elevations range from 6 to 14 feet above mean sea level, with ground water apparent from ca. 1.5 to over 3 meters below surface in most areas depending on the elevation. At the western border elevations increase to over 24 feet on the knoll along the bordering edge, although the knoll is off the property. Near the southeast border to the Harbor Lights Complex, elevations are uneven, alternating from 6 to 8 to 6 to 10 feet, creating a "washboard" effect from southwest to northeast, with Kaihee Place at an elevated 12 feet. This part of the parcel is presently quite swamp-like. Kahului Beach Road also has an elevation of ca. 12 feet. Land between the subject parcel and Kahului Beach Road (both part of Lot 1A, same TMK) exhibits an elevation on average of ca. 6-7 feet with a berm to 12 feet at the mauka Kahului Beach Road border. An additional berm on the mauka side of the low area to ca. 8-9 feet above sea level. This low-lying land serves as a catchment for storm runoff, with four pipe-culverts passing under Kahului Beach Road and the beach into Kahului Harbor for drainage.

The parcel is covered with heavy undergrowth of various soft fiber and woody plants. The most abundant and notable large plants include koa haole (Leucaena leucocephala), Kiawe (Prosopis pallida), Castor Bean (Ricinus communis), Tree Heliotrope (Messerschmidia argentea), and coconut palm (Cocos nucifera), which are found planted in rows bordering a former road on the Marine Base (Photos 4 & 5). Smaller species forming the understory include herbacious plants (Spinifera sp.), some Buffle grass (Cenchrus ciliarus), and other grasses, lantana (Lantana camara) and morning glory (Ipomoea indica). Other exotic, less noticable species are also present. No significant faunal remains were observed during the survey.

BACKGROUND HISTORICAL RESEARCH

The subject parcel is part of the large ahupua'a of Wailuku, which included land from Wailuku to Paia, and extending nearly halfway across the isthmus. This ahupua'a is located in,

foundations associated with World War II military use. Large coastal dunes lie to the west and north of the subject parcel. Presently, low elevations with averages between 6 and 12 above mean sea level feet are typical. Portions of the area appear to have been part of a lowland swamp wetland. Evidences of earth-fill activities were discovered during the archaeological survey. It was also noted that the portion of the parcel bordering Harbor Lights Complex is still a wet swamp-like depression. The maximum elevation of the area at the extreme western border increases to ca. 24 feet.

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BACKGROUND HISTORICAL RESEARCH

The subject parcel is part of the large ahupua'a of Wailuku, which included land from Wailuku to Paia, and extending nearly halfway across the isthmus. This ahupua'a is located in,

and encompasses roughly half the land area of the Wailuku District. A detailed summary of pre- and post-European contact history for this ahupua'a is presented in two recent reports on land parcels nearby the present, subject parcel (Kennedy, et. al., September 1992a, and September 1992b). The subject parcel is located in the eastern half of the ahupua'a, an area apparently little used for agriculture or habitation until late in the 19th century, when some of it was put into sugarcane production.

Descriptions from documents, and information on historic maps lead numbers of authors to conclude that the eastern portion of the ahupua'a was little used in pre-contact times, because of it's relatively barren landscape (Kennedy, 1992a, pp. 11-14). Referring to land use in the mid-eighteenth century, Kennedy states, "The only mention of habitation sites in the eastern portion that could be found is that referring to the fishermen's huts fronting Kahului Bay." (Ibid., p. 8). The population of the ahupua'a of Wailuku was listed as being 2,256 in 1831-32 (Cordy, 1978, p. 59).

After the Great Mehele in 1848 it was declared to be Crown Land, set aside to support the "royal state and dignity". After the death of the last Kamehameha (Lot, or Kamehameha V) in 1872, the land went to his sole heir, his sister Ruth. To settle debts, Princess Ruth Ke'elikolani sold one-half interest in the Crown Lands of Hawaii to Claus Spreckels in 1882. He had already leased 16,000 acres in the eastern portion of the ahupua'a in 1878. Land Grant 3343 from King Kalakaua in 1882 gave Spreckels the 24,000 acre ahupua'a of Wailuku in return for the surrender of his claim to one-half the Crown Lands of Hawaii (Adler, 1966, pp. 262-64).

By 1899, Alexander & Baldwin controlled the ahupua'a and it was utilized for pasturage and some agriculture. The Kahului Railroad Company acquired portions of the land for their transportation network in the 1870's, and the railroad track-bed was built, traversing the subject parcel. The railroad remained in service until the mid-1960's, when it was dismantled (Fredericksen, September 1988, p. 8). Map 5 shows the route of the Kahului Railroad System in 1955.

Oral History

Information on land use of the survey parcel during World War II was provided by Mr. Jack Crouse during an oral history interview in December, 1992. He was a U.S. Marine who came to Maui in 1944, and was stationed with the 18th

Service Battalion. Mr. Crouse, a local businessman, has lived on Maui since that time. He continues his involvement with the U.S. Marines, and is active in a number of their organizations. Information relevant to land use of the survey parcel is presented below.

During the Second World War there were a number of U.S. Military camps located on Maui. Two U.S. Navy Airwings were centered around Kahului and Pu'unene, each with their own landing field. These airwings trained pilots for air combat. The Fourth Division, U.S.M.C. was stationed at Camp Maui, and the camp served as a staging and training area for marines heading overseas in the Pacific Theater (See, Proehl, et al., 1946, for a detailed history of the Fourth Division Marines during World War II). NOTE: Other reference is made to Camp Maui as a rest and recreation camp for military personnel serving in the Pacific.

In 1944, the 18th Service Battalion (U.S.M.C.) was attached to the Fourth Marine Division at Camp Maui, and their camp was built and located between the present University of Hawaii, Maui Community College campus and Kanaloa Road, which is about .5 kilometer to the north. Remains of various poured, reinforced concrete floors and foundations of buildings and structures which were part of the 18th Service Battalion military camp complex are present on the survey parcel (Photos 2 and 3; Figure 8). The mission of the 18th was to provide supplies for the 4th Marines and to be responsible for the dispersal and disposal of military equipment and supplies on Maui following the conclusion of the war. Surplus material was shipped to the mainland and elsewhere.

NOTE: According to a Maui News article dated July 24, 1948, the former Marine camp of the 18th Service and Supply, was turned over to the new owner, the Kahului Railroad Company.

A series of Quonset Huts were built along Kahului Beach Road by the U.S. Navy "SeaBees", as part of the storage/office space for the camp (Photo 7 shows 1946 tsunami damage). They were fronted on the makai side by the railroad. After the camp mission was concluded in 1947, the Quonset Hut complex continued to be used by the Kahului Railroad Company until it terminated service in 1965. Private commercial businesses utilized them until their destruction and removal during the 1980's.

Mr. Crouse was the military Aide to the camp commander, Lt. Colonel Park. Colonel Park lived in one of a series of

homes on the beach where the present Maui Beach Hotel is located. The homes were originally built for plantation administrative personnel. The present Harbor Lights Complex sits on the site of a former plantation village or camp, housing workers and their families.

The coconut palm trees described earlier in this report lined one of the road entrances to the camp near the present Harbor Lights Project (Photos 4 and 5). A second camp entrance was located near Kanaloa Road. Professors Ernest Rezents and Bruce Palmer, University of Hawaii, Maui Community College, provided additional oral history on the existing palm-tree row. Apparently, the Kahului Railroad ran its track just to the north of the row of palms, drawing alongside the Quonset Huts complex for loading and offloading of materials. Professor Palmer recalls discovering railroad tie timbers in situ along the north border of the palms during several biology field trips in the late 1960's. "Raw Fish" Camp laid along the south border of the palm tree row and consisted of camp houses for plantation laborers and their families. Professor Rezents, a life-long resident of Maui, recalled "Raw Fish" camp as being an "old-style" plantation settlement in existence prior to World War II. He had no information regarding the significance of the camp name.

Landfill materials have been freely deposited on the parcel during the past. Some of these materials may have resulted from efforts to fill and raise the elevation of the barren lowlands reported in this area during the latter part of the 19th and early 20th centuries. An article in the Maui News, June 8, 1907, states: "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."

When the first harbor breakwater wall was built in 1904 the harbor was dredged and the dredge fill was used in filling the lowland areas of Kahului to make it more suitable for dwellings and commercial uses (Kennedy, 1992, p. 12). Jack Crouse (personal communication, 1992) witnessed Kahului Harbor dredged material being deposited on the survey parcel and other land in the areas around the harbor shortly after the war. Certainly, the 1946 Tsunami that devastated Hilo, Hawaii, and caused considerable damage to buildings and material at the Marine camp on the subject parcel contributed to land disturbance, as shown in photographs taken at the time (Photos 4, 6 and 7).

Following the war, the site was used for the new home of Maui Vocational School. This institution, originally located behind the Kahului School, was built in 1931 after the Territorial Legislature authorized $20,000 for its construction in 1929, with legislation known as the Paschoal Bill. An article in the Maui News dated July 22, 1931, describes the new school:

> "The building itself is an attractive one-storied structure finished with sand-colored walls, red roof, and a pale green trim in order to harmonized with the Kahului Elementary School close to which it has been erected.
>
> It houses an automobile shop, a carpentry shop, a machine shop, an electric shop, one main classroom, and offices for the principal, store rooms and the like.
>
> The three main wings are connected on the street side by an arcade which also serves as a corrider between the main shop building and sinble classroom...."

Mr. Duncan Sinclair was initially the machine shop instructor, and became the school's Principal in 1941, serving in that capacity for 25 years until his retirement in 1966. He wrote a brief history of the Maui Vocational School following his retirement, from which portions of the following were taken. Upon taking over the job as principal, Mr. Sinclair recognized the need for expanding the existing programs and adding new ones. A dressmaking program was added. Having outgrown the existing campus, Sinclair approached Legislator Harold Rice, who negotiated with Frank Baldwin, Manager of Hawaiian Commercial and Sugar Company. HC & S donated 11.5 acres on Kaahumanu Avenue "for the specific use of vocational education students who wanted to learn a trade, and also for those who could not afford to go to college." Three new shops were built at a cost of $68,000 per building. These were the auto, carpentry and machine shops. In the next two years, an administrative/classroom complex was completed. By 1955, two small buildings were moved from NASKA to house the auto body shop and architecture/drafting programs, and the expansion was completed. At this time 750 students were enrolled.

In 1958, the name was changed to Maui Technical School. In 1965 the University of Hawaii created the Community College System, and Maui Community College came into being. The addition of general education programs required the building of a "new, upper campus", to completment the "lower campus" buildings and vocational programs already in existence. The present expansion is a continuation of that process.

A Drive-in Movie Theater occupied much of the space

presently used for the main MCC Parking Lot and part of the subject survey parcel. It was operational until the construction of Maui Community College campus began in 1967. No indicators of its former existence were discovered during the survey, although the theater and its concession buildings, viewing screen structure and land sculpting for automobile parking/viewing must have required considerable land disturbance during its construction. Landfill and leveling activities for the present MCC parking lot probably removed and/or covered any traces of this former complex, including the poured concrete foundations and floors for the concession stand and projection building , as well as the viewing screen.

Present use of the study area includes several formerly bulldozed access roads, now heavily overgrown, and two, existing blacktop roadways in the area of the MCC campus Agricultural building and field complex. Notably in this area are numbers of heaped-up sand and construction detritus piles remaining from former unknown clearing or construction activities. Along the western border with the Maui Community Arts and Cultural Center, bulldozed piles of construction refuse of all sorts form a wall-like barrier up to 3 meters in height.

BACKGROUND ARCHAEOLOGICAL RESEARCH

After perusing the available literature and consulting with the State Historic Preservation Division, we conclude no archaeological work has been done on the subject parcel. However, a number of surveys have been completed on parcels nearby. Archaeological Consultants of Hawaii (Kennedy, 1990), surveyed the site of the Maui Commmunity Arts and Cultural Center, located on the property contiguous to the subject parcel. No archaeological data were recovered after extensive subsurface survey. Donham (1990) surveyed the Maui Palms site, which nearly borders the subject parcel to the north and east. Two potential historic sites were determined to be contained in introduced land fill, and thus not archaeological sites.

The authors conducted surveys along Kahului Beach Road and Lower Main Street at four different sites (Fredericksen, December, 1990; January, 1992; November, 1992, and December, 1992). Two of the survey areas are located along Lower Main Street about 2 kilometers north and west of the subject parcel. Both of these sites lie along the former Kahului Railroad track-bed. Nothing remains of it on one site (TMK 3-4-39: 77; Fredericksen, December, 1990), and only a portion about 15 meters long remains on the other, adjacent to Lower Main Street (TMK 3-4-39: 82;

Fredericksen, January, 1992). Neither of these sites produced any pre-contact archaeological materials.

The two most recent surveys, TMK 3-8-07: 123, the Nisei Veterans Memorial Center, and TMK 3-8-07: 38, the A & B Properties OWA Subdivision are located in the dune areas near the beach, only about one half kilometer to the north. Site 50-04-3119B, on the Nisei Veterans Memorial Center produced pre-contact archaeological cultural materials and a very early radiocarbon date of 1790 +/- 70 RCYBP (Stuiver and Pearson calibrated date: 233-410 A.D.). Cultural materials included midden, a one-piece fishhook, coral files, basalt flakes and hammerstones. The artifacts are consistent with what would be expected in coastal dune cultural deposits, i.e., representing activities related to coastal resource exploitation (Fredericksen, December, 1992). Data recovery at that site is presently continuing.

The OWA Subdivision site, TMK 3-8-07: 38, contains historic materials and remnants of the former Kahului Railroad track-bed (Site 3112) and Makaweli Rock Crusher Mill (Site 3135), but no clear pre-contact Hawaiian archaeological sites were discovered (Fredericksen, November 1992). The coastal beach dune no longer extends eastward beyond this site, having been removed during numerous landmoving activities for other construction projects lying to the south and east.

A Bernice P. Bishop Museum survey party described Site 50-04-1172, TMK 3-8-36: 94, during a 1972 survey. It was an archaeological site containing midden and 3 pre-contact artifacts, but no further work was carried out although it was recommended that further work be done at a future time (Connolly, 1973).

With the exception of Site 50-04-3119 and Site 50-04-1172, all perused archaeological literature of surveys nearby the subject parcel did not produce indications of pre-contact land use in the past.

Settlement Pattern Summary

The ahupua'a of Wailuku was large, covering 24,000 acres and extended through several cultural zones. It was most heavily inhabited in its western portion, where there was more available water. The eastern portion was comparatively dry and barren. Cordy (1978, p. 59) gives population figures for the ahupua'a in 1831-32 as 2256 persons.

The subject parcel lies near the beach in what is

described by Kirch (1985) as a "coastal living zone". Prehistorically, these were zones where housing might be found, especially in dry areas with a nearby freshwater source. In beach coastal areas, "dry areas" would probably be limited to elevated dunes. Land around Kahului Bay was swampy, mauka of the coastal dunes, shifting to barren lands inland in the eastern portion of the ahupua'a.

Reports of fishing huts fringing Kahului Bay in the mid-eighteenth century have not been substantiated by recent archaeological work in the area. This is most likely due to the disrupting effects of constructing Kahului Harbor coupled with the temporary, insubstantial construction of the huts. Expansion and enclosure of the Harbor within the Bay required considerable dredging and the construction of seawalls, breakwaters and piers. These activities probably destroyed any traces of fishing huts that may have been in the area.

As discussed earlier, the study parcel has been greatly disturbed by various landfill and construction activities. If there were coastal dunes originally present on the property, they are long gone. If there were any temporary subsistence habitats, they probably were also destroyed during these processes.

Human burials historically occur in coastal dune areas. Because of the destruction of possible dunes on the parcel, the probability for discovery of human burials is low, but cannot be ruled out.

ARCHAEOLOGICAL FIELD SURVEY

From four to six field personnel were involved in the field survey. Principal investigators were Demaris L. Fredericksen, MA, PhD (ABD) and Walter M. Fredericksen, MA, PhD (ABD). The research strategy included a walk-over reconnaissence surface survey of all accessible areas. Possible features were flagged for further observation and/or testing by manual or mechanical excavation. The subsurface backhoe tests emphasized exploration of what appeared to be relatively untouched portions of the parcel. Floral and faunal observations were made and recorded during the initial survey.

SURVEY FINDINGS

This parcel is best described as being very disturbed by

previous landfill projects, military construction, railroad bed construction, commercial projects and most recently, State of Hawaii projects concerned with construction of the University of Hawaii, Maui Community College campus. If there were coastal dunes on this parcel, they were probably destroyed during early landfill and other construction activities, further reducing the possibility of any archaeological features remaining on the parcel.

A line of coconut palms dominate the vegetative landscape. These lined a Kahului Railroad Line, and later the roadway leading into the 18th Marine camp and are shown in Photo 4, as they looked in 1946, just after the tsunami. Photo 5 shows the trees today. Mr. Ernest Rezents estimates that they are about 75 years old. The Kahului Railroad tracks, restored after the war, ran north of them, and ties remained until the 1970's.

Several features exist on the property associated with the military operations in World War II. Three poured concrete foundations remain, two which appear to be latrines or showers. These are 5.5 meters long and 3 meters wide and are bifercated by a wall foundation. Each bifercation has a 75 cm. doorway on the northern side. The wall foundations are elevated about 5 cm. above the floor level, and are 10 cm. thick. Each room has a drain, one is covered with grating and the other open. The other foundation is somewhat smaller, being 3.7 meters in length and 3 meters wide, and has only one 75 cm. wide entrance.

Another feature appears to be a pond of some sort. It is made of concrete and rounded stones, and stands about 60 cm. above ground level. The depression is 45 cm. deep. Along side it is a horse-shoe shaped concrete and rounded stone flower bed, 2.4 meters in width, and 1.6 meters long. A large kiawe tree is growing in the middle. A poured concrete L-shaped sidewalk, 1 meter wide completes the configuration. See Figure 8, and Photos 2 and 3.

Broken concrete slabs, pipes of all types and sizes (i.e., steel, galvanized steel, concrete, plastic and composite), discarded automobiles and parts, quantities of discarded construction material and equipment, including electrical wiring and insulators, timber, and general types of household refuse and/or litter are found on or buried in the parcel. Remnants of basic shelter camps, some apparently only recently abandoned by their itinerant builder/dwellers, were found scattered throughout the parcel.

Landfill from the construction of the present campus parking lot extends up to 40 meters into the subject parcel, increasing

elevations as much as 1.5 meters. Composition of the fill varies, but includes discarded construction materials, oxidized machinery and remnants of other equipment.

Surface features included floor and foundation remains of World War II military installations mentioned above, and the Kahului Railroad trackbed which crossed just north of the parcel and was removed during construction of the Harbor Lights Project. There had also been several residential dwellings just north of the project area which were removed during the early 1970's. Nothing remains of these former residences. Their architectural style can be seen in Photos 6 and 7.

Subsurface excavation was done with a mechanical backhoe. Trenches were similar in dimensions throughout the site, measuring ca. 4 meters in length, by .5 meters in width, and 2.5 meters in depth, depending on depth of groundwater. Most trenches were placed in areas of least apparent disturbance. Sifting was done only where it seemed cultural materials might be present in the fill. A .25 mesh screen was used.

A total of 22 backhoe test trenches were excavated, recorded and mapped. Profiles were prepared for trenches that were stratigraphically representative of other trenches or were unusual for their content. Map 4 shows the location of the backhoe trench series. Table #1 summarizes detailed information on the backhoe test trenches.

No recognizable features or identifiable pre-contact Hawaiian artifacts were recovered from any of these trenches. Recent historic artifacts discovered consisted of aluminum drink containers, glass bottle sherds, plastic bits, oxidized metal (e.g., auto parts, machinery, etc.), and the like. Several abandoned automobiles decorate the landscape. A nearly complete "shot" glass was recovered, and may have been from the World War II Marine military base, as were several sherds of white crockery characteristic of military issue.

SUMMARY AND CONCLUSIONS

As noted throughout this report, the most notable features of this survey include the extreme land disturbance from previous construction projects on the parcel. Historic references note the unused, barren nature of the land in the vicinity of the study parcel in early historic times. Archaeological work, including numerous backhoe tests, done on the contiguous property (Maui Community Arts and Cultural Center) produced no cultural

materials (Kennedy, 1990). Nothing remains of the coastal sand dunes that may have existed in the immediate area, or on the study property. No cultural features or early artifacts were discovered in any of the backhoe test trenches during the present survey.

We conclude it is very unlikely that significant archaeological materials are present on the parcel. The remains of the World War II, 18th Service Battalion, U.S.M.C. base camp might have significance under Criterion D. However, it is noted here that the U.S.M.C. camp was not built until 1944, making it less than 50 years old. Significance would have to be on the basis of public interest.

Although no evidences of human burials were found, the ever present possibility of their occurrence in sandy areas exists. For this reason we suggest monitoring in the early phases of site preparation and ground excavating/leveling, most particularly for the Retention Basin.

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TABLE 1

BACKHOE TRENCHES

Test Trench #1: Dimensions: 4 m x .5 m x 2 m in depth. Located near eastern corner of survey parcel. Surface matrix (decaying vegetation, root penetration), 15-20 cmbs, sand (7.5 YR 4/2) to 1.3 cmbs, chunks of reef coral fill at c. 1 mbs. Light-gray sand lens (7.5 YR 5/0) and ground water, 1.6 mbs. Sterile, no artifacts. See Figure 1.

Test Trench #2: Dimensions: 4 m x .5 m x 2 m in depth. Yellowish-brown sand (7.5 YR 4/2) to ground water at 1.45 mbs. Chunk of reef coral at ca. 1 m. No stratigraphy. Sterile, no artifacts.

Test Trench #3: Dimensions: 4 m x .5 m x 1 m in depth. This trench on sloping ground from c. 10' - 12' amsl. This represents the edge of the fill that was dozed in from the MCC parking lot construction. Mixed fill, excavation aborted at c. 1 mbs. No stratigraphy. Sterile, no artifacts.

Test Trench #4: Dimensions: 4 m x .5 m x 2.5 m in depth. Located in a depression north of dozed campus fill. Surface, light gray sand (7.5 YR 6/1) to c. 1.2 mbs, where a narrow band of crushed coral (c. 5 - 10 cm) separates upper layer from lower yellowish sand (7.5 YR 5/3) layer which continues to ground water at 2.25 mbs. Sterile, no artifacts.

Test Trench #5: Dimensions: 4 m x .5 m x 2.5 m in depth. Located in depression bordered with dozed fill, near fire hydrant (un-numbered). Yellowish brown sand (7.5 YR 4/2) to c. 2.4 mbs and ground water. Several large root castings, otherwise, sterile, no artifacts.

Test Trench #6: Dimensions: 4 m x .5 m x 4 m in depth. Located near near parking lot embankment.

Light-gray/beige sandy, compacted lens, (10 YR 7/2), slightly mineralized. At c. 2.6 mbs, some lithified sand. At a depth of c. 3.8 mbs, no apparent ground water. This was maximum backhoe depth. Sterile, no artifacts.

Test Trench #7: Dimensions: 4 m x .5 m x 3 m in depth. Surface to 45 cmbs, light- gray sand lens (10 YR 7/2), mixed fill. Some burned root and charcoal, recent deposit. From c. 45 cmbs to 1.6 mbs , light-gray sand with some lithified sand inclusions and whitish mottling (10 YR 7/1). From 1.6 to 2.75 mbs sand (10 YR 5/2) with some large chunks of beach coral fill. At 2.75 mbs, moist sand indicates ground water.
See Figure 2.

A dense, rounded basalt stone was recovered in the upper 45 cm lens, with no provenience. A broken piece of a possible canoe rubbing stone was also recovered near the surface in mixed matrix, with no provenience. There was no indication of any other possible artifact content and the recovered bits may have been brought in with fill material.

Test Trench #8: Dimensions: 4 m x .5 m x 2.5 m in depth. Sandy loam with grass and roots in matrix, to 20 cmbs. Light yellowish, coarse grained sand to 40 cmbs (7.5 YR 5/3). An intrusive lithified sand lens with same sand as above to 1.25 mbs. From 1.25 mbs, dark brown sand with some coral chunks as fill, to ground water at c. 2.2 mbs. No artifacts.
See Figure 3.

Test Trench #9: Dimensions: 4 m x .5 m x 1.5 m in depth. Surface root/grass matrix to 50 cmbs. Aeolian sand (7.5 YR 5/3), fine-grained and unstable. Trench wall continually collapsed and the trench was abandoned at 1.5 mbs. Sterile, no artifacts or inclusions.

Test Trench #10: Dimensions: 4 m x .5 m x 3 m in depth. Near property border with MCACC Project. Recently burned undergrowth and charcoal in matrix of sandy loam/humus to c. 40 cmbs. Bands of lithified sand to 2.2 mbs, with red clay lens

(2 YR 3/6) to bottom of trench (3 m mbs). Some large angular rocks at c. 2.75 mbs. Sterile, no artifacts.
See Figure 4.

Test Trench #11: Dimensions: 4 m x .5 m x 2 m in depth.
Near property border with MCACC Project.
This trench is characterized by large rocks, electrical insulators, construction lumber, piles of electrical wire, copper ground-strapping and other materials likely cleared from the old Quonset buildings formerly on the MCACC Project parcel.

Some of the insulator brand names included: Brookfield, New York, Whitall, Tatum, Hemigray, Green-Patent May 2 1893.

This portion of the parcel is extremely disturbed from various construction projects and the materials that were discarded here. These materials are mixed with sand and obviously have been moved to their present site.

Test Trench #12: Dimensions: 4 m x .5 m x 2 m in depth.
Mixed surface overburden to 60 cmbs of sand and root/grass material. Coral/stone fill to 1.25 mbs, gray stone/coral gravel mix to 1.85 mbs. A one foot long piece of 8" diameter concrete pipe was found at from 60-80 cmbs, along with a 2' long x 2" diameter metal pipe, a Coca Cola bottle glass sherd, a nearly complete "shot" glass, some porcelain sherds and beer bottle glass sherds. The material looks like possible harbor dredging, with stones and recent historic artifacts mixed with grayish "muck". Ground water was reached at 1.85 mbs.

Test Trench #13: Dimensions: 4 m x .5 m x 2 m in depth.
This trench bisects an old waterline pipe in its stone-filled trench . The fill is similar to TT #12, apparent dredged coral,sand and gray muck. There are numbers of pieces of concrete throughout the matrix. No artifacts.
See Figure 5.

Test Trench #14: Dimensions: 4 m x .5 m x 1.5 m in depth.
Located in a cleared road area, ground water

was reached through a homogeneous sand (10 YR 5/2) matrix at a depth of 1.40 mbs. Two pieces of coral were found in the matrix. No artifacts.

Test Trench #15: Dimensions: 4 m x .5 m x 1.60 m in depth. Homogeneous fill, with coral and sand (10 YR 6/2) matrix to groundwater at 1.60 mbs. At 55 cm to 85 cmbs, a 20 cm thick lens of 10 YR 4/3 sand intrudes the matrix. A single sherd of small bowl crockery was recovered.
See Figure 6.

Test Trench #16: Dimensions: 4 m x .5 m x 2 m in depth. From surface to 60 cmbs, a reddish-sand matrix with grasses and roots dominates. From 50 to 60 cmbs, a charcoal lens nearly runs the length of the trench. From 60 cm to 1.25 mbs, probable Harbor dredging fill of coral and sand dominates, with a yellow sand lens (10 YR 4/3) to 1.50 mbs. Dark gray harbor dredged "muck" extends to ground water at 1.65 mbs. Sterile, no artifacts.
See Figure 7.

Test Trench #17: Dimensions: 4 m x .5 m x 1.4 m in depth. Surface covered with swampgrass and recent bottles (vitamin, ink, catsup) and glass sherds, several broken, shellfish fragments and a marble.
Sand/coral probable harbor-dredging fill to ground water at 1.3 mbs. Subsurface fill was sterile, no artifacts.

Test Trench #18: Dimensions: 4 m x .5 m x 1.60 m in depth. As in TT #17, surface covered with swampgrass, and surface littered chunks of cement, beer bottles and glass sherds (Budweiser), a few sawn pig bones and a few unidentifiable shellfish fragments.
Coral/stone fill to 65-70 cmbs with numerous recent artifacts, e.g., rusted metal pipe, Dainia brown bottle, crockery fragments, rice vinegar bottle, green Star Ice & Soda Works bottle, a milk bottle top, a brown Purex bottle (top portion), Lysol Inc., Bloomfield, NJ. From 1 - 1.5 mbs, the fill matrix is dominated by the probable harbor dredged "muck". Ground water was encountered at 1.60 mbs.

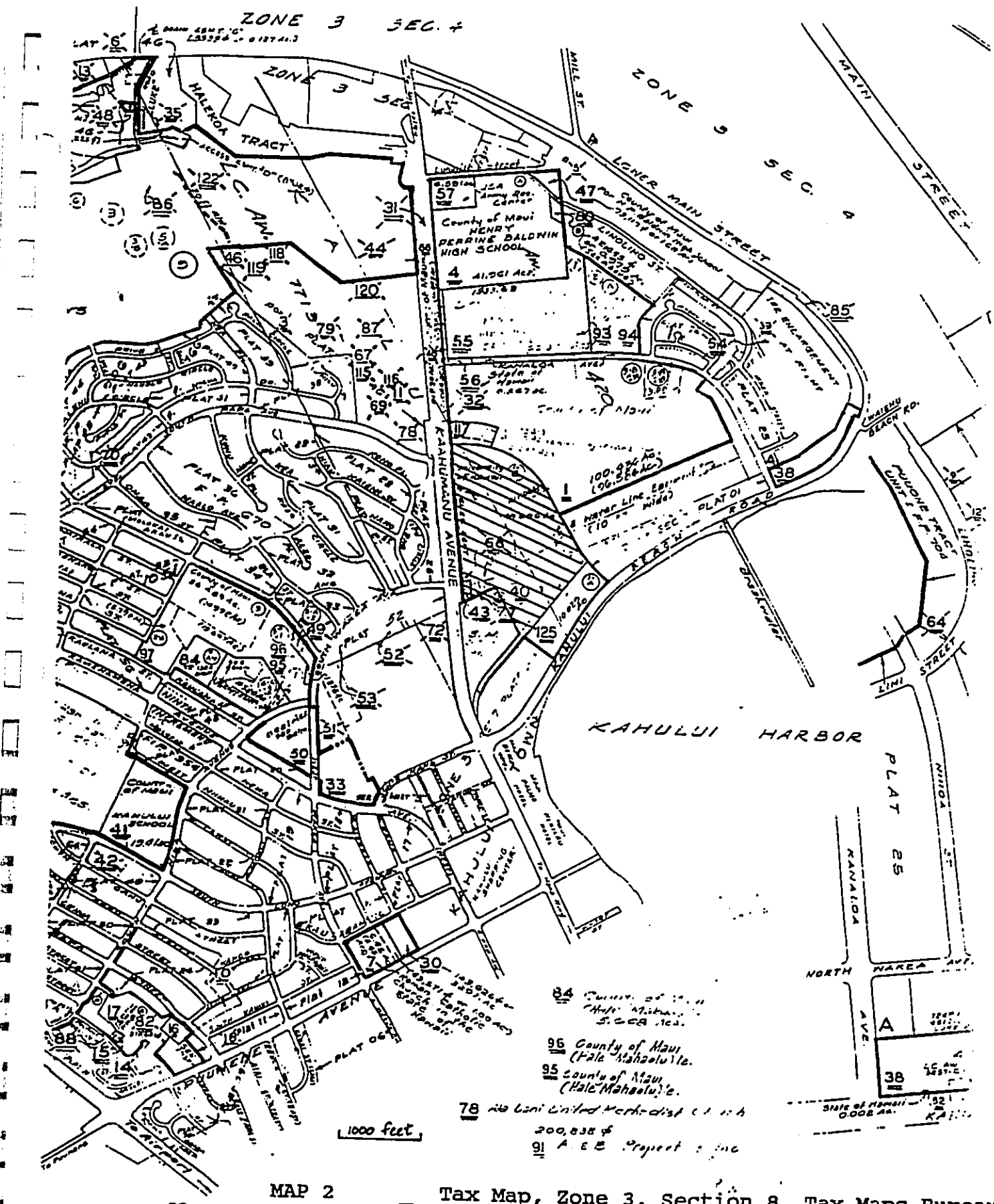
Test Trench #19: Dimensions: 4 m x .5 m x 1.9 m in depth. Located in area of dense undergrowth. Same coral/sand fill typical of other trenches. Ground water at 1.9 mbs. With the exception of a few beer bottle sherds at the surface, there were no artifacts, and the subsurface fill was sterile.

Test Trench #20: Dimensions: 4 m x .5 m x 2.2 m in depth. This trench exhibits the same homogeneous sand fill to 1.4 mbs and the dredged gray "muck" to 2.2 mbs, where ground water was encountered. Sterile, no artifacts.

Test Trench #21: Dimensions: 4 m x .5 m x 2 m in depth. From surface to c. 1 mbs, sand matrix (7.5 YR 5/2), with several calcified, cemented root castings. Brown sand (10 YR 3/3) to 2 mbs. no ground water. Sterile, no artifacts.

Test Trench #22: Dimensions: 4 m x .5 m x 1.3 m in depth. This trench was excavated to check the extent of disturbance from MCC parking lot construction activity. It was mixed matrix including discarded construction materials, equipment and various cast-off food and beverage containers, etc. Soil was mixed sand, concrete pieces and broken rock. There were no features or archaeological artifacts. The trench was aborted at 1.3 mbs.

The test trenches were generally sterile and showed mixed, confused soil. This probably resulted from fill materials being brought in from outside the parcel, or from cast-off materials and mechanical equipment grading activities connected with various past construction activities. A rather uniform consistency fill was discovered in numbers of the trenches, most probably being harbor dredged material described as "muck".

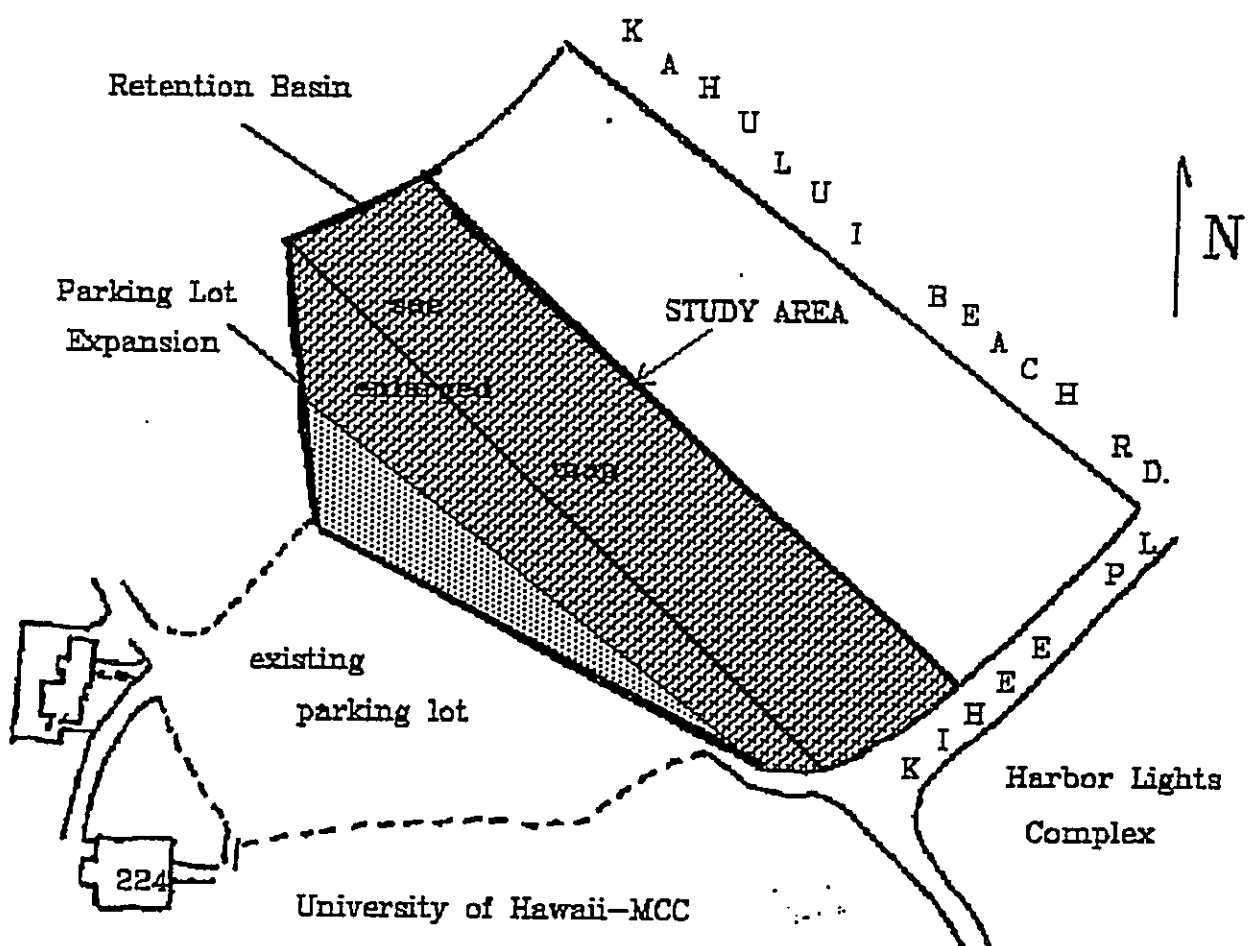


MAP 2 — Tax Map, Zone 3, Section 8, Tax Maps Bureau, State of Hawaii.

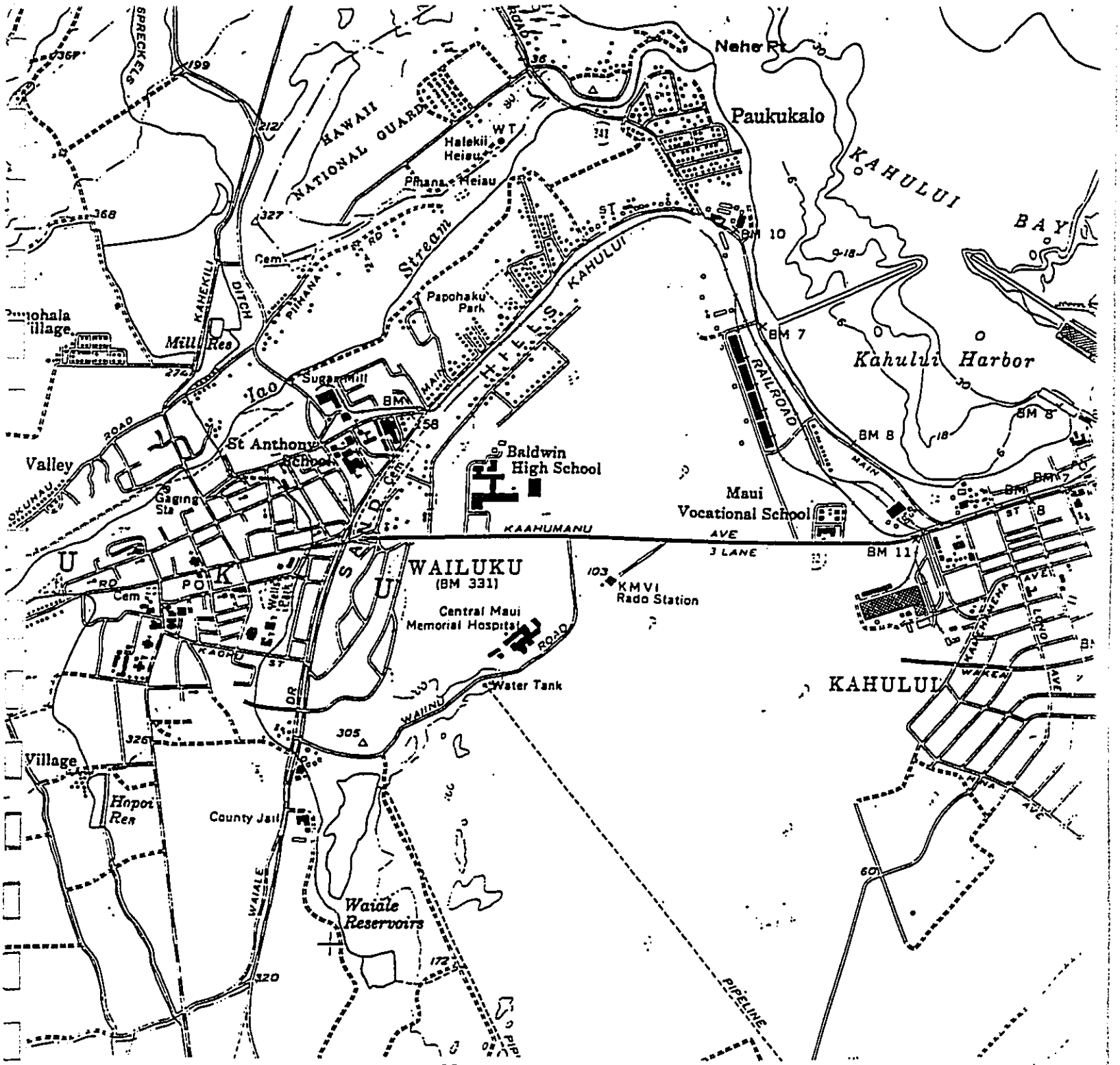
Note: All parcels owned by Alexander & Baldwin, Inc. unless otherwise noted.

Owner's, lessee's & vendee's names recorded on this tax map print may not be current. Please refer to ownership history sheets and field books for current owners.

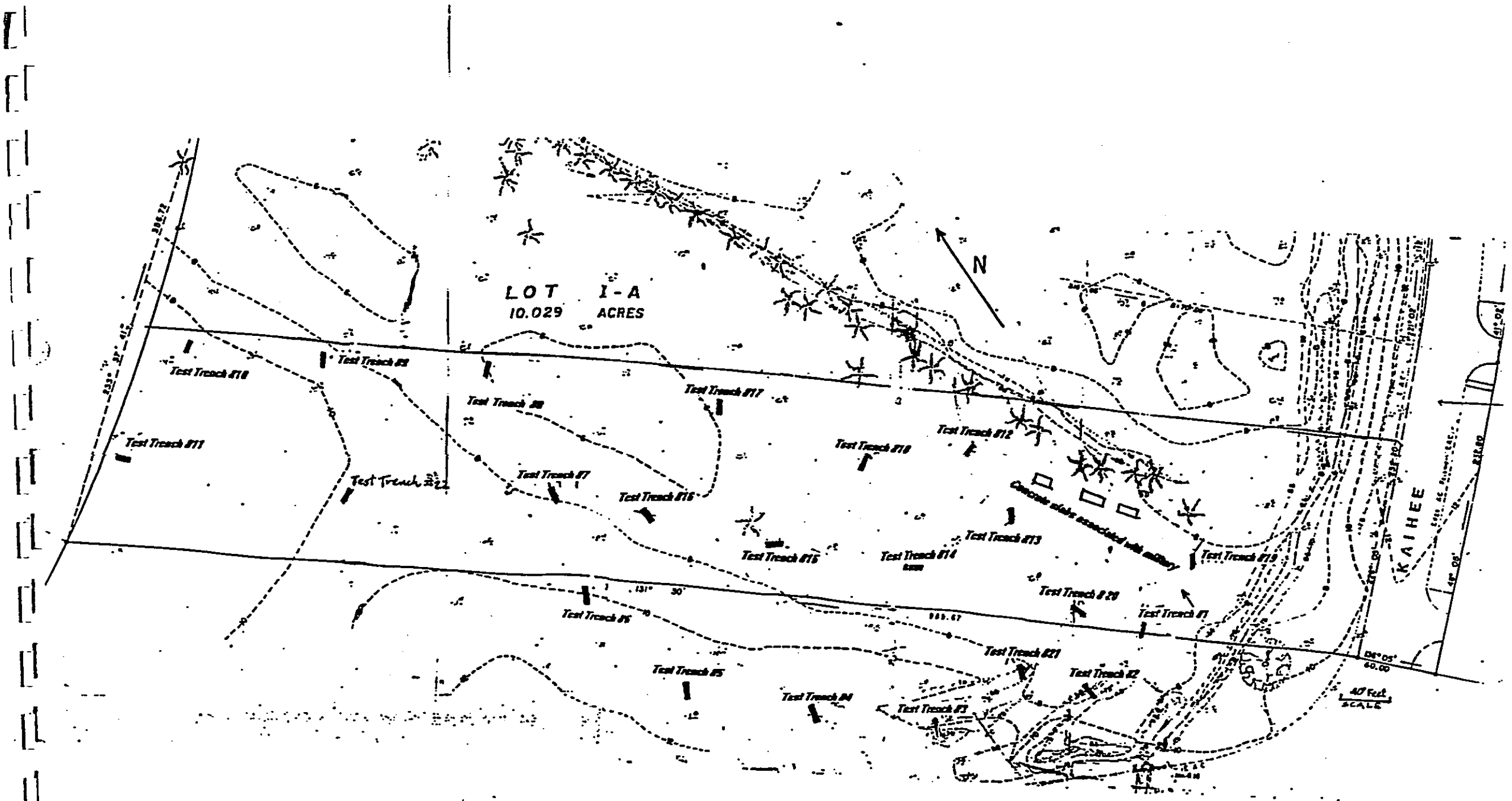
SUBJECT TO CHANGE MAR 20



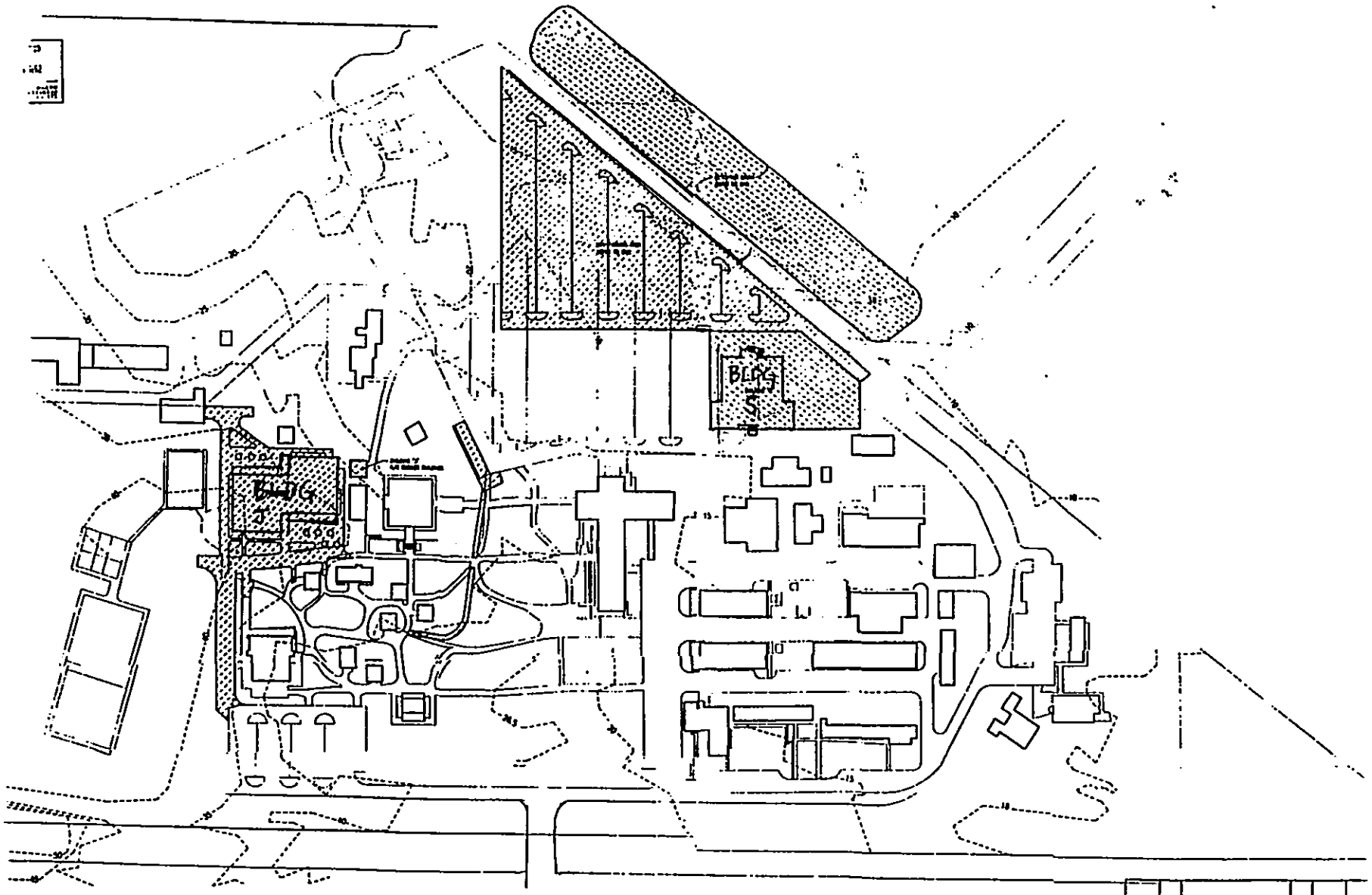
MAP 3 - Map showing the area contained in the inventory survey.



MAP 4 - Topographic Map, U.S.G.S., Wailuku Quadrangle, Scale 1:24,000, 1955, showing railroad line.



MAP 5 - Topographic site map, showing backhoe trenches, and concrete slabs associated with the military.



MAP 6 — Map showing the existing Maui Community College Campus, and areas to be expanded.

FIGURE 1: PROFILE TEST TRENCH 1

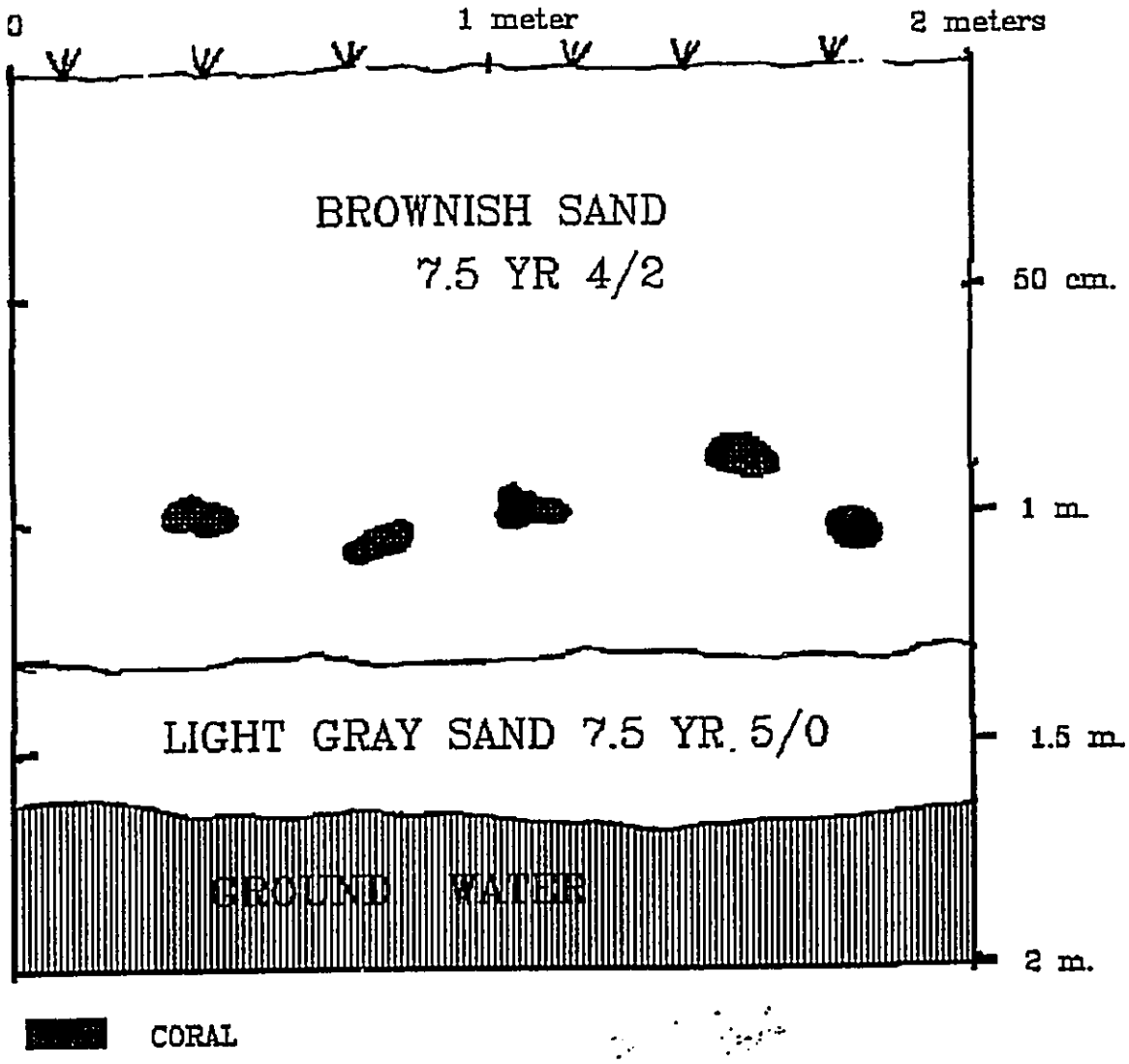


FIGURE 2: PROFILE TEST TRENCH 7

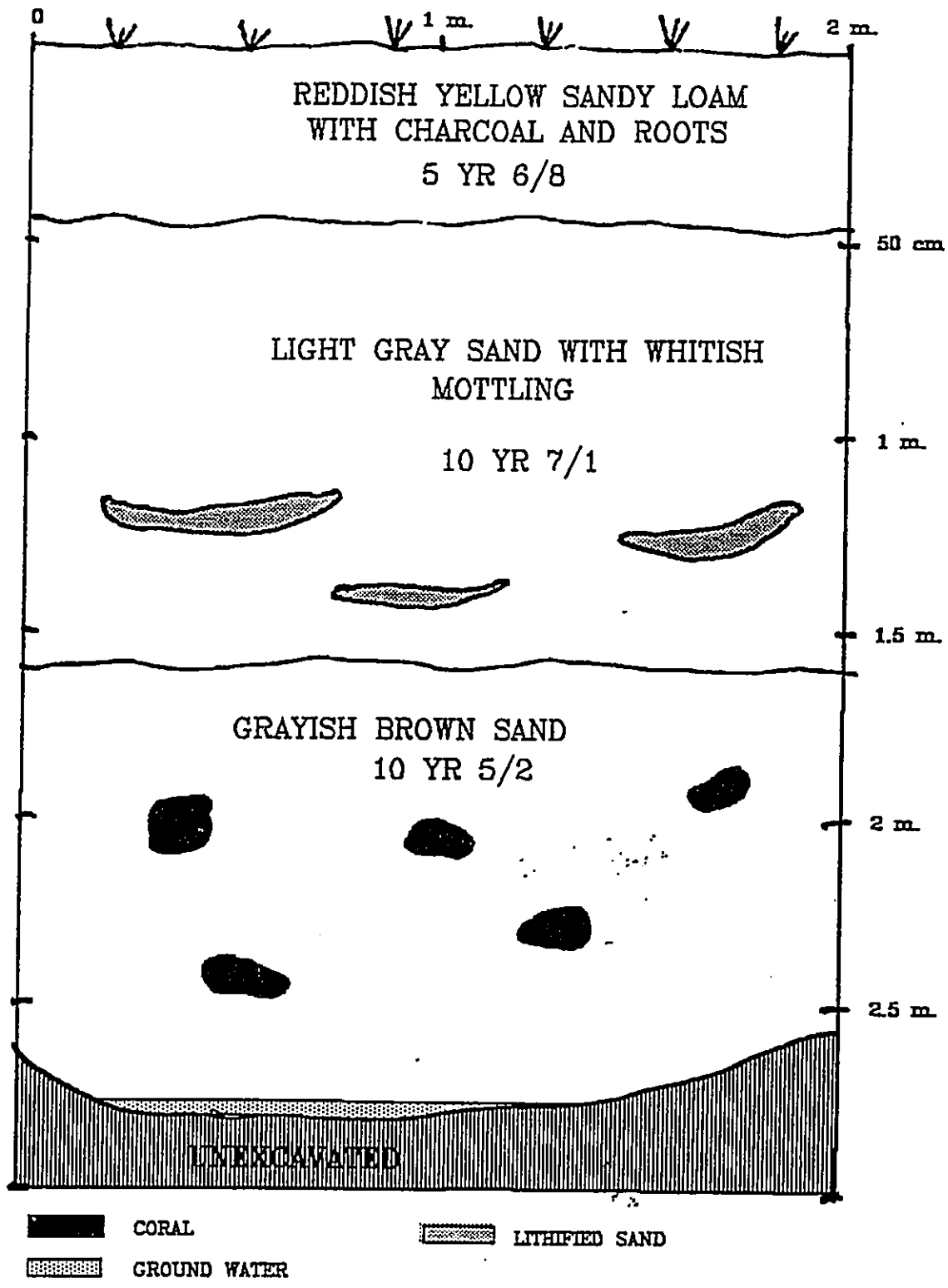


FIGURE 3: PROFILE TEST TRENCH 8

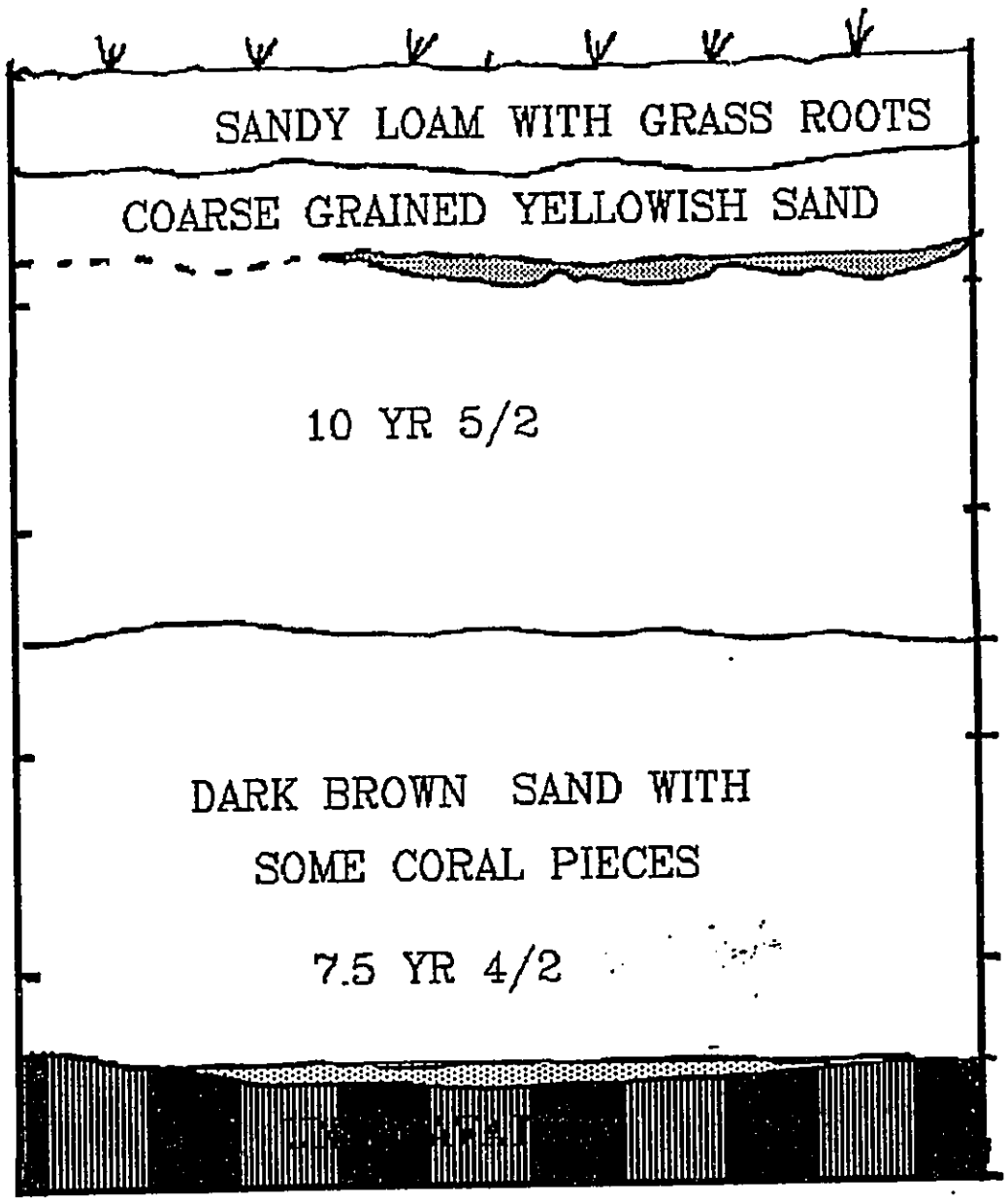


FIGURE 4: PROFILE TEST TRENCH 10

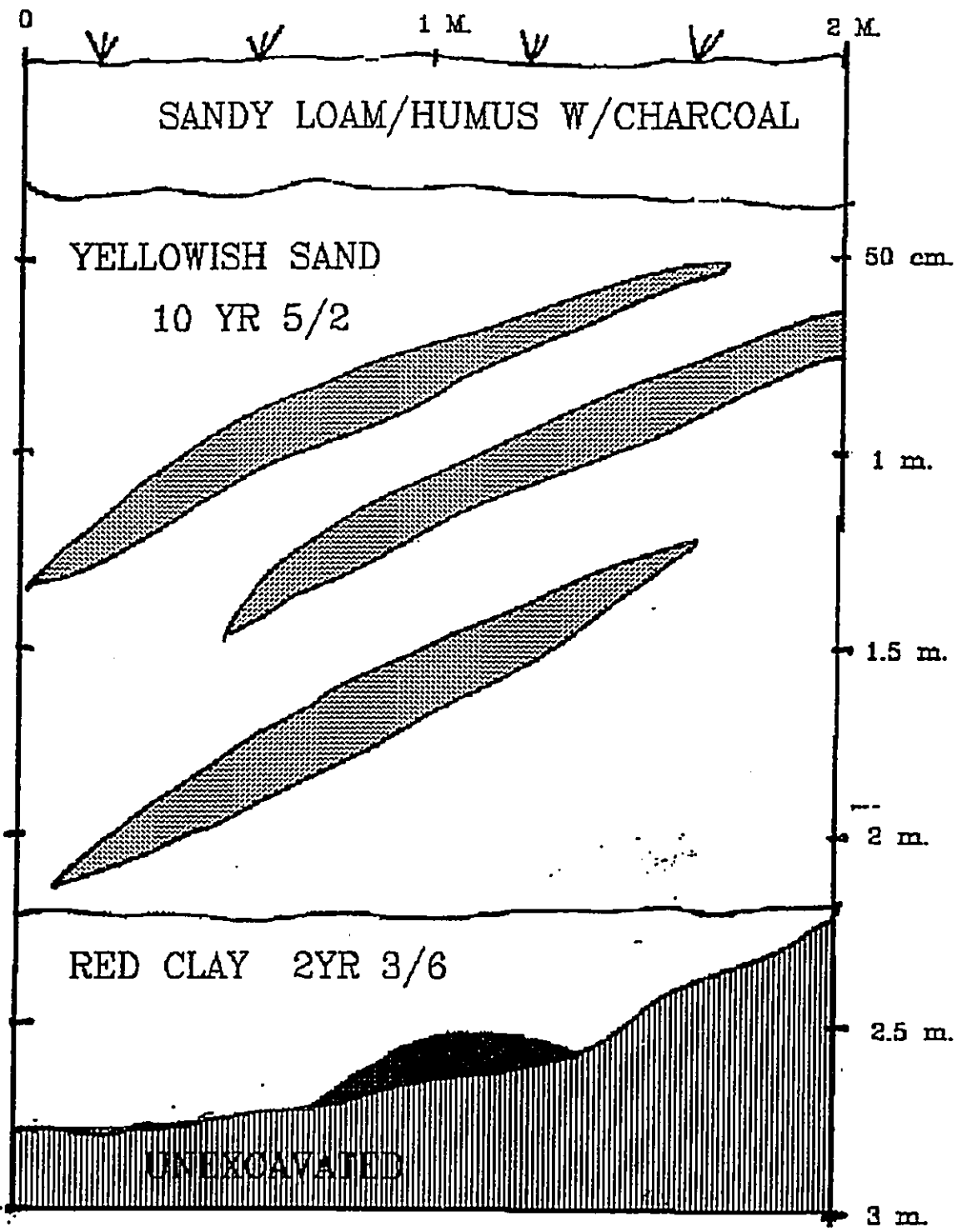


FIGURE 5: PROFILE TEST TRENCH 13

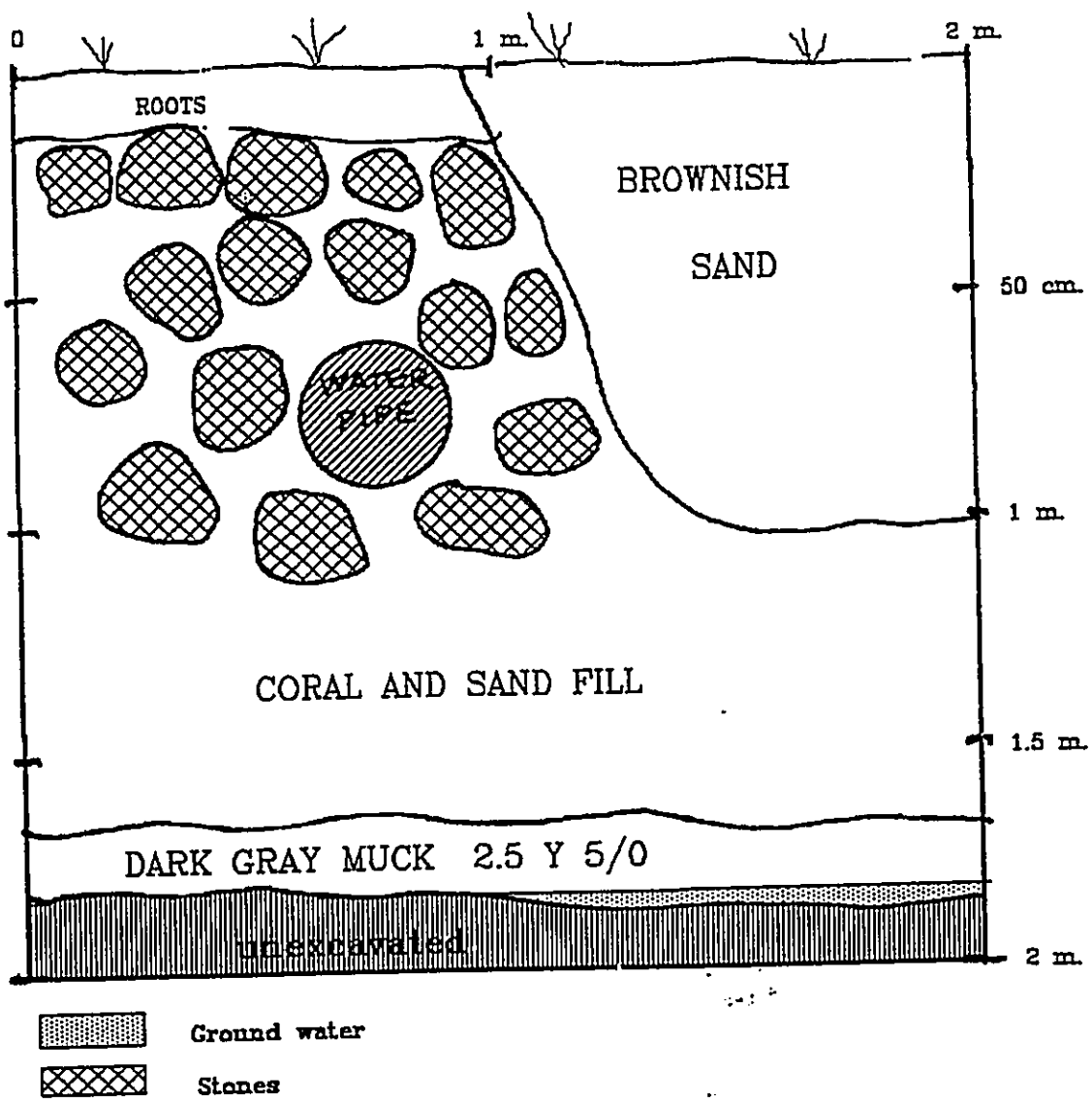


FIGURE 6: PROFILE TEST TRENCH 15

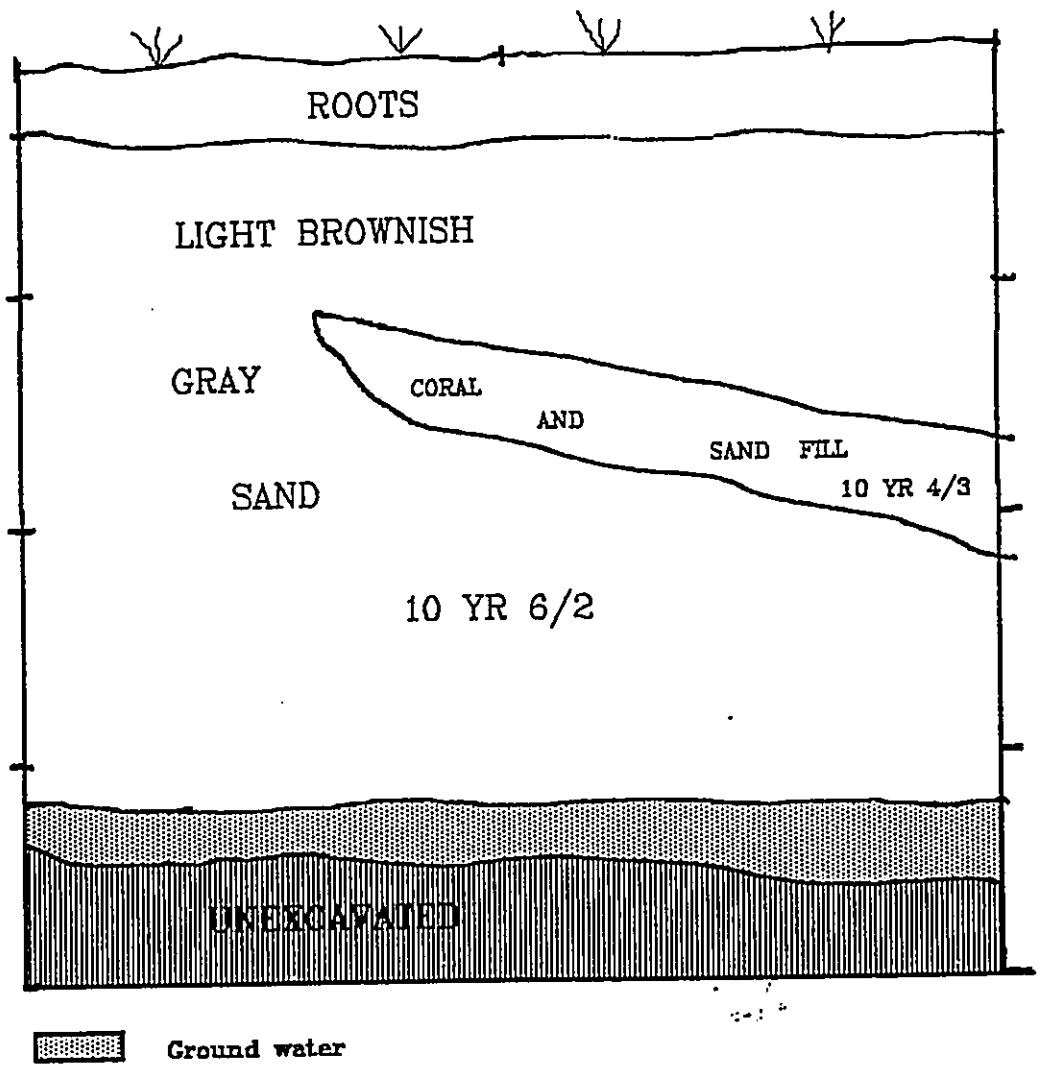


FIGURE 7: PROFILE TEST TRENCH 16

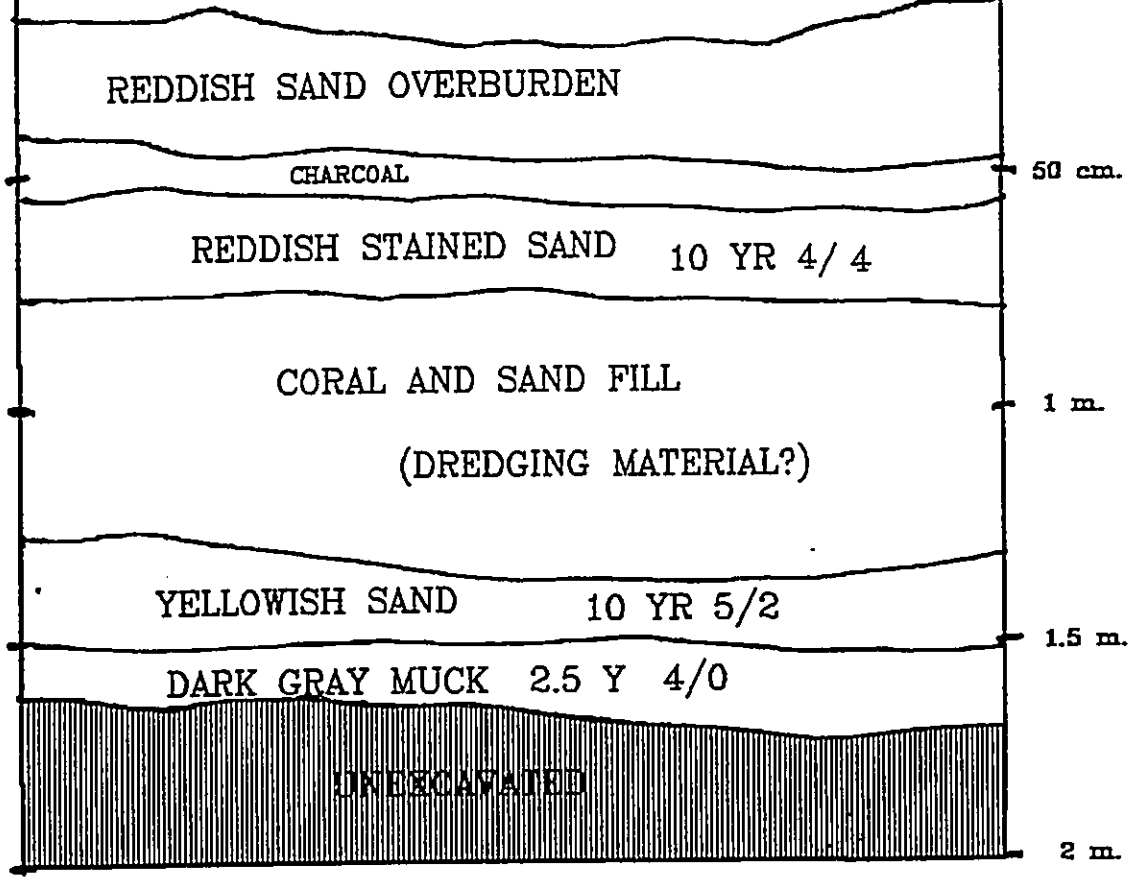
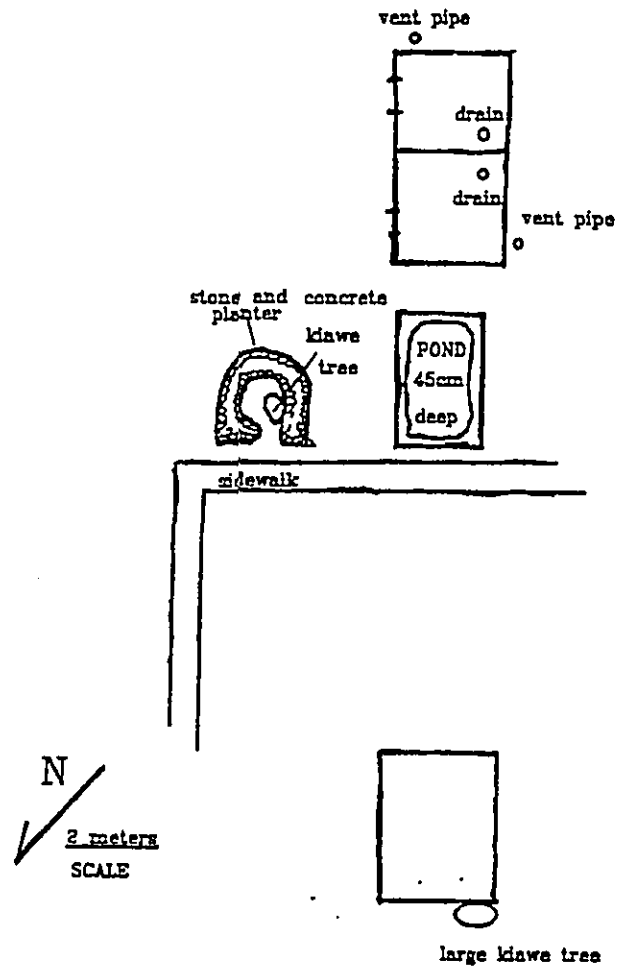


FIGURE 8: Concrete Foundations



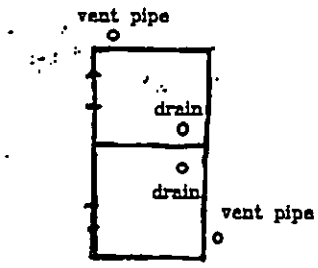


FIGURE 8 - Plan map of the concrete foundations associated with military activities during the Second World War.

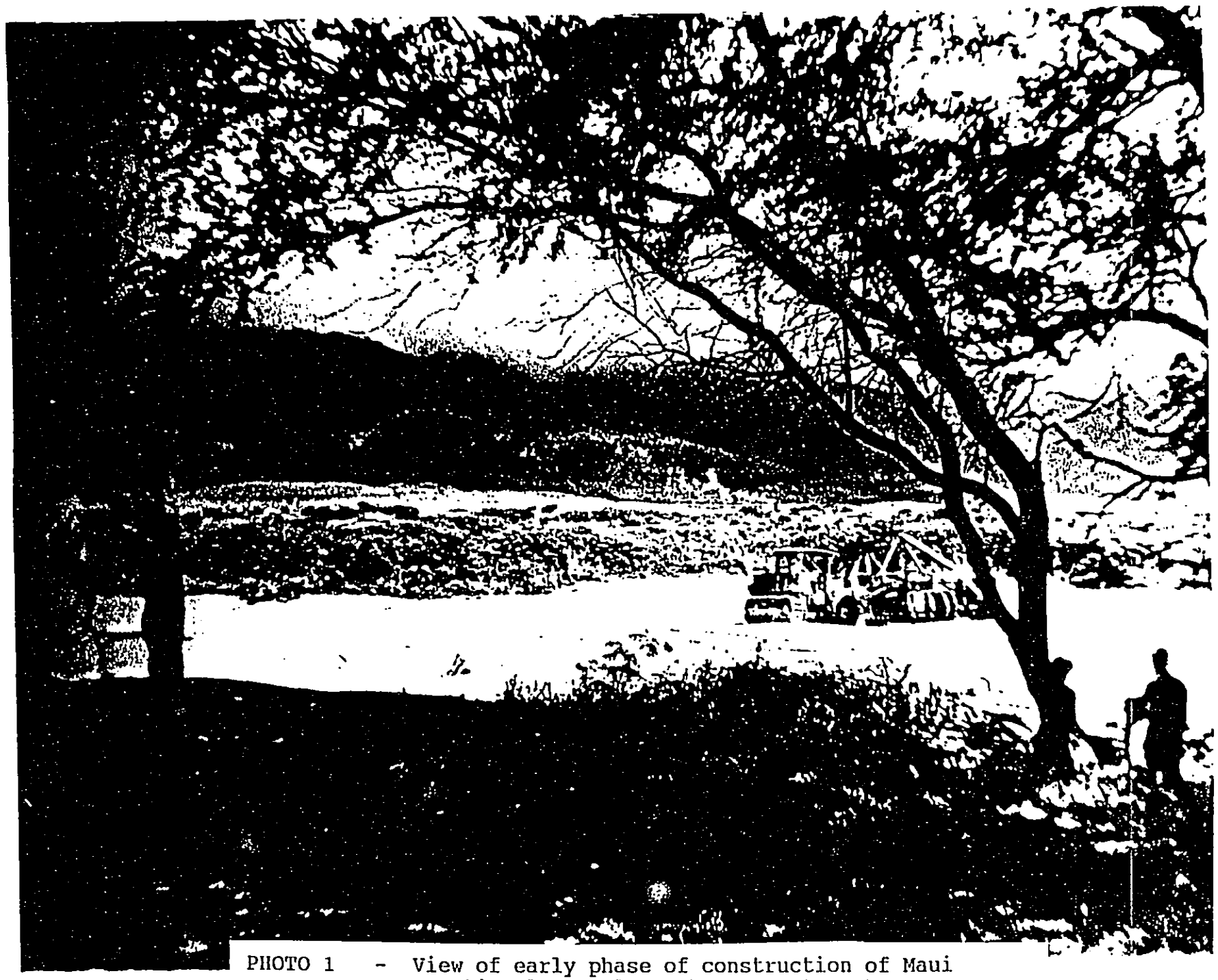


PHOTO 1 - View of early phase of construction of Maui Vocational School at the present Kaahumanu Avenue location of study parcel (1949).

PHOTO 2 - Portion of a concrete floor which was part of the [illegible] 18th Service and Supply Battalion, USMC.

PHOTO 3 - Stone and concrete planter, or flower bed, near the poured concrete floors, 18th Service and Supply Battalion, USMC.

PHOTO 4 - Row of coconut trees along the road into the USMC Base, taken in 1946 after the tsunami. (Maui Historical Society Archives)

PHOTO 5 - Same line of trees, 1992.

PHOTO 6 - View of the makai side of the study parcel showing damage done during the 1946 tsunami. (Maui Historical Society Archives)

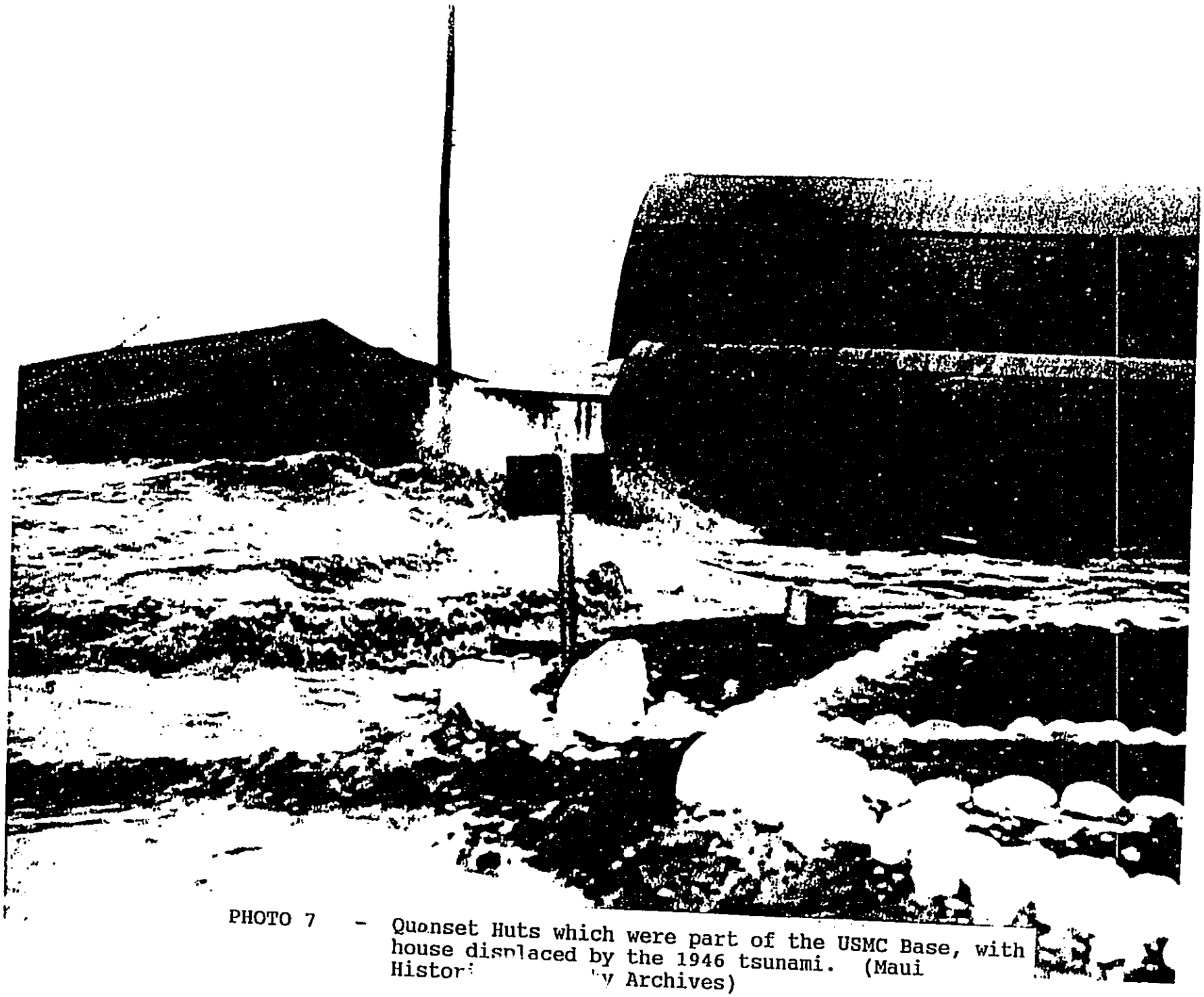


PHOTO 7 - Quonset Huts which were part of the USMC Base, with house displaced by the 1946 tsunami. (Maui Histor[illegible]y Archives)

PHOTO 8 - Backhoe testing in dense vegetation on subject parcel

Appendix B

Traffic Impact Assessment

TRAFFIC IMPACT ANALYSIS REPORT

FOR THE PROPOSED

MAUI COMMUNITY COLLEGE EXPANSION

PREPARED FOR

GIMA YOSHIMORI MIYABARA DEGUCHI–

ARCHITECTS, INC.

Prepared by

Austin, Tsutsumi & Associates, Inc.
Engineers • Surveyors
Honolulu • Wailuku • Hilo, Hawaii

TRAFFIC IMPACT ANALYSIS REPORT

FOR THE PROPOSED

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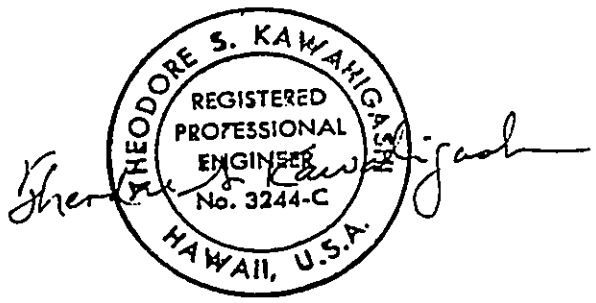

Prepared by

Austin, Tsutsumi & Associates, Inc.
Engineers • Surveyors
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November 1992

CONTENTS

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EXECUTIVE SUMMARY

I. INTRODUCTION

The purpose of this study is to analyze the traffic impacts resulting from the proposed Maui Community College (MCC) expansion in Kahului, Maui, Hawaii. The expansion of MCC is expected to provide additional classroom space to accommodate 5,000 full-time equivalent (FTE) students, an increase of 2,200 students over the 1992 enrollment. This study is analyzed at full build-out condition by the Year 2000 at the 5,000 FTE enrollment level.

The study area includes the intersections of:

1. Kaahumanu Avenue and Mahalani Street/Kanaloa Avenue
2. Kaahumanu Avenue and South Papa Avenue
3. Kaahumanu Avenue and Wakea Avenue
4. Kaahumanu Avenue and Kahului Beach Road/Kane Street
5. Kahului Beach Road and Kaihee Place

A. Existing Traffic Operations

From a regional perspective, Kaahumanu Avenue and Kahului Beach Road/Lower Main Street are the only major roadways linking the two urban centers of Wailuku and Kahului. These roadways are heavily utilized during the peak periods of commuter traffic. Although relatively heavy, vehicular traffic generally moves well on Kaahumanu Avenue in the project vicinity. No apparent problems were noted during the AM peak hour of traffic. However, during the PM peak hour, the east bound right-turn movement on Kaahumanu Avenue to south bound South Papa Avenue queues on Kaahumanu Avenue. Much of the east bound Kaahumanu Avenue traffic entering the South Papa Avenue intersection appear to be trips primarily generated by the

Maui Memorial Hospital on Mahalani Street, and Baldwin High School and the War Memorial Complex on Kanaloa Avenue.

B. Projected Traffic

1. Site-Generated Traffic

The projected increase in student enrollment is expected to generate 353 vehicles during the AM peak hour of traffic, 342 vehicles entering and 11 vehicles exiting. During the projected PM peak hour of traffic, the increase in student enrollment is expected to generate 264 vehicles, 198 vehicles entering and 66 vehicles exiting.

2. External Traffic

The State Department of Transportation and the County of Maui have developed the "Maui Long-Range Highway Planning Study, Wailuku-Kahului Plan " (Wailuku-Kahului Plan), dated May 1991 as a supplement to the "Maui Long-Range Highway Planning Study, Island-Wide Plan" (Island-Wide Plan), dated May 1991, both prepared by Austin, Tsutsumi & Associates, Inc. The travel forecasts developed by this study indicate a reduction in traffic demand on Kaahumanu Avenue for the Year 2000 from the present. The travel forecasts are based upon land use forecasts and highway improvements for the Year 2000 resulting from regional developments expected to occur in the Kahului/ Wailuku area during this time frame. The roadway improvements cited in the report include:

- The extension of Mahalani Street to Waiale Road.
- The construction of Maui Lani Parkway, a new roadway between Kaahumanu Avenue and Kuihelani Highway.
- The extension of Kamehameha Avenue through the new Maui Lani Parkway.

- The extension of Onehee Avenue to the new Maui Lani Parkway.
- The extension and widening of Waiale Road to Honoapiilani Highway.
- Roadway widening of Waiale Road between the Kahekili Extension and the Mahalani Street Extension.
- The Puunene Bypass Road between Mokulele Highway and Kuihelani Highway, connecting to the Maui Lani Parkway.

C. Traffic Impact Analysis

The total number of vehicles entering the intersection of Kaahumanu Avenue and Mahalani Street/Kanaloa Avenue would increase by approximately 4% over projected traffic demands without the proposed MCC expansion during the AM peak hour. During the PM peak hour, the increase would be approximately 3%.

At the intersection of Kaahumanu Avenue and South Papa Avenue, the north bound approach of South Papa Avenue would operate at LOS "D" during the AM peak hour. Under projected conditions without the proposed project, this approach would operate at LOS "C". The approach would continue to operate at LOS "C" during the PM peak hour. The other traffic movements at this intersection would operate at satisfactory LOS during the AM and PM peak hours with the proposed project.

Vehicular traffic entering the MCC main entrance at the intersection of Kaahumanu Avenue and Wakea Avenue is expected to increase by 105 vehicles during the projected AM peak hour of traffic with the proposed project. During the PM peak hour, entering traffic would increase by 45 vehicles. Despite the increase in traffic entering MCC, the traffic movements at this intersection would operate at satisfactory LOS during the projected AM and PM peak hours.

The total number of vehicles entering the intersection of Kaahumanu Avenue and Kahului Beach Road/Kane Street is expected to increase by approximately 3% over projected conditions without the proposed project. During the PM peak hour, the increase is expected to be 2%.

II. PROPOSED IMPROVEMENTS AND RECOMMENDATIONS

A. Improvements to Mitigate Existing Roadway Deficiencies

1. Provide exclusive left-turn, through, and right-turn lanes on the north bound Mahalani Street approach at Kaahumanu Avenue.

2. Construct an exclusive left-turn lane, an optional left/through lane, and an exclusive right-turn lane on the north bound approach of Wakea Avenue at Kaahumanu Avenue.

B. Site Access Recommendations

1. Restrict access from Kaihee Place and utilize the new road connecting Kanaloa Avenue to Kahului Beach Road as the access to the faculty/ student parking lot located north of the campus.

2. Provide an exclusive right-turn lane and an optional left/through lane on the south bound approach exiting the MCC campus at the intersection of Kaahumanu Avenue and South Papa Avenue.

3. Provide an exclusive right-turn lane and an optional left/through lane on the south bound approach exiting the MCC campus at the intersection of Kaahumanu Avenue and Wakea Avenue.

4. Each of the campus parking lot driveways on the South Papa Avenue Extension should have exclusive left-turn and right-turn lanes for vehicles exiting the parking areas.

5. Left-turn lanes to the parking lot driveways should be constructed to maintain through traffic flow on the South Papa Avenue Extension.

III. CONCLUSIONS

Based upon the "Wailuku-Kahului Plan", the proposed roadway improvements and new roadways included in the development plans of other projects in the Kahului/Wailuku area are expected to reduce the traffic demand on Kaahumanu Avenue. The projected AM and PM peak hour traffic volumes on Kaahumanu Avenue, west of Mahalani Street/Kanaloa Avenue, with the proposed MCC expansion, would increase by 3% and 2%, respectively, over projected conditions without the proposed project. East of Kahului Beach Road/Kane Street, the AM and PM peak hour traffic projections on Kaahumanu Avenue, with the proposed expansion, would each increase by approximately 2%.

With the implementation of roadway improvements and the construction of new roads discussed in this report, the proposed Maui Community College expansion should not have any significant impact on traffic in the vicinity of the project.

AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

TED S. KAWAHIGASHI, P.E.
GEORGE M. NEUFFER, P.E.
KENNETH K. KUROKAWA, P.E.
THOMAS S. OTAGURO
IVAN K. NAKATSUKA, P.E.

TRAFFIC IMPACT ANALYSIS REPORT

FOR THE PROPOSED

MAUI COMMUNITY COLLEGE EXPANSION

I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to analyze the traffic impacts resulting from the proposed Maui Community College expansion in Kahului, Maui, Hawaii. This report presents the findings and recommendations of the study.

B. Scope of Study

The scope of this study includes:

1. Description of the proposed project.
2. Evaluation of existing roadway and traffic conditions.
3. Analysis of future roadway and traffic conditions without the proposed project.
4. Development of trip generation characteristics for the proposed project.
5. Superimposing the site-generated traffic over future traffic conditions.
6. The identification and analysis of traffic impacts resulting from the proposed project.
7. Recommendation of improvements, if appropriate, that would mitigate the traffic impacts resulting from the development of the proposed project.

REPLY TO:
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OFFICES IN:
HONOLULU, HAWAII
WAILUKU, MAUI, HAWAII • HILO, HAWAII

II. PROJECT DESCRIPTION

A. Location

Maui Community College (MCC) is located immediately north of Kaahumanu Avenue, between the intersections with Kahului Beach Road and South Papa Avenue. MCC is near residential areas and shopping centers to the south and Kahului Harbor to the east. The vicinity of the project is shown in Exhibit 1.

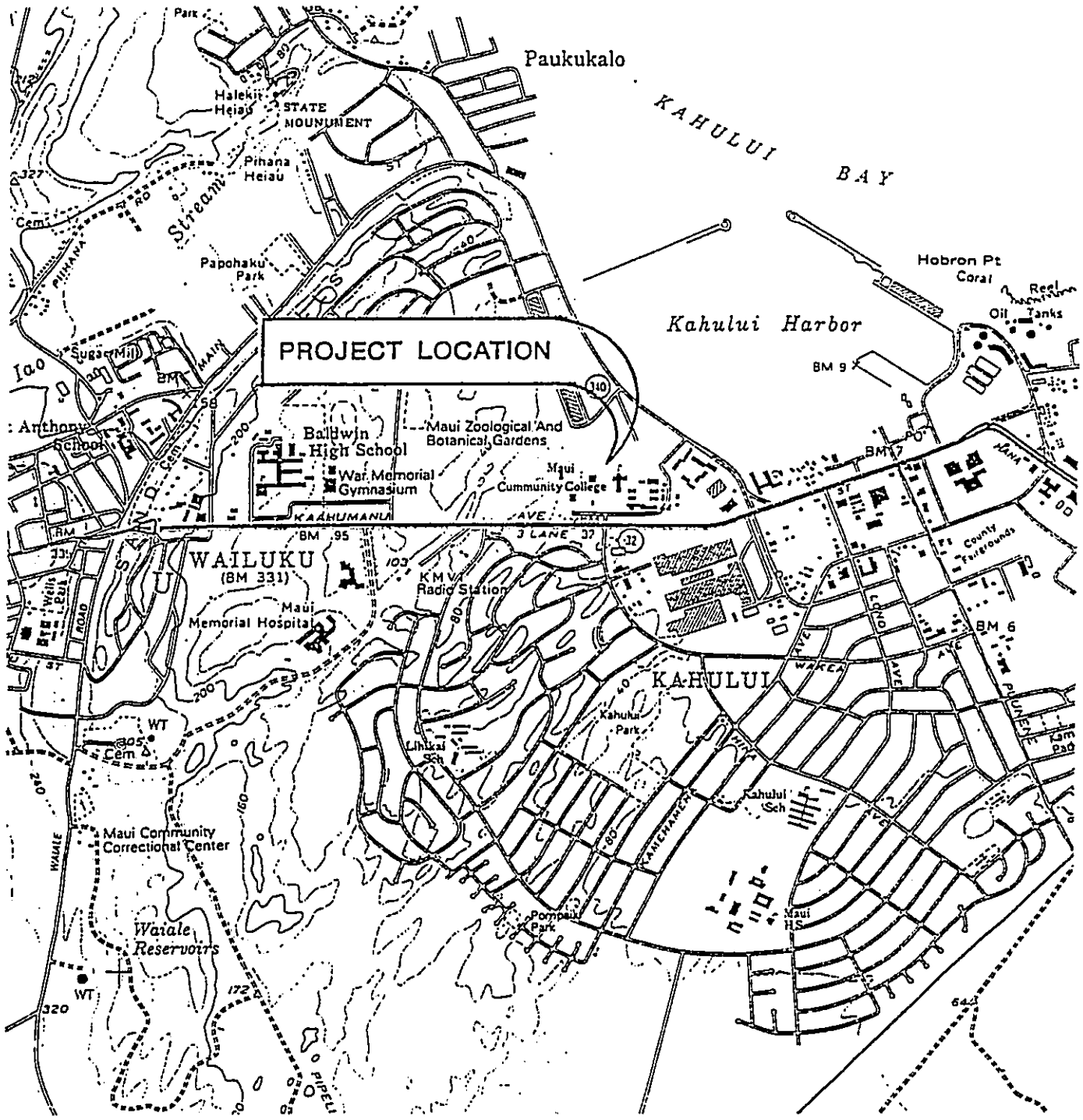
B. Site Characteristics

1. Project Site Access

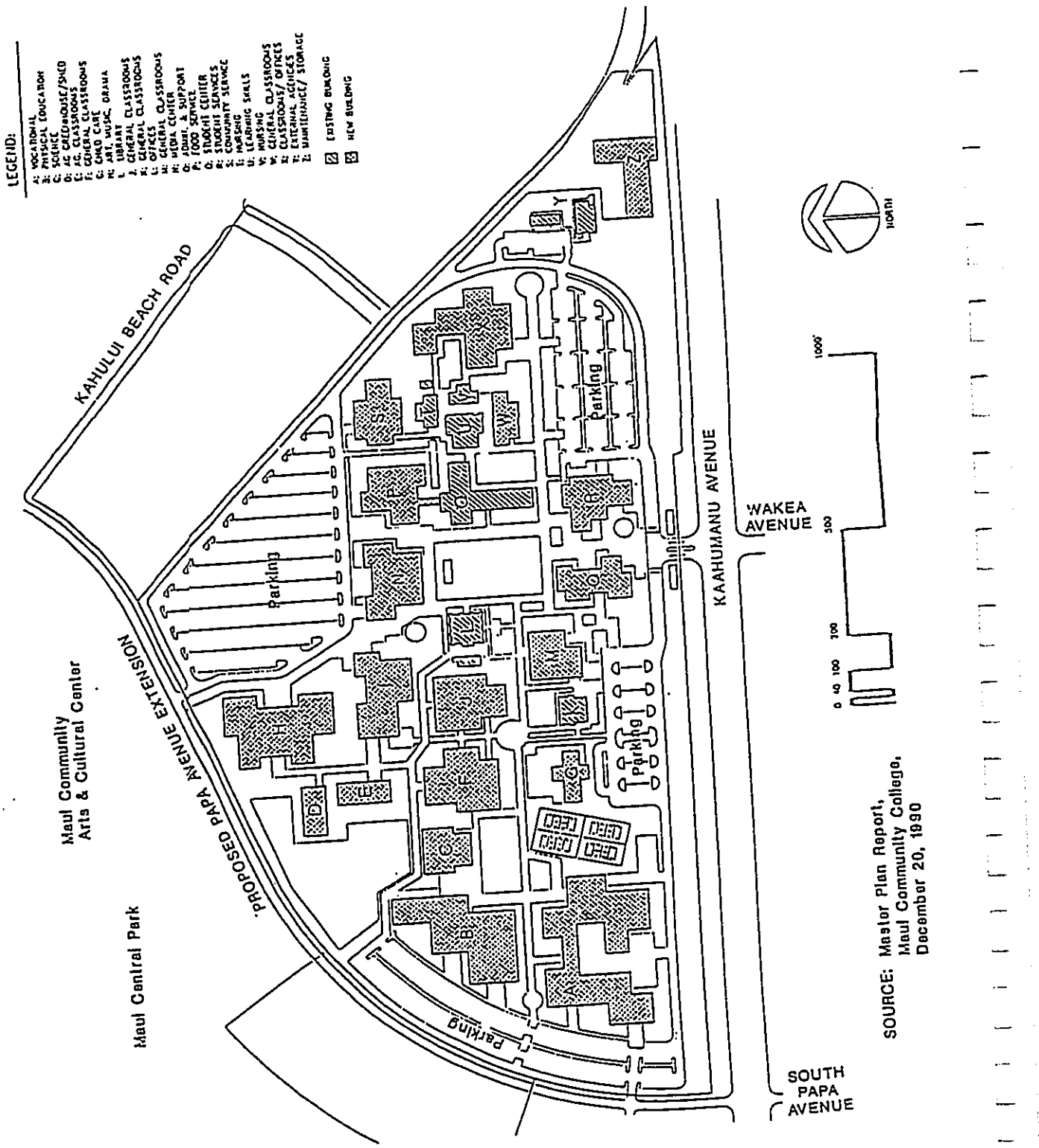
Site access would be provided by three access points. The existing main entrance on Kaahumanu Avenue at Wakea Avenue would remain as the main entrance. The two other access points would be provided on an extension of South Papa Avenue and on a new road connecting Kanaloa Avenue to Kahului Beach Road, north of the project site. This new road is expected to be completed with the construction of the new Maui Community Arts and Cultural Center, located north of the MCC campus. The access driveways on the South Papa Avenue extension, and on the new road, would lead to student and faculty parking lots. For the purpose of this traffic impact analysis, site access is assumed to be provided by these access points. The site plan is shown in Exhibit 2.

2. Proposed Land Use Intensity

MCC enrollment in the Year 1992 is approximately 2,800 students. The "Maui Community College Master Plan Report", prepared by Gima, Yoshimori & Associates, AIA, Inc., dated December 20, 1990, includes an Ultimate Site Plan that provides additional classroom space to



ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE VICINITY MAP	EXHIBIT 1



ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE PROJECT SITE PLAN	EXHIBIT 2

accommodate 5,000 full-time equivalent (FTE) students, an increase of 2,200 students over the 1992 enrollment. For the purpose of this study, the project is analyzed at full build-out condition by the target Year 2000 at the 5,000 FTE enrollment level.

III. EXISTING TRAFFIC CONDITIONS

A. General

The traffic signal system on Kaahumanu Avenue is coordinated between Wharf Street on the east and Mahalani Street/Kanaloa Avenue on the west by an on-street master controller. Kaahumanu Avenue is a four- to six-lane divided urban arterial roadway generally oriented in the east-west direction. Kaahumanu Avenue is a major roadway that connects the two urban centers of Kahului and Wailuku. Kaahumanu Avenue is signalized at the intersections fronting MCC, with left-turn storage lanes and right-turn deceleration and acceleration lanes at major intersections. Kaahumanu Avenue intersects Kahului Beach Road, which leads to Lower Main Street and Waiehu Beach Road in Wailuku. Kanaloa Avenue connects Kahului Beach Road and Kaahumanu Avenue. The posted speed on Kaahumanu Avenue, in the project vicinity, is 45 miles per hour.

South Papa Avenue and Wakea Avenue are two-lane, two-way collector roads which begin in the industrial area of South Kahului and connect to Kaahumanu Avenue through the Kahului residential area. South Papa Avenue, north of Kaahumanu Avenue, provides access to the MCC faculty housing. The main entrance to MCC is at the Kaahumanu Avenue and Wakea Avenue intersection. The entrance to the faculty/student parking lot is through Kaihee Place off Kahului Beach Road.

1. **Kaahumanu Avenue and Mahalani Street/Kanaloa Avenue Intersection**

The intersection of Kaahumanu Avenue and Mahalani Street/ Kanaloa Avenue is controlled by a traffic signal system. Kaahumanu Avenue at this intersection has exclusive left-turn lanes to south bound Mahalani Street and north bound Kanaloa Avenue. Right-turn deceleration and acceleration lanes on west bound and east bound Kaahumanu Avenue are provided. The south bound Kanaloa Avenue approach consists of three lanes: an exclusive left-turn lane, and optional left-turn/through lane, and an exclusive right-turn lane to west bound Kaahumanu Avenue. There is an optional left-turn/through lane and an exclusive right-turn lane on the north bound Mahalani Street approach. This intersection is controlled by a six-phase traffic signal system with protected/permissive left-turn movements on Kaahumanu Avenue.

2. **Kaahumanu Avenue and South Papa Avenue Intersection**

The intersection of Kaahumanu Avenue and South Papa Avenue is a signalized intersection. The east bound approach on Kaahumanu Avenue has an exclusive left-turn lane, two through lanes, and a right-turn deceleration lane to south bound South Papa Avenue. The west bound approach of Kaahumanu Avenue has an exclusive left-turn lane and two through lanes. The north bound South Papa Avenue approach has an exclusive left-turn lane and a shared left, through and right-turn lane. An acceleration lane is provided on Kaahumanu Avenue for the right-turn movement from north bound South Papa Avenue to east bound Kaahumanu Avenue. The south bound approach of South Papa Avenue has one lane for the left turn, through and right-turn movements. This intersection is controlled by a three phase traffic signal system with protected/permissive left-turn movements on Kaahumanu Avenue.

3. Kaahumanu Avenue and Wakea Avenue Intersection

The intersection of Kaahumanu Avenue and Wakea Avenue operates as a signalized intersection. Right-turn deceleration and acceleration lanes are provided on Kaahumanu Avenue for both east bound and west bound traffic. The east bound and west bound approaches on Kaahumanu Avenue at Wakea Avenue each have an exclusive left-turn lane, two through lanes, and a right-turn deceleration lane. The north bound approach of Wakea Avenue has an optional left-turn/through lane and an exclusive right-turn lane. The south bound approach exiting MCC has a shared left-turn, through and right-turn lane. This intersection is controlled by a five phase traffic signal system with protected/permissive left-turn movements on Kaahumanu Avenue.

4. Kaahumanu Avenue and Kahului Beach Road/Kane Street Intersection

The intersection of Kaahumanu Avenue and Kahului Beach Road/Kane Street operates as a signalized intersection. The west bound approach on Kaahumanu Avenue has four lanes: an exclusive left-turn lane, two through lanes, and a mandatory right-turn lane to north bound Kahului Beach Road. The east bound approach has an exclusive left-turn lane, two through lanes, and a right-turn deceleration lane to south bound Kane Street. The north bound Kane Street approach at Kaahumanu Avenue has an exclusive left-turn lane and a shared through/right-turn lane. The south bound approach of Kahului Beach Road has an exclusive left-turn lane, an optional left-turn/through lane, and a right-turn lane to west bound Kaahumanu Avenue. This intersection is controlled by a six phase traffic signal system with protected/permissive left-turn movements on Kaahumanu Avenue.

5. Kahului Beach Road and Kaihee Place Intersection

The entrance to the MCC faculty/student parking lot is through Kaihee Place. Kaihee Place intersects Kahului Beach Road, north of Kaahumanu Avenue, as an unsignalized tee-intersection. It is a two-lane, two-way roadway, which also provides access to the Harbor Lights Condominium. A left-turn lane on north bound Kahului Beach Road to Kaihee Place, and a right-turn deceleration lane on south bound Kahului Beach Road to Kaihee Place are provided. Kaihee Place, at Kahului Beach Road, is stop-controlled with a right-turn acceleration lane for vehicles from Kaihee Place to south bound Kahului Beach Road.

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

A field investigation was conducted in September 1992 to establish baseline traffic conditions. The field investigation was comprised of a site inspection of the road and traffic conditions and a traffic count survey. The traffic count survey was conducted between the hours of 6:30 and 8:30 AM in the morning, and between 3:30 and 5:30 PM in the afternoon at the intersections of Kaahumanu Avenue with Kahului Beach Road/Kane Street, Wakea Avenue, South Papa Avenue, and Mahalani Street/Kanaloa Avenue; and at the intersection of Kahului Beach Road and Kaihee Place.

b. Capacity Analysis Methodology

The highway capacity analysis performed for this study is based upon procedures presented in the "Highway Capacity Manual", Special Report 209, Transportation Research Board, 1985 and the "Highway Capacity Software", Federal Highway Administration.

Level of Service (LOS) is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through LOS "F"; LOS "A" being the best operating condition and LOS "F" the worst operating condition.

"Volume-to-capacity (v/c) ratio is another measure indicating the relative traffic demand to the road's carrying capacity. A v/c ratio of 1.00 indicates that the roadway is operating at 100% of its capacity. A v/c ratio greater than one (1.00) indicates that the projected traffic demand exceeds the road's traffic handling capacity.

The definitions for the various Levels of Service are included in the Appendix.

2. Traffic Operations

From a regional perspective, Kaahumanu Avenue and Kahului Beach Road/Lower Main Street are the only major roadways linking the two urban centers of Wailuku and Kahului. Although relatively heavy, vehicular traffic generally moves well on Kaahumanu Avenue in the project vicinity. No apparent problems were noted during the AM peak hour of traffic. However, during the PM peak hour of traffic, the east bound right-turn movement on Kaahumanu Avenue to south bound South Papa Avenue queues on Kaahumanu Avenue. Much of the east bound Kaahumanu Avenue traffic entering the South Papa Avenue

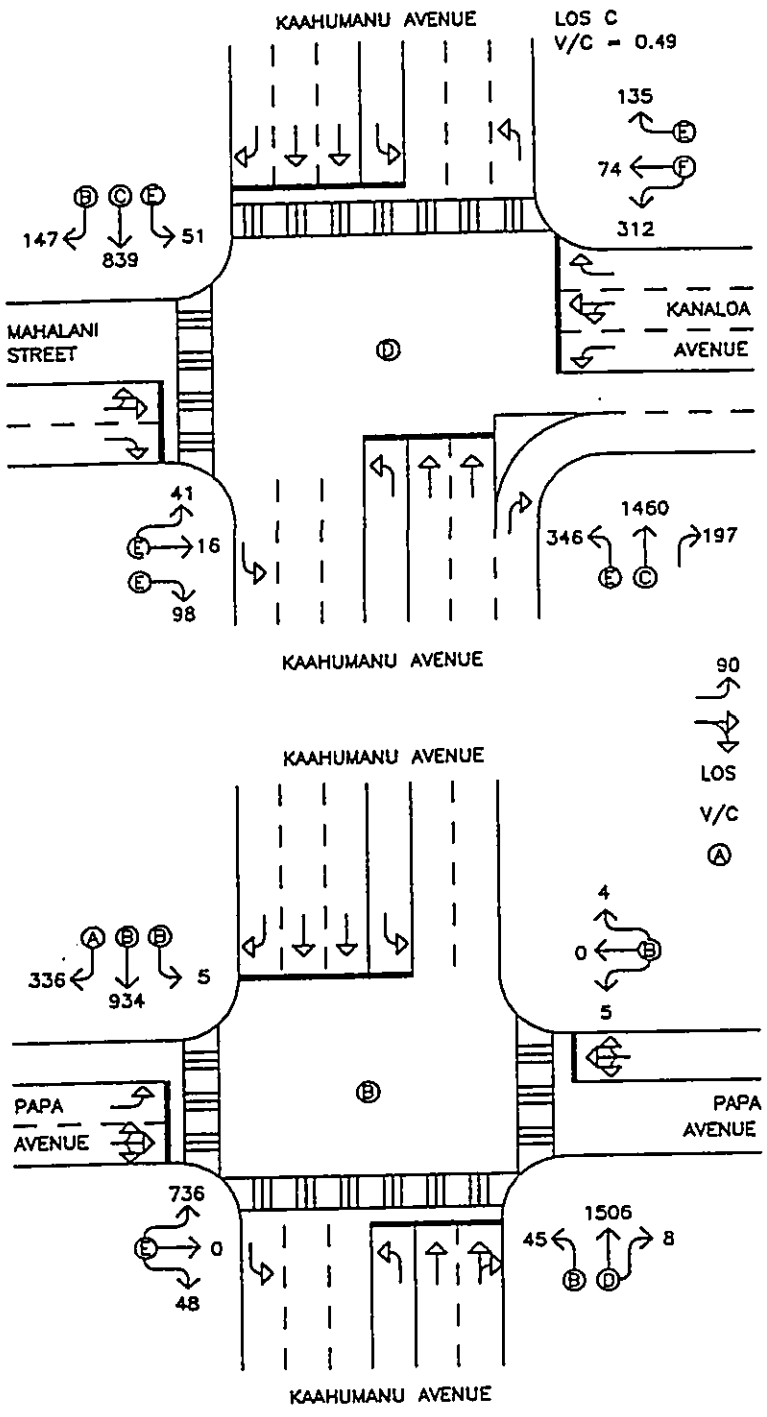
intersection may be trips generated by the Maui Memorial Hospital on Mahalani Street and the War Memorial Complex on Kanaloa Avenue. During the PM peak hour, the traffic counts show a high north bound right-turn volume from Mahalani Street to east bound Kaahumanu Avenue, and a high south bound left-turn volume from Kanaloa Avenue to east bound Kaahumanu Avenue. South Papa Avenue would provide access to the Kahului residential area for these trips. South Papa Avenue also serves as an alternate route for motorists destined to areas south and Up Country via South Puunene Avenue, Kuihelani Highway and Hana Highway. This route would enable motorists to bypass the retail centers on Kaahumanu Avenue and avoid entering the heavily utilized Kaahumanu Avenue and Kahului Beach Road intersection.

3. Existing AM Peak Hour Traffic Analysis

The AM peak hour of traffic in the study area occurs between 7:15 and 8:15 AM. The existing AM peak hour traffic volumes and operating Levels of Service are shown in Exhibits 3 and 4.

Kaahumanu Avenue, west of Kanaloa Avenue/Mahalani Street, carries 2,676 vehicles per hour (vph) during the existing AM peak hour, 1,639 vph west bound and 1,037 vph east bound. West bound traffic on Kaahumanu Avenue, just west of Mahalani Street/Kanaloa Avenue, operates at LOS "C" and at a v/c ratio of 0.49 during the existing AM peak hour of traffic.

The left-turn movement from Kanaloa Avenue to east bound Kaahumanu Avenue operates at LOS "F" during the AM peak hour of traffic. The other left-turn movements at the intersection of Kaahumanu Avenue and Mahalani Street/Kanaloa Avenue operate at LOS "E". The



LEGEND

TRAFFIC MOVEMENT VOLUME (VPH)

LANE CONTROL

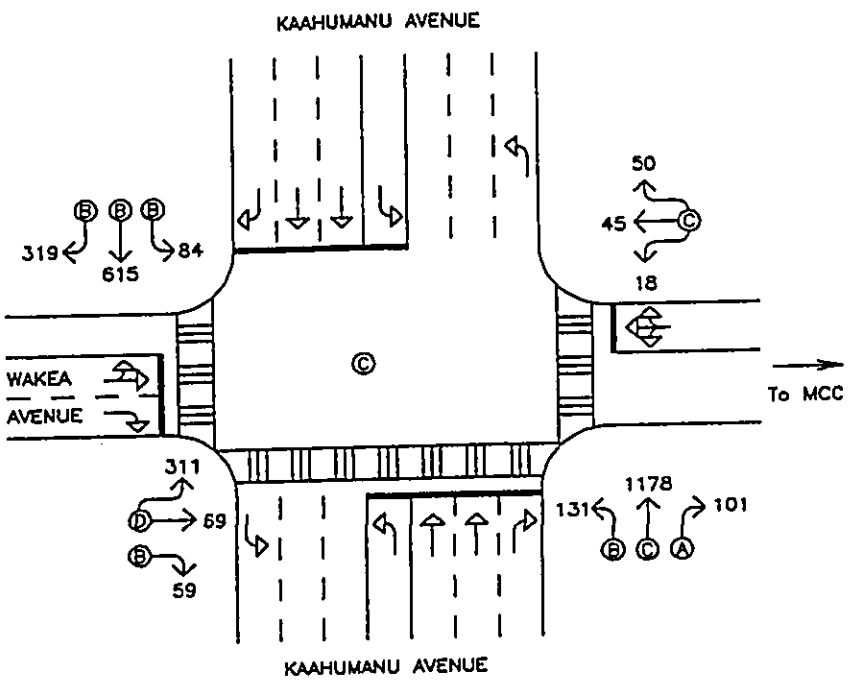
LEVEL OF SERVICE (MULTI-LANE HWY)

VOLUME-TO-CAPACITY RATIO

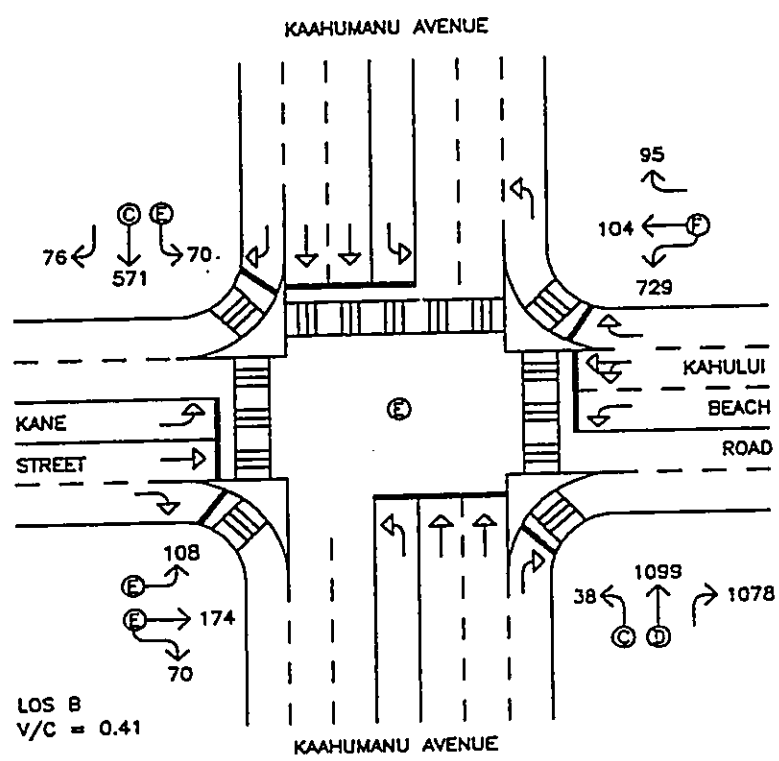
CAPACITY ANALYSIS (SIGNALIZED CONDITION)

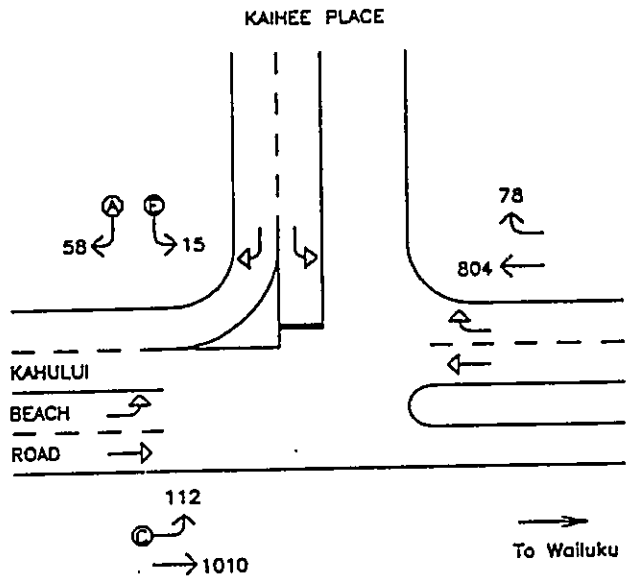
DATE OF COUNT: SEPTEMBER 30, 1992

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE EXISTING AM PEAK HOUR	EXHIBIT 3



DATE OF COUNT: SEPTEMBER 29, 1992
OCTOBER 1, 1992





AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE EXISTING AM PEAK HOUR	EXHIBIT 4

intersection operates at an overall LOS "D" during the AM peak hour of traffic.

At the intersection of Kaahumanu Avenue and South Papa Avenue, the north bound double left-turn movement from South Papa Avenue to west bound Kaahumanu Avenue operates at LOS "E" during the AM peak hour of traffic. The west bound Kaahumanu Avenue through movement operates at LOS "D". The other traffic movements at the intersection of Kaahumanu Avenue and South Papa Avenue operate at satisfactory LOS. The intersection operates at an overall LOS "B" during the AM peak hour of traffic.

The north bound Wakea Avenue left/through movement operates at LOS "D" at the intersection with Kaahumanu Avenue during the AM peak hour of traffic. The opposing south bound traffic on Wakea Avenue from MCC is very light. The other movements at the intersection of Kaahumanu Avenue and Wakea Avenue operate at satisfactory LOS. The intersection operates at an overall LOS "C" during the AM peak hour of traffic.

The north bound approach of Kane Street at the intersection with Kaahumanu Avenue operates at LOS "E" during the AM peak hour of traffic. The south bound left-turn movement on Kahului Beach Road to east bound Kaahumanu Avenue operates at LOS "F". The east bound left-turn movement of Kaahumanu Avenue to north bound Kahului Beach Road operates at LOS "D". The east bound through movement also operates at LOS "D". The other movements at the intersection of Kaahumanu Avenue and Kahului Beach Road/Kane Street operate at satisfactory LOS. The intersection operates at an overall LOS "E" during the AM peak hour of traffic. Kaahumanu Avenue, east of Kahului Beach Road, carries 3,585 vph during the AM peak hour, 1,370 vph east bound and 2,215 vph west bound.

At the intersection of Kahului Beach Road and Kaihee Place, the east bound left-turn and right-turn movements out of Kaihee Place to Kahului Beach Road operate at LOS "E" and LOS "A", respectively. The north bound left-turn movement from Kahului Beach Road to west bound Kaihee Place operates at LOS "C". Kaihee Place, just west of Kahului Beach Road, carries 280 vehicles, 201 vehicles entering and 79 vehicles exiting during the AM peak hour of traffic.

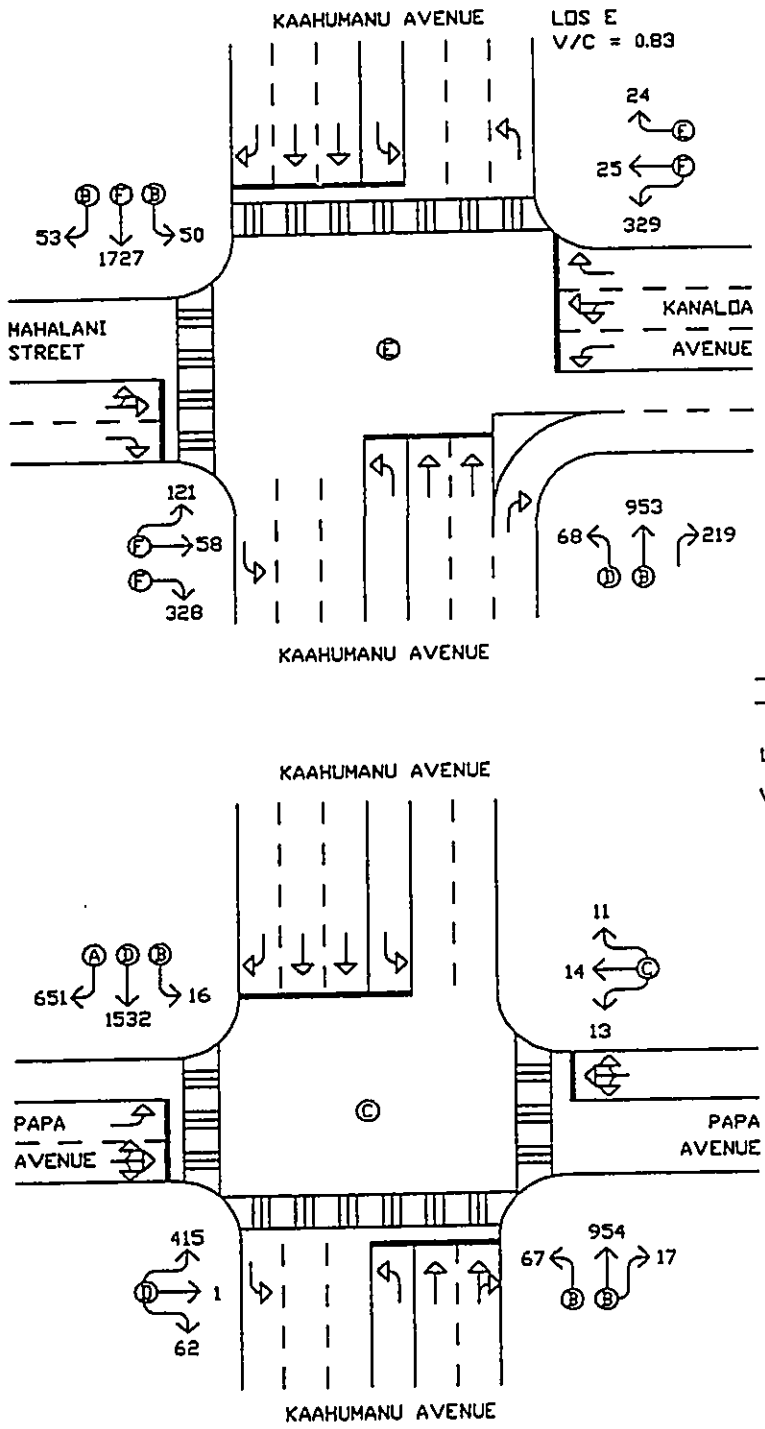
4. Existing PM Peak Hour Traffic Analysis

The PM peak hour of traffic in the study area occurs between 4:00 and 5:00 PM. The existing PM peak hour traffic volumes and operating Levels of Service are shown in Exhibits 5 and 6.

Kaahumanu Avenue, west of Mahalani Street/Kanaloa Avenue, carries 2,928 vph during the PM peak hour; 1,830 vph east bound and 1,098 vph west bound. East bound traffic on Kaahumanu Avenue operates at LOS "C" and at a v/c ratio of 0.55 during the PM peak hour of traffic.

The north bound approach of Mahalani Street and the south bound approach of Kanaloa Avenue, at the intersection with Kaahumanu Avenue, both operate at LOS "F". The east bound through movement on Kaahumanu Avenue at Mahalani Street/Kanaloa Avenue also operates at LOS "F". The intersection operates at capacity and at an overall LOS "E" during the PM peak hour of traffic.

At the intersection of Kaahumanu Avenue and South Papa Avenue, the north bound approach of South Papa Avenue and the east bound through movement on Kaahumanu Avenue both operate at LOS "D". The other traffic movements operate at satisfactory LOS during the PM peak hour of traffic. The intersection of Kaahumanu Avenue and South Papa Avenue operates at an overall LOS "C".

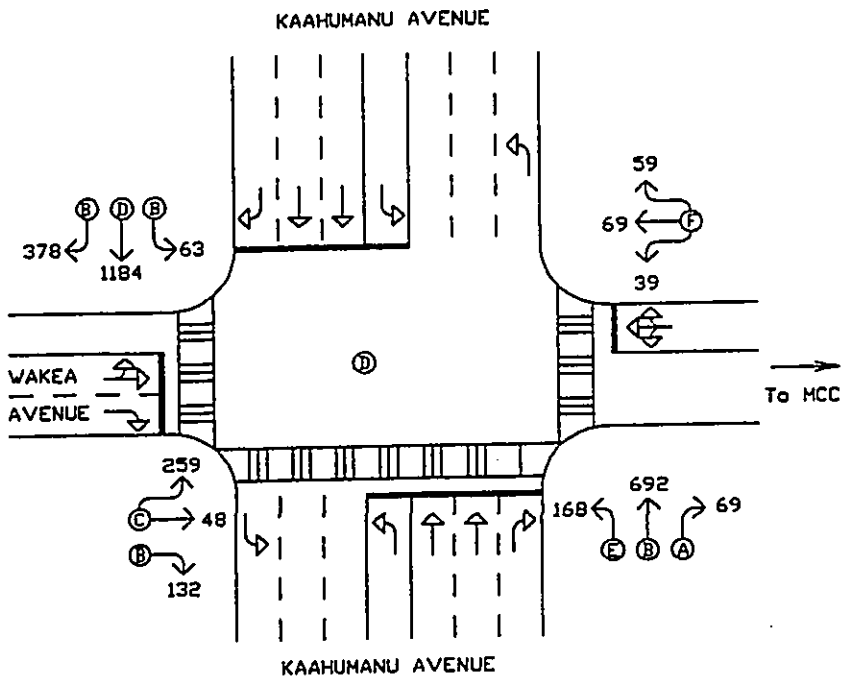


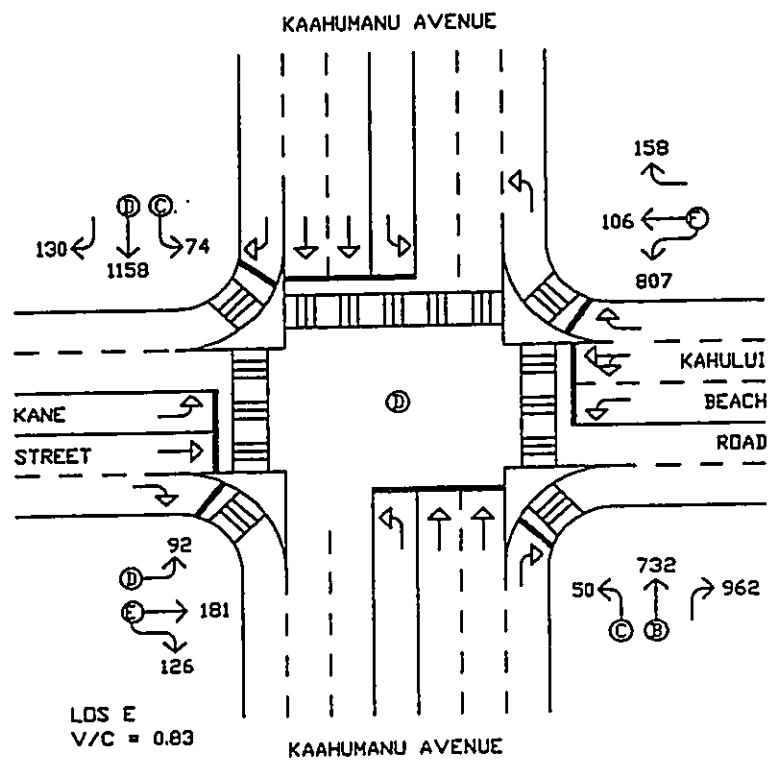
LEGEND

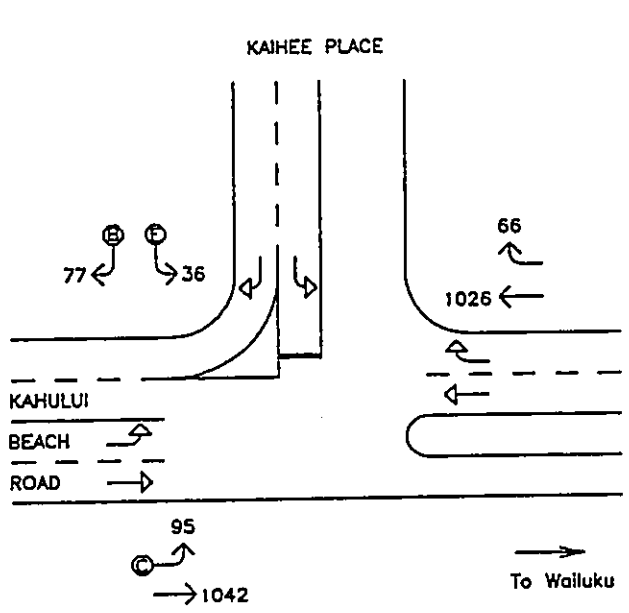
90	TRAFFIC MOVEMENT VOLUME (VPH)
	LANE CONTROL
LOS	LEVEL OF SERVICE (MULTI-LANE HWY)
V/C	VOLUME-TO-CAPACITY RATIO
Ⓐ	CAPACITY ANALYSIS (SIGNALIZED CONDITION)

DATE OF COUNT: SEPTEMBER 30, 1992

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE EXISTING PM PEAK HOUR	EXHIBIT 5







LEGEND

90	TRAFFIC MOVEMENT VOLUME (VPH)
	LANE CONTROL
LOS	LEVEL OF SERVICE (MULTI-LANE HWY)
V/C	VOLUME-TO-CAPACITY RATIO
Ⓐ	CAPACITY ANALYSIS (SIGNALIZED CONDITION)
Ⓑ	CAPACITY ANALYSIS (UNSIGNALIZED CONDITION)

DATE OF COUNT: SEPTEMBER 30, 1992

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE EXISTING PM PEAK HOUR	EXHIBIT 6

The south bound approach of Wakea Avenue at Kaahumanu Avenue operates at LOS "F" during the PM peak hour of traffic. The west bound left-turn movement from Kaahumanu Avenue to south bound Wakea Avenue operates at LOS "E", while the east bound through movement on Kaahumanu Avenue operates at LOS "D". The other traffic movements at the intersection of Kaahumanu Avenue and Wakea Avenue operate at satisfactory LOS. The intersection operates at an overall LOS "D" during the PM peak hour of traffic.

The south bound approach of Kahului Beach Road at the intersection with Kaahumanu Avenue operates at LOS "F" during the PM peak hour of traffic. The north bound approach on Kane Street at Kaahumanu Avenue operates at LOS "E". The intersection of Kaahumanu Avenue and Kahului Beach Road/Kane Street operates at an overall LOS "D" during the PM peak hour of traffic. With an intersection v/c of 0.978, the intersection operates at near capacity conditions.

Kaahumanu Avenue, just east of Kahului Beach Road/Kane Street, carries 3,837 vph during the PM peak hour; 2,093.vph west bound and 1,744 vph east bound. East bound traffic on Kaahumanu Avenue, east of Kahului Beach Road/Kane Street, operates at LOS "D" and at a v/c ratio of 0.63 during the PM peak hour of traffic.

At the intersection of Kahului Beach Road and Kaihee Place, the east bound left-turn and right-turn movements operate at LOS "E" and LOS "B", respectively. The north bound left-turn movement from Kahului Beach Road to west bound Kaihee Place operates at LOS "C". Kaihee Place, just west of Kahului Beach Road, carries 176 vehicles; 87 vehicles entering and 89 vehicles exiting during the PM peak hour of traffic.

IV. PROJECTED TRAFFIC

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 5th Edition", 1991. The ITE trip rates are developed empirically, by correlating the vehicle trip generation data with various land use characteristics, such as vehicle trips per student.

2. Trip Generation Characteristics

The proposed Maui Community College expansion is expected to accommodate an increase of 2,200 students over the 1992 enrollment of 2,800 students. The "Ultimate Site Plan", included in the "Maui Community College Master Plan Report", prepared by Gima, Yoshimori & Associates, AIA, Inc., dated December 20, 1990, contains provisions for additional classroom space at the 5,000 FTE level. For the purpose of this study, the trip generation characteristics are based upon a total enrollment of 5,000 students. The projected increase in student enrollment is expected to generate 353 vehicles during the AM peak hour; 342 vehicles entering and 11 vehicles exiting. During the projected PM peak hour of traffic, the increase in student enrollment is expected to generate 264 vehicles; 198 vehicles entering and 66 vehicles exiting. The trip generation characteristics are summarized in Table 1.

TABLE 1. TRIP GENERATION SUMMARY

Project:	MCC Expansion			
Location:	Kahului, Maui			
Independent Variable:	Students			2,200
Average Weekday Vehicle Trip Ends			ITE Rate 1.330	Trip Ends 2,927
Peak Hour of Adjacent Street	AM Peak Hour of Generator	Enter	0.155	342
		Exit	0.005	11
		Total	0.160	353
	PM Peak Hour of Generator	Enter	0.090	198
		Exit	0.030	66
		Total	0.120	264

3. Traffic Assignment

The vehicular traffic generated by the proposed project is assigned to the street system in the vicinity of the project. The residential population of major cities and towns on the island of Maui, obtained from "The State of Hawaii Data Book, 1990", by the State Department of Business, Economic Development and Tourism, was used as the basis for estimating traffic assignment. The traffic generated by the proposed project during the peak hours was distributed to the roadway system proportionately to the population of the cities and towns of the island of Maui. The directional distribution of existing traffic to and from MCC, obtained by the manual traffic counts taken in September of 1992, seem to correlate to the population distribution of the island of Maui.

B. External Traffic

The State Department of Transportation and the County of Maui have developed the "Wailuku-Kahului Plan", dated May 1991, as a supplement to

the "Island-Wide Plan", dated May 1991, both prepared by Austin, Tsutsumi & Associates, Inc. The travel forecasts developed by this study indicate a reduction in traffic demand on Kaahumanu Avenue for the Year 2000 from the present. The travel forecasts are based upon land use forecasts and highway improvements for the Year 2000 resulting from regional developments expected to occur during this time frame in the Kahului/ Wailuku area. For example, developers of projects such as Maui Lani and the Wailuku and Piihana Project Districts include roadway improvements within their respective development plans. These roadway improvements would provide alternative access to Wailuku and Kahului and relieve much of the traffic congestion on Kaahumanu Avenue in the project vicinity. The roadway improvements cited in the report include:

1. The extension of Mahalani Street to Waiale Road.
2. The construction of Maui Lani Parkway, a new roadway between Kaahumanu Avenue and Kuihelani Highway.
3. The extension of Kamehameha Avenue through the new Maui Lani Parkway.
4. The extension of Onehee Avenue to the new Maui Lani Parkway.
5. The extension and widening of Waiale Road to Honoapiilani Highway.
6. Roadway widening of Waiale Road between the Kahekili Highway Extension and the Mahalani Street Extension.
7. The Puunene Bypass Road between Mokulele Highway and Kuihelani Highway, connecting to the Maui Lani Parkway.

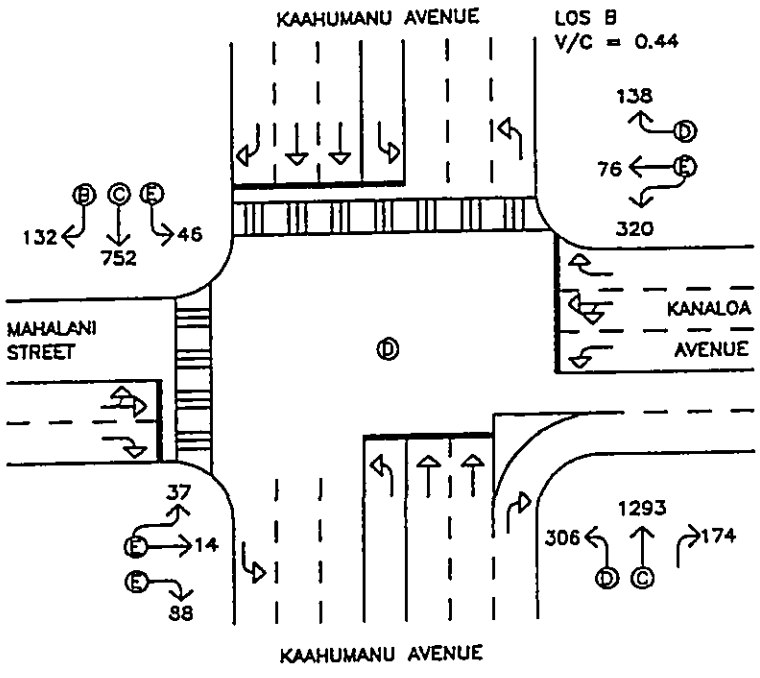
The proposed Maui Central Park is a development that would be located adjacent to the MCC campus. The park would provide recreational space and serve to separate the individual integrity of Wailuku and Kahului. The construction phasing of the proposed Maui Central Park is not

determined at this writing. For the purpose of this study, the trips generated by the proposed park are excluded from the traffic projections.

The proposed Maui Community Arts and Cultural Center would be located immediately north of the MCC campus. The Maui Community Arts and Cultural Center would include a 1,150-seat theater, a 200-seat support theater, a restaurant, and other theater-related facilities. Vehicular access would be provided by a new road connecting Kahului Beach Road and Kanaloa Avenue, immediately north of MCC. An exclusive left-turn lane on north bound Kahului Beach Road, at the new access road, is proposed. The new road would also intersect an extension of South Papa Avenue along the westerly boundary of MCC. Based on the "Maui Community College Master Plan Report", the new road would eliminate the need for the present Kaihee Place access. This study assumes that access to MCC's north parking lot is via the proposed new road. Based on a report titled "Traffic Impact Study, Maui Community Arts and Cultural Center", dated April 7, 1989, prepared by Parsons Brinkherhoff Quade and Douglas, Inc., vehicular trips generated by the proposed Maui Community Arts and Cultural Center would primarily occur during the off-peak periods of traffic on Kaahumanu Avenue. Therefore, these trips are excluded from the peak period traffic analysis.

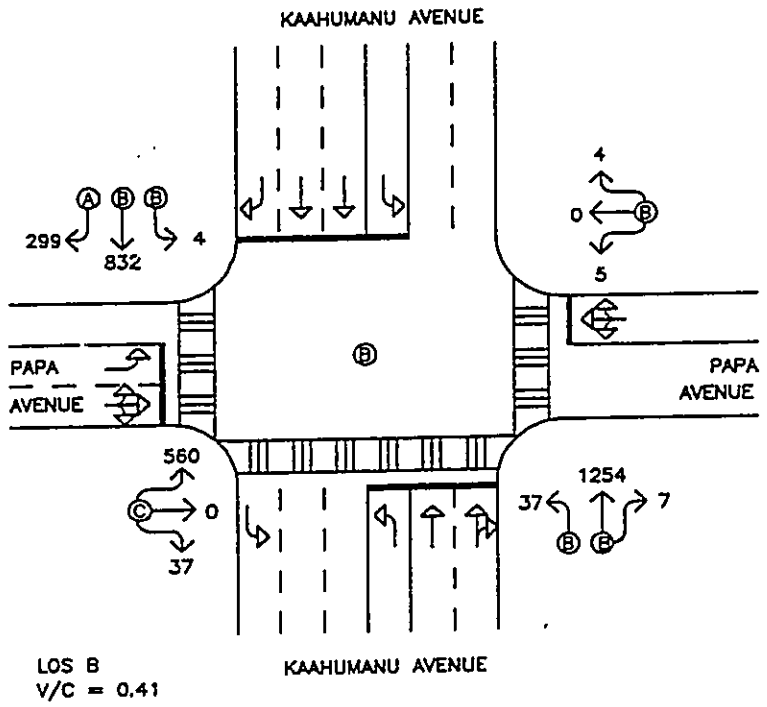
C. Total Traffic Volumes Without Project

The Year 2000 traffic projections, without the proposed expansion, are shown on Exhibits 7 through 10. The "Wailuku-Kahului Plan" was used as the basis in projecting existing 1992 AM and PM traffic volumes to the Year 2000. Tables 2 and 3 show the operating overall LOS and v/c ratios of the intersections in the study area for the projected AM and PM peak hours of traffic, without the proposed expansion, respectively. Kaahumanu Avenue, west of Mahalani Street/Kanaloa Avenue, is expected to carry 2,398 vph during the projected AM peak hour of traffic; 930 vph east bound and 1,468 vph west bound. West bound traffic on Kaahumanu Avenue, west of

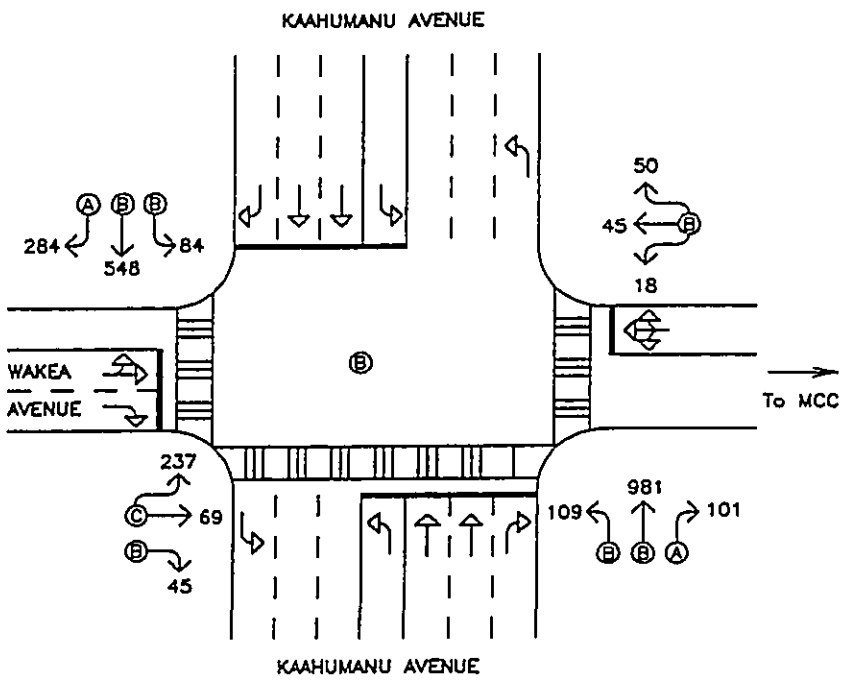


LEGEND

90	TRAFFIC MOVEMENT VOLUME (VPH)
	LANE CONTROL
LOS	LEVEL OF SERVICE (MULTI-LANE HWY)
V/C	VOLUME-TO-CAPACITY RATIO
Ⓐ	CAPACITY ANALYSIS (SIGNALIZED CONDITION)

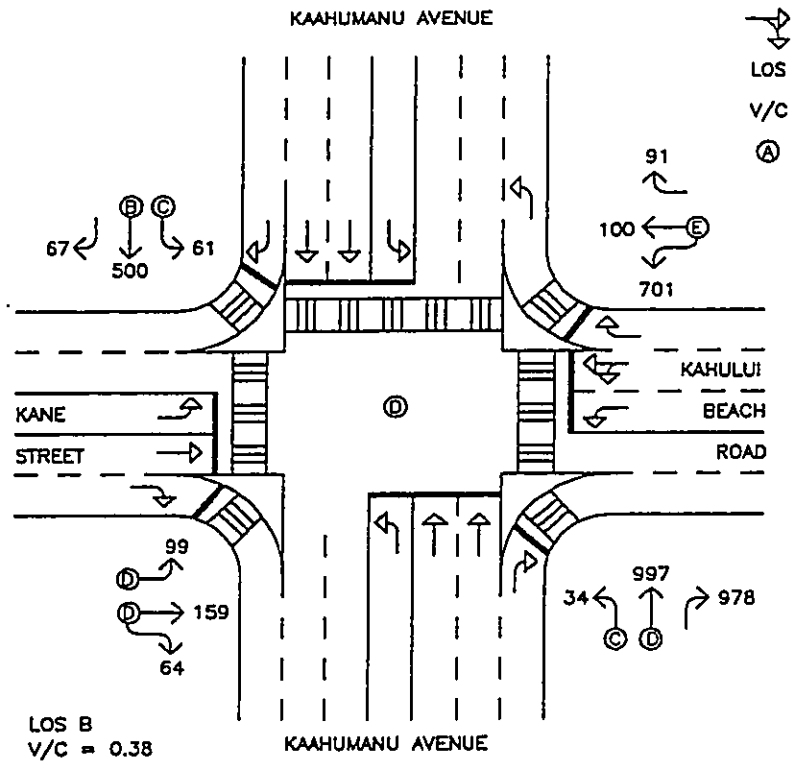


AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE YEAR 2000 AM PEAK HOUR WITHOUT PROJECT	EXHIBIT 7

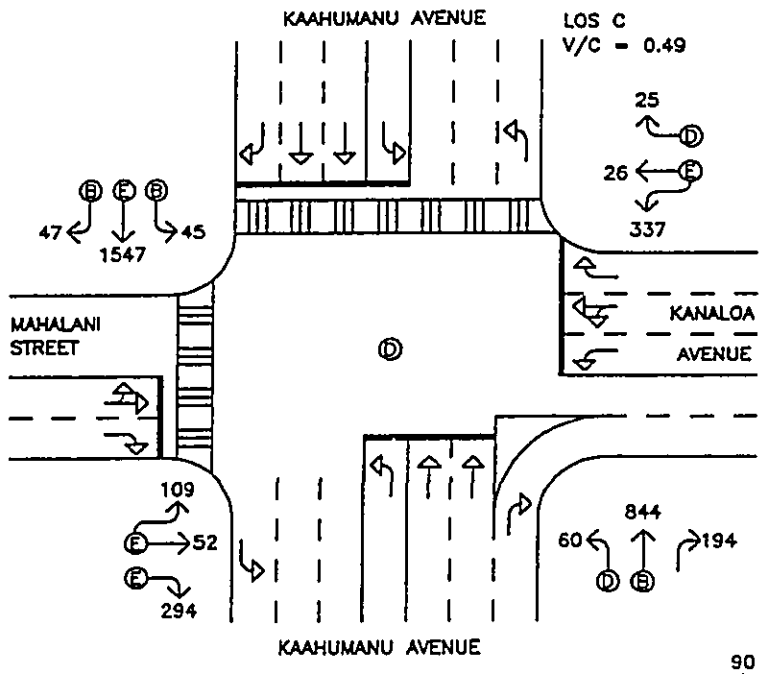


LEGEND

90	TRAFFIC MOVEMENT VOLUME (VPH)
	LANE CONTROL
LOS	LEVEL OF SERVICE (MULTI-LANE HWY)
V/C	VOLUME-TO-CAPACITY RATIO
Ⓐ	CAPACITY ANALYSIS (SIGNALIZED CONDITION)

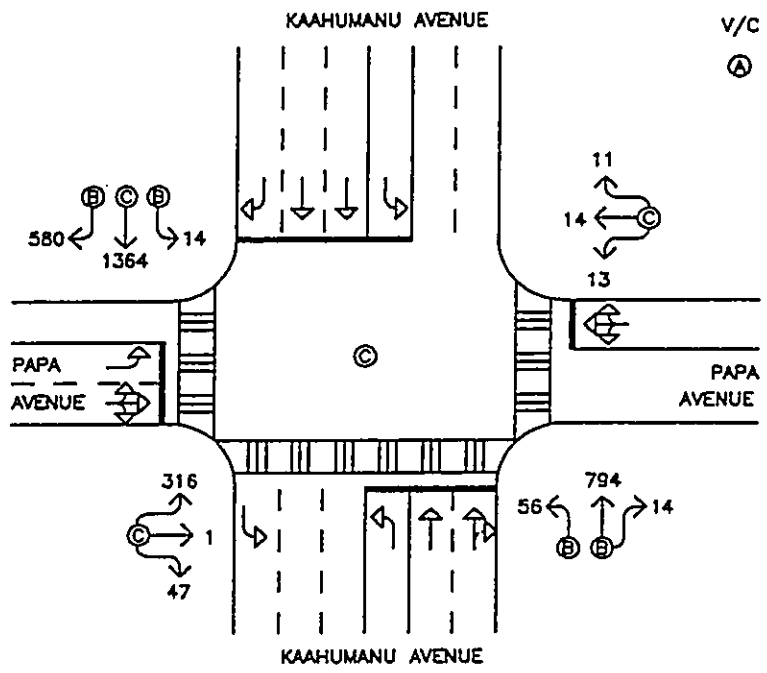


ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE YEAR 2000 AM PEAK HOUR WITHOUT PROJECT	EXHIBIT 8

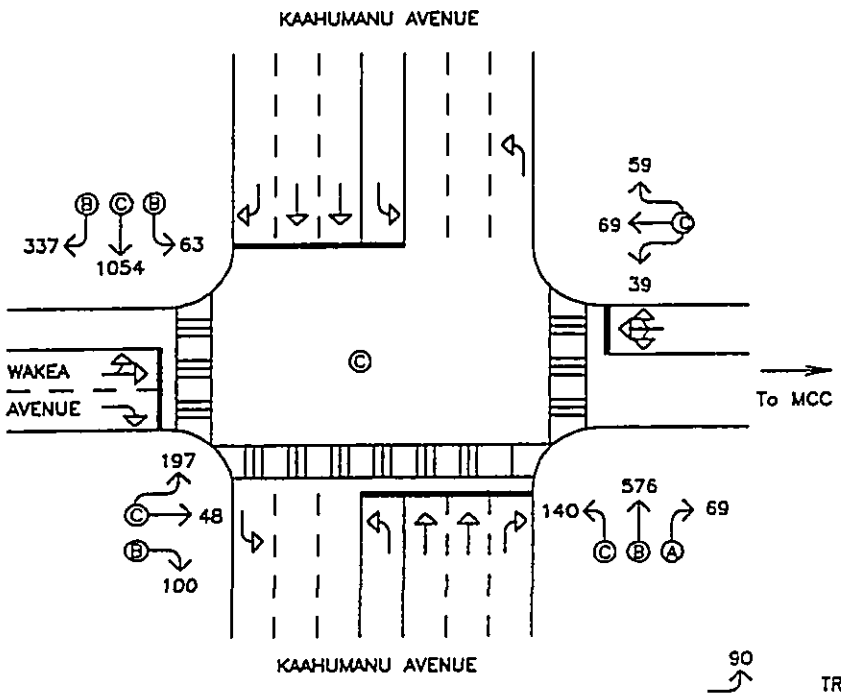


LEGEND

90	TRAFFIC MOVEMENT VOLUME (VPH)
	LANE CONTROL
LOS	LEVEL OF SERVICE (MULTI-LANE HWY)
V/C	VOLUME-TO-CAPACITY RATIO
Ⓐ	CAPACITY ANALYSIS (SIGNALIZED CONDITION)

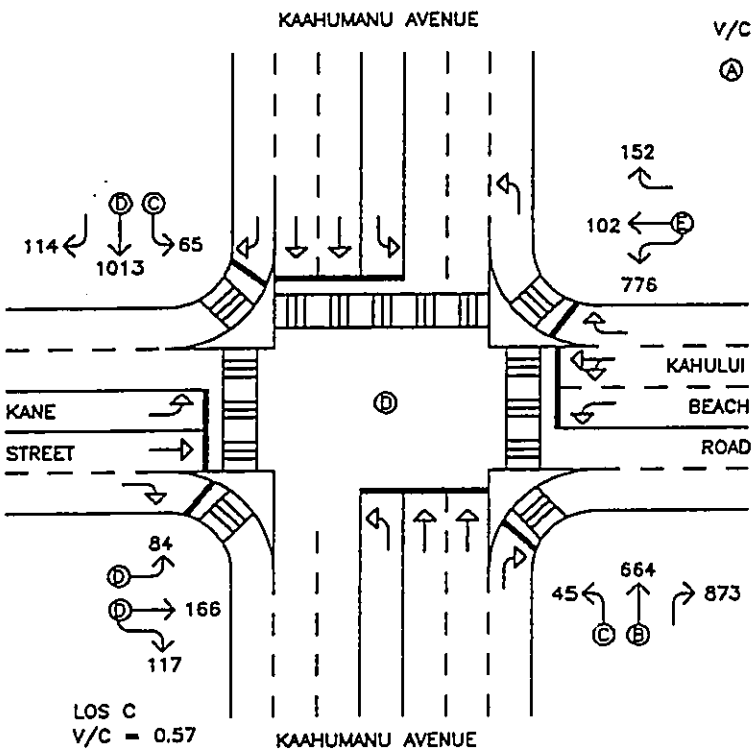


ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE YEAR 2000 PM PEAK HOUR WITHOUT PROJECT	EXHIBIT 9



LEGEND

90	TRAFFIC MOVEMENT VOLUME (VPH)
	LANE CONTROL
LOS	LEVEL OF SERVICE (MULTI-LANE HWY)
V/C	VOLUME-TO-CAPACITY RATIO
Ⓐ	CAPACITY ANALYSIS (SIGNALIZED CONDITION)



ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE YEAR 2000 PM. PEAK HOUR WITHOUT PROJECT	EXHIBIT 10

TABLE 2. YEAR 2000 AM PEAK HOUR INTERSECTION V/C RATIO AND OPERATING LOS WITHOUT THE PROPOSED PROJECT

KAAHUMANU AVENUE	V/C	LOS
MAHALANI STREET/ KANALOA AVENUE	0.805	D
SOUTH PAPA AVENUE	0.772	B
WAKEA AVENUE	0.712	B
KAHULUI BEACH ROAD/ KANE STREET	0.907	D

TABLE 3. YEAR 2000 PM PEAK HOUR INTERSECTION V/C RATIO AND OPERATING LOS WITHOUT THE PROPOSED PROJECT

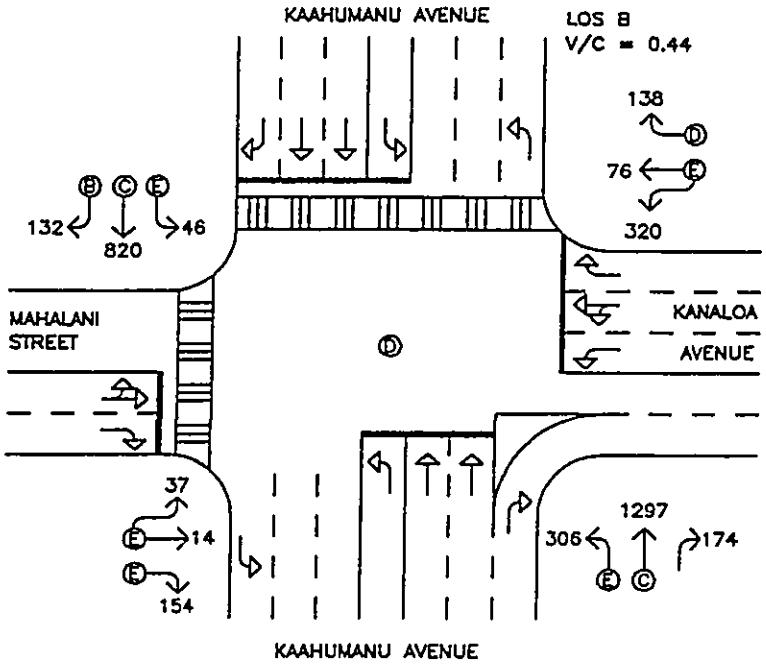
KAAHUMANU AVENUE	V/C	LOS
MAHALANI STREET/ KANALOA AVENUE	0.955	D
SOUTH PAPA AVENUE	0.748	C
WAKEA AVENUE	0.791	B
KAHULUI BEACH ROAD/ KANE STREET	0.891	D

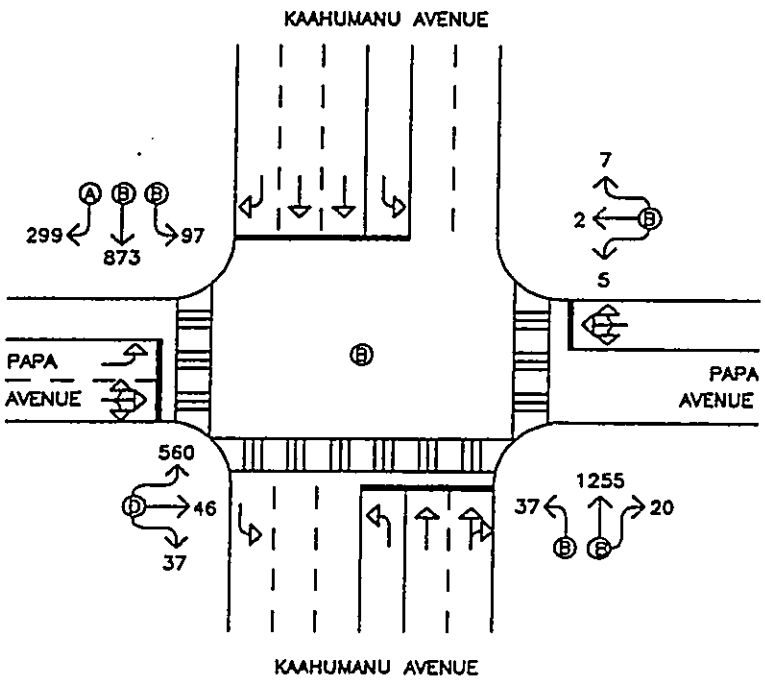
Mahalani Street/Kanaloa Avenue, would operate at LOS "B" and a v/c ratio of 0.44. Kaahumanu Avenue, east of Kahului Beach Road, is expected to carry 3,274 vph, 1,265 vph east bound and 2,009 vph west bound. East bound traffic on Kaahumanu Avenue, east of Kahului Beach Road/Kane Street, would operate at LOS "B" and at a v/c ratio of 0.38 during the projected AM peak hour of traffic.

During the projected PM peak hour of traffic, Kaahumanu Avenue, west of Mahalani Street/Kanaloa Avenue, is expected to carry 2,617 vph; 1,639 vph east bound and 978 vph west bound. East bound traffic on Kaahumanu Avenue, west of Mahalani Street/Kanaloa Avenue, would operate at LOS "C" and at a v/c ratio of 0.49. East of Kahului Beach Road/Kane Street, Kaahumanu Avenue is expected to carry 3,488 vph during the projected PM peak hour of traffic; 1,906 vph east bound and 1,582 vph west bound. Kaahumanu Avenue, east of Kahului Beach Road/Kane Street, would operate at LOS "C", and at a v/c ratio of 0.57 for east bound traffic during the projected PM peak hour.

D. Total Traffic With Project

Exhibits 11 through 14 show the Year 2000 traffic projections with the proposed MCC expansion. The intersection capacity analysis is shown under existing geometric and signalized conditions. Tables 4 and 5 show the overall intersection LOS at the intersections in the study area for the projected AM and PM peak hours of traffic, respectively. The traffic impact analysis of the site-generated traffic is discussed in the next section.

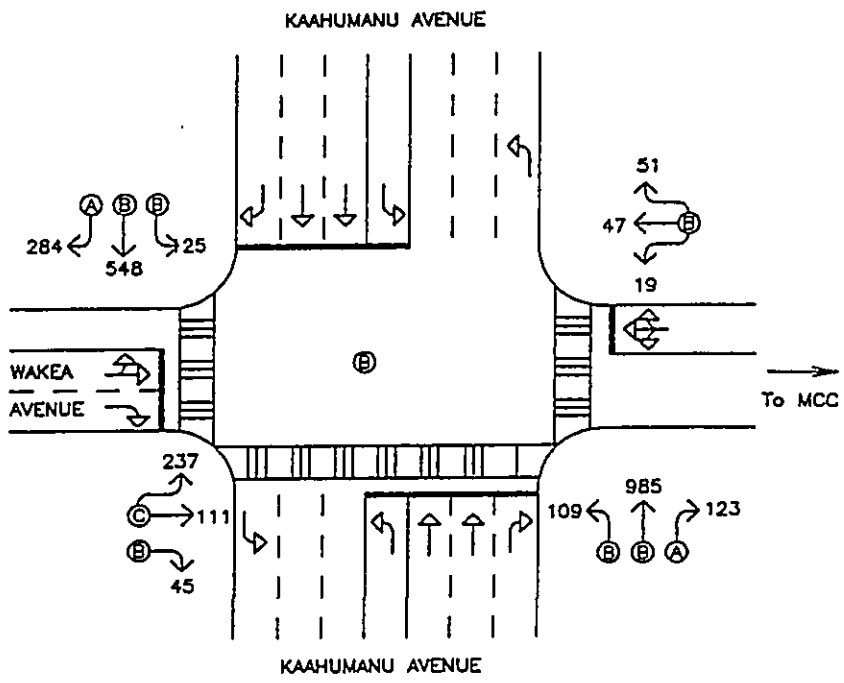




LEGEND

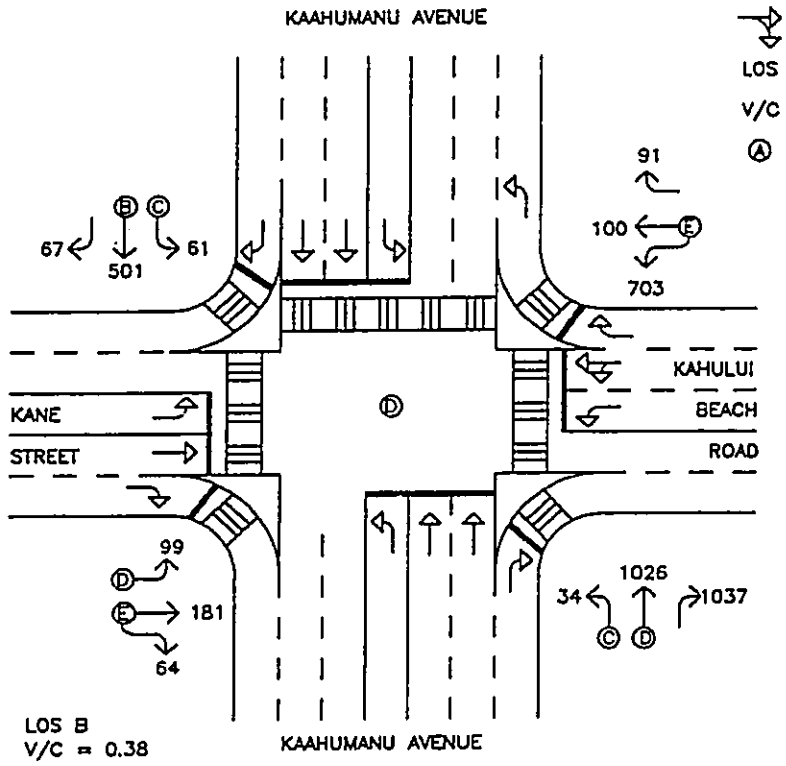
90	TRAFFIC MOVEMENT VOLUME (VPH)
	LANE CONTROL
LOS	LEVEL OF SERVICE (MULTI-LANE HWY)
V/C	VOLUME-TO-CAPACITY RATIO
Ⓐ	CAPACITY ANALYSIS (SIGNALIZED CONDITION)

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE YEAR 2000 AM PEAK HOUR WITH PROJECT	EXHIBIT 11

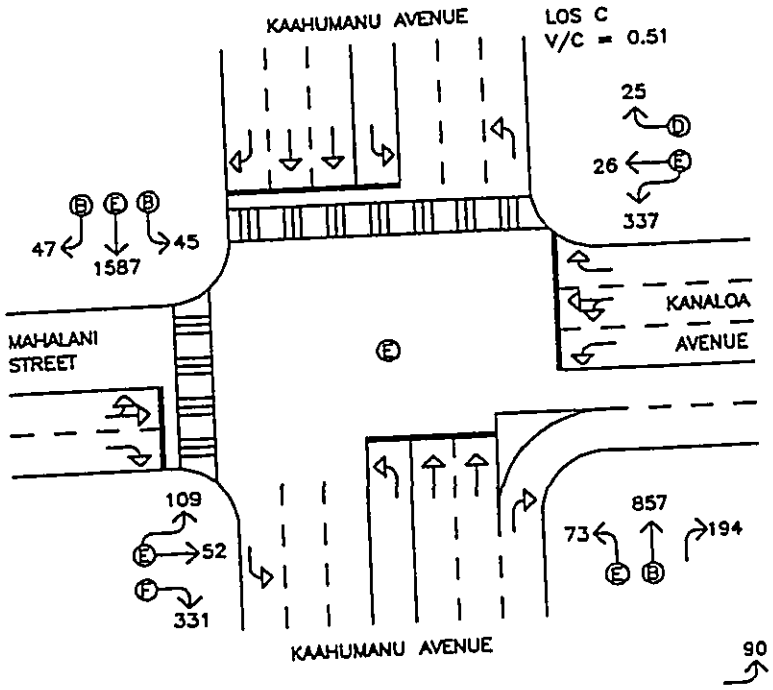


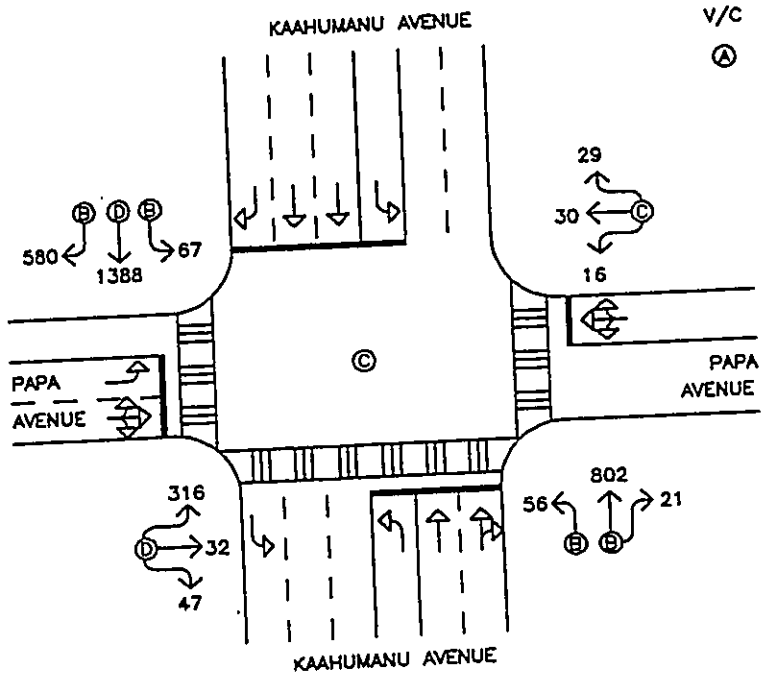
LEGEND

90	TRAFFIC MOVEMENT VOLUME (VPH)
	LANE CONTROL
LOS	LEVEL OF SERVICE (MULTI-LANE HWY)
V/C	VOLUME-TO-CAPACITY RATIO
Ⓐ	CAPACITY ANALYSIS (SIGNALIZED CONDITION)



ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE YEAR 2000 AM PEAK HOUR WITH PROJECT	EXHIBIT 12





N

LEGEND

90 — TRAFFIC MOVEMENT VOLUME (VPH)

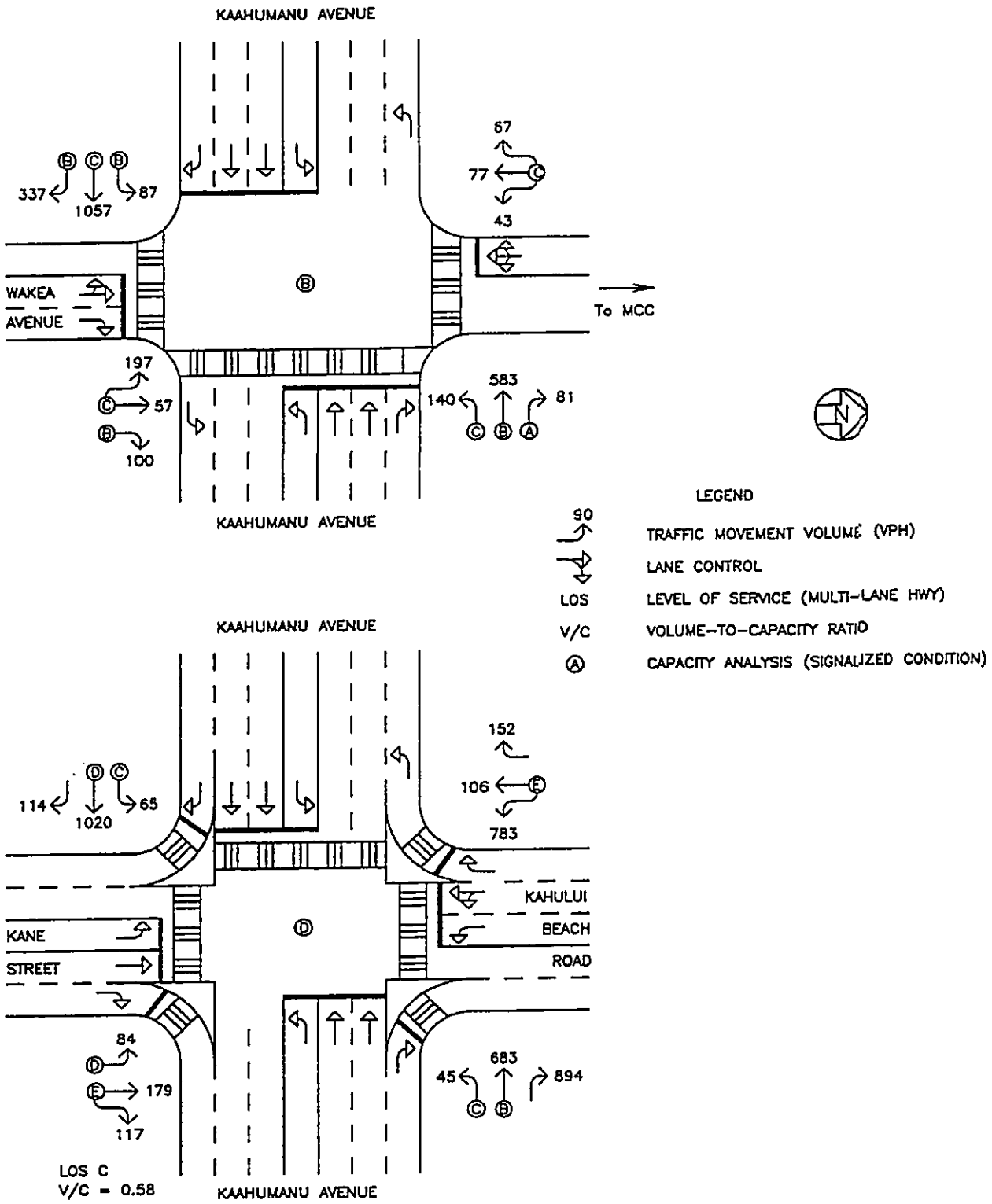
LANE CONTROL

LOS — LEVEL OF SERVICE (MULTI-LANE HWY)

V/C — VOLUME-TO-CAPACITY RATIO

Ⓐ — CAPACITY ANALYSIS (SIGNALIZED CONDITION)

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE YEAR 2000 PM PEAK HOUR WITH PROJECT	EXHIBIT 13



ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	TRAFFIC IMPACT REPORT MAUI COMMUNITY COLLEGE YEAR 2000 PM PEAK HOUR WITH PROJECT	EXHIBIT 14

TABLE 4. YEAR 2000 AM PEAK HOUR INTERSECTION V/C RATIO AND OPERATING LOS WITH THE PROPOSED PROJECT

KAAHUMANU AVENUE	V/C	LOS
MAHALANI STREET/ KANALOA AVENUE	0.824	D
SOUTH PAPA AVENUE	0.860	B
WAKEA AVENUE	0.763	B
KAHULUI BEACH ROAD/ KANE STREET	0.922	D

TABLE 5. YEAR 2000 PM PEAK HOUR INTERSECTION V/C RATIO AND OPERATING LOS WITH THE PROPOSED PROJECT

KAAHUMANU AVENUE	V/C	LOS
MAHALANI STREET/ KANALOA AVENUE	1.038	E
SOUTH PAPA AVENUE	0.790	C
WAKEA AVENUE	0.839	B
KAHULUI BEACH ROAD/ KANE STREET	0.923	D

V. TRAFFIC IMPACT ANALYSIS

A. AM Peak Hour Traffic With Project

Kaahumanu Avenue, west of Kanaloa Avenue/Mahalani Street, would carry 2,470 vph during the projected AM peak hour with the proposed project; 1,472 vph west bound and 998 vph east bound. West bound traffic on Kaahumanu Avenue would operate at LOS "B" and at a v/c ratio of 0.44 during the projected AM peak hour of traffic.

The left-turn and through movements on the Kanaloa Avenue approach at Kaahumanu Avenue would operate at LOS "E" during the projected AM peak hour of traffic. The other left-turn movements at the intersection of Kaahumanu Avenue and Mahalani Street/Kanaloa Avenue would also operate at LOS "E". the intersection would continue to operate at an overall LOS "D" during the projected AM peak hour of traffic. The total number of vehicles entering this intersection would increase by approximately 4% over projected traffic demands without the proposed project.

At the intersection of Kaahumanu Avenue and South Papa Avenue, the north bound approach of South Papa Avenue would operate at LOS "D" during the projected AM peak hour of traffic. The other traffic movements at this intersection would continue to operate at satisfactory LOS, similar to projected traffic conditions without the proposed project. The intersection would operate at an overall LOS "B" during the projected AM peak hour of traffic.

The Wakea Avenue north bound left/through movement would operate at LOS "C" at the intersection with Kaahumanu Avenue during the projected AM peak hour of traffic with the proposed project. The other movements at the intersection of Kaahumanu Avenue and Wakea Avenue would operate at satisfactory LOS. The intersection would operate at an overall LOS "B" during the projected AM peak hour of traffic. Vehicular traffic entering the

MCC main entrance at the intersection of Kaahumanu Avenue and Wakea Avenue is expected to increase by 105 vph during the projected AM peak hour of traffic with the proposed project.

The north bound approach of Kane Street at the intersection with Kaahumanu Avenue would operate at LOS "E" during the projected AM peak hour of traffic. The south bound left-turn movement on Kahului Beach Road to east bound Kaahumanu Avenue would operate at LOS "E". The west bound approach on Kaahumanu Avenue would operate at LOS "D". The other traffic movements at the intersection of Kaahumanu Avenue and Kahului Beach Road/Kane Street would operate at satisfactory LOS. The intersection would operate at an overall LOS "D" during the projected AM peak hour of traffic.

Kaahumanu Avenue, east of Kahului Beach Road, would carry 3,365 vph during the projected AM peak hour; 1,268 vph east bound and 2,097 vph west bound. East bound traffic on Kaahumanu Avenue, east of Kahului Beach Road, would operate at LOS "B" and at a v/c ratio of 0.38 during the AM peak hour of traffic. The total number of vehicles entering the intersection of Kaahumanu Avenue and Kahului Beach Road/Kane Street is expected to increase by approximately 3% over projected conditions without the proposed project.

B. PM Peak Hour Traffic With Project

Kaahumanu Avenue, west of Kanaloa Avenue/Mahalani Street, would carry 2,670 vph during the projected PM peak hour with the proposed project; 991 vph west bound and 1,679 vph east bound. East bound traffic on Kaahumanu Avenue would operate at LOS "B" and at a v/c ratio of 0.51 during the projected PM peak hour of traffic.

The north bound right-turn movement from Mahalani Street to east bound Kaahumanu Avenue would operate at LOS "F" during the projected

PM peak hour of traffic with the proposed project. The left-turn and through movements on the Kanaloa Avenue approach at Kaahumanu Avenue would continue to operate at LOS "E". The Kaahumanu Avenue west bound left-turn movement to south bound Mahalani Street also would operate at LOS "E". The intersection would operate at an overall LOS "E" during the projected PM peak hour of traffic. The total number of vehicles entering this intersection would increase by approximately 3% over projected traffic demands without the proposed project.

At the intersection of Kaahumanu Avenue and South Papa Avenue, the north bound approach of South Papa Avenue would operate at LOS "D" during the projected PM peak hour of traffic. The other traffic movements at this intersection would continue to operate at satisfactory LOS, similar to projected traffic conditions without the proposed project. The intersection would operate at an overall LOS "B" during the projected PM peak hour of traffic.

The north bound Wakea Avenue left/through movement would operate at LOS "C" at the intersection with Kaahumanu Avenue during the projected PM peak hour of traffic with the proposed project. The south bound approach from MCC would continue to operate at LOS "C". The other traffic movements at the intersection of Kaahumanu Avenue and Wakea Avenue also would operate at satisfactory LOS. The intersection operates at an overall LOS "B" during the projected PM peak hour of traffic. Vehicular traffic entering the MCC main entrance at the intersection of Kaahumanu Avenue and Wakea Avenue is expected to increase by 45 vehicles during the projected PM peak hour of traffic with the proposed project.

The north bound approach of Kane Street at the intersection with Kaahumanu Avenue would operate at LOS "E" during the projected PM peak hour of traffic. The south bound left-turn movement on Kahului Beach Road to east bound Kaahumanu Avenue also would operate at LOS "E". The

other traffic movements at the intersection of Kaahumanu Avenue and Kahului Beach Road/Kane Street would operate at satisfactory LOS. The intersection would continue to operate at an overall LOS "D" during the projected AM peak hour of traffic.

Kaahumanu Avenue, east of Kahului Beach Road, would carry 3,542 vph during the projected PM peak hour; 1,920 vph east bound and 728 vph west bound. East bound traffic on Kaahumanu Avenue, east of Kahului Beach Road, would operate at LOS "C" and at a v/c ratio of 0.58 during the PM peak hour of traffic. The total number of vehicles entering the intersection of Kaahumanu Avenue and Kahului Beach Road/Kane Street is expected to increase by approximately 2% over projected conditions without the proposed project.

VI. PROPOSED ROADWAY IMPROVEMENTS AND RECOMMENDATIONS

A. Improvements to Mitigate Existing Roadway Deficiencies

1. Provide exclusive left-turn, through, and right-turn lanes on the north bound Mahalani Street approach at Kaahumanu Avenue.

2. Construct an exclusive left-turn lane, an optional left/through lane, and an exclusive right-turn lane on the north bound approach of Wakea Avenue at Kaahumanu Avenue.

B. Site Access Recommendations

1. Restrict access from Kaihee Place and utilize the new road connecting Kanaloa Avenue to Kahului Beach Road as the access to the faculty/student parking lot located north of the campus.

2. Provide an exclusive right-turn lane and an optional left/through lane on the south bound approach exiting the MCC campus at the intersection of Kaahumanu Avenue and South Papa Avenue.

3. Provide an exclusive right-turn lane and an optional left/through lane on the south bound approach exiting the MCC campus at the intersection of Kaahumanu Avenue and Wakea Avenue.

4. Each of the campus parking lot driveways on the South Papa Avenue Extension should have exclusive left-turn and right-turn lanes for vehicles exiting the parking areas.

5. Left-turn lanes to the parking lot driveways should be constructed to maintain through traffic flow on the new roadway and the South Papa Avenue Extension.

VII. CONCLUSION

Based upon the "Wailuku-Kahului Plan", the proposed roadway improvements and new roadways included in the development plans of other projects in the Kahului-Wailuku area are expected to2 reduce the traffic demand on Kaahumanu Avenue. The projected AM and PM peak hour traffic volumes on Kaahumanu Avenue, west of Mahalani Street/Kanaloa Avenue, with the proposed MCC expansion, would increase by 3% and 2%, respectively, over projected traffic conditions without the proposed project. East of Kahului Beach Road/Kane Street, the AM and PM peak hour traffic projections on Kaahumanu Avenue, with the proposed MCC expansion, would each increase by approximately 2% over projected traffic conditions without the proposed project.

With the implementation of roadway improvements and new roadways discussed in this report, the proposed Maui Community College expansion should not have any significant impact on traffic in the vicinity of the project.

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APPENDICES

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
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APPENDIX A

LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE DEFINITIONS

1. LEVEL-OF-SERVICE CRITERIA FOR MULTILANE HIGHWAY

Level of Service (LOS) criteria for multilane highways are defined in terms of density. Density is a measure which quantifies the proximity to other vehicles in the traffic stream. It expresses the degree of maneuverability within the traffic stream.

Level of service criteria depend on the design speed of the highway element being studied. A "highway element" can be an isolated geometric element, such as a curve or grade having a reduced design speed, or a series of such geometric elements that dominate the operation of a longer segment of highway.

Level of Service A describes completely free-flow conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway and driver preferences. Vehicles are spaced at an average of 440 feet, or 22 car-lengths, at a maximum density of 12 pc/mi/ln. The ability to maneuver within the traffic stream is high. Minor disruptions to flow are easily absorbed at this level without causing significant delays or queuing.

Level of Service B is also indicative of free flow, although the presence of other vehicles begins to be noticeable. Average travel speeds are somewhat diminished from LOS A. Vehicles are spaced at an average of approximately 264 feet, or 13 car-lengths, at a maximum density of 20 pc/mi/ln. Minor disruptions are still easily absorbed at this level, although local deterioration in LOS will be more obvious.

Level of Service C represents a range in which the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream, and to select an operating speed, is now clearly affected by the presence of other vehicles. The average spacing of vehicles is reduced to approximately 175 feet, or 9 car-lengths, at a maximum density of 30 pc/mi/ln. Minor disruptions may be expected to cause serious local deterioration in service, and queues may form behind any significant traffic disruption. Severe or long-term disruptions may cause the facility to operate at LOS F.

Level of Service D borders on unstable flow. Speeds and ability to maneuver are severely restricted because of traffic congestion. The average spacing of vehicles is 125 feet, or 6 car-lengths, at a maximum density of 42 pc/mi/ln. Only the most

minor of disruptions can be absorbed without the formation of extensive queues and the deterioration of service to LOS F.

Level of Service E represents operations at or near capacity, and is quite unstable. At capacity, vehicles are spaced at only 80 feet, or 4 car-lengths, at a maximum density of 67 pc/mi/ln. This is the minimum spacing at which uniform flow can be maintained, and effectively defines a traffic stream with no usable gaps. Thus, disruptions cannot be damped or dissipated, and any disruption, no matter how minor, will cause queues to form and service to deteriorate to LOS F.

Level of Service F *represents forced or breakdown flow. It occurs at a point* where vehicles arrive either at a rate greater than that at which they are discharged, or at a point on a planned facility where forecasted demand exceeds the computed capacity. While operations at such points (and on immediately downstream sections) will appear to be at capacity or better, queues will form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing short spurts of movement followed by stoppages. Densities are higher than 67 pc/mi/ln. Note that the term "LOS F" may be used to characterize both the point of the breakdown and the operating conditions within the queue. It must be remembered, however, that it is the point of breakdown that causes the queue to form, and that operations within the queue are generally not related to defects along the highway segment over which the queue extends.

2. LEVELS OF SERVICE CRITERIA FOR TWO-LANE HIGHWAYS

The highest quality of traffic service occurs when motorists are able to drive at their desired speed, representative of Level of Service A. Almost no platoons of three or more vehicles are observed. Drivers would be delayed no more than 30 percent of the time by slow-moving vehicles. A maximum flow rate of 420 pcph, total in both directions, may be achieved under ideal conditions.

Level of Service B characterizes the region of traffic flow where drivers are delayed up to 45 percent of the time on the average. Service flow rates of 750 pcph, total in both directions, can be achieved under ideal conditions. Above this flow rate, the number of platoons forming in the traffic stream begins to increase dramatically.

Further increases in flow characterize Level of Service C, resulting in noticeable increases in platoon formation, platoon size, and frequency of passing impediment. At high volume levels, chaining of platoons and significant reductions in passing capacity begin to occur. While traffic flow is stable, it is becoming susceptible to congestion due to turning traffic and slow-moving vehicles. Percent time delays

are up to 60 percent. A service flow rate of up to 1,200 pcph, total in both directions, can be accommodated under ideal conditions.

Unstable traffic flow is approached as traffic flows enter Level of Service D. The two opposing traffic streams essentially begin to operate separately at higher volume levels. Mean platoon sizes of 5 to 10 vehicles are common, although speeds of 50 mph can still be maintained under ideal conditions. The fraction of no passing zones along the roadway section usually has little influence on passing. Turning vehicles and/or roadside distractions cause major shockwaves in the traffic stream. The percentage of time motorists are delayed approaches 75 percent. Maximum service flow rates of 1,800 pcph, total in both directions, can be maintained under ideal conditions. This is the highest flow rate that can be maintained for any length of time over an extended section of level terrain without a high probability of breakdown.

Level of Service E is defined as traffic flow conditions on two-lane highways having a percent time delay of greater than 75 percent. Passing is virtually impossible under Level of Service E conditions, and platooning becomes intense when slower vehicles or other interruptions are encountered.

The highest volume attainable under Level of Service E defines the capacity of the highway. Under ideal conditions, capacity is 2,800 pcph, total in both directions. Operating conditions at capacity are unstable and difficult to predict. Traffic operations are seldom observed near capacity on rural highways, primarily because of a lack of demand.

As with other highway types, Level of Service F represents heavily congested flow with traffic demand exceeding capacity. Volumes are lower than capacity. Level of Service E is seldom attained over extended sections on level terrain as more than a transient condition; most often, perturbations in traffic flow as Level E is approached cause a rapid transition to Level of Service F.

3. LEVEL OF SERVICE OF SIGNALIZED INTERSECTIONS

Level of service for signalized intersections is defined in terms of **delay**. Delay is a measure of driver discomfort, frustration, fuel consumption and lost travel time. specifically, level-of-service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The criteria are given in Table A-1.

Table A-1. Level-of Service Criteria for Signalized Intersections

Level of Service	Stopped Delay for Vehicle (SEC)
A	≤ 5.0
B	5.1 to 15.0
C	15.1 to 25.0
D	25.1 to 40.0
E	40.1 to 60.0
F	> 60.0

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

Level-of-service A describes operations with very low delay, i.e., less than 5.0 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level-of-service B describes operations with delay in the range of 5.1 to 15.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level-of-service C describes operations with delay in the range of 15.1 to 25.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level-of-service D describes operations with delay in the range of 25.1 to 40.0 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level-of-service E describes operations with delay in the range of 40.1 to 60.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent occurrences.

Level-of-service F describes operations with delay in excess of 60.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

4. LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service definitions for unsignalized intersections is determined by the reserve or unused capacity of a lane. The potential capacity is determined by the size and frequency in gaps in conflicting traffic that can accommodate the side street demand. The reserve capacity is equal to the potential capacity minus the traffic demand. A lower Level of Service translates into longer side street delay. The Levels of Service criteria are shown in the following table:

Table A-2. Level-of-Service Criteria
for Unsignalized Intersections

Reserve Capacity	Level of Service	Expected Delay to Minor Street Traffic
≥ 400	A	Little or no delay
300-399	B	Short traffic delays
200-299	C	Average traffic delays
100-199	D	Long traffic delays
0- 9	E	Very long traffic delays
< 0	F	Extreme traffic delays

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APPENDIX B

EXISTING TRAFFIC COUNT DATA

MAUI COMMUNITY COLLEGE EXPANSION

SITE CODE : 2 — PAGE: 1
Major St. : KAAHUMANU AVENUE — FILE: KAAMAHAM
Minor St. : MAHALANI ROAD / KANALOA AVE.
Weather : DRY, SUNNY — Primary Movements: Vehicles — DATE: 9/30/92

Time Begin	From North RT	THRU	LT	From East RT	THRU	LT	From South RT	THRU	LT	From West RT	THRU	LT	Vehicle Total
6:30	16	5	26	33	132	43	4	3	6	15	95	8	390
6:45	15	20	34	39	231	71	14	3	7	36	140	10	620
HR TOTAL	31	25	60	72	363	114	18	6	13	55	235	18	1010
7:00 AM	17	6	59	47	275	49	22	5	9	22	166	3	580
7:15	40	10	92	45	372	70	15	1	13	26	201	14	899
7:30	22	21	99	46	377	80	25	3	11	45	233	16	978
7:45	45	26	66	45	379	83	25	6	5	45	244	15	984
HR TOTAL	124	63	316	183	1403	282	87	15	38	138	844	48	3541
8:00 AM	28	17	55	61	332	113	33	6	12	31	161	6	855
8:15	24	17	35	30	207	65	27	8	29	26	159	22	660
DAY TOTAL	207	122	467	346	2305	574	165	35	92	250	1489	94	6069

PEAK PERIOD ANALYSIS FOR THE PERIOD: 6:30 AM - 8:30 AM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	7:15 AM	0.92	135	74	312	521	26	14	60
East	7:15 AM	0.93	197	1460	345	2003	10	73	17
South	7:30 AM	0.74	110	23	57	190	58	12	30
West	7:15 AM	0.85	147	839	51	1037	14	81	5
Entire Intersection									
North	7:15 AM	0.92	135	74	312	521	26	14	60
East		0.99	197	1460	346	2003	10	73	17
South		0.75	98	16	41	155	63	10	26
West		0.85	147	839	51	1037	14	81	5

MAUI COMMUNITY COLLEGE EXPANSION

SITE CODE : 2 — PAGE: 1
Major St. : KAAHUMANU AVENUE — FILE: KAAPAPAN
Minor St. : PAPA AVENUE / M.C.C
Weather : DRY, SUNNY — Primary Movements: Vehicles — DATE: 9/30/93

Time Begin	From North RT	THRU	LT	From East RT	THRU	LT	From South RT	THRU	LT	From West RT	THRU	LT	Vehicle Total
6:30	0	0	1	2	150	7	12	0	76	28	110	0	386
6:45	0	0	1	1	239	11	14	0	131	50	135	1	581
HR TOTAL	0	0	2	3	389	18	26	0	207	78	245	1	967
7:00 AM	1	1	0	0	258	6	11	1	166	78	151	0	673
7:15	2	0	1	3	350	17	12	0	224	102	219	1	930
7:30	0	0	0	0	367	9	7	0	192	121	241	2	939
7:45	0	0	2	4	363	6	9	0	192	68	291	2	927
HR TOTAL	3	1	3	8	1338	38	39	1	754	369	902	5	3469
8:00 AM	2	0	2	2	426	13	20	0	138	48	193	0	841
8:15	1	0	1	1	218	4	8	0	85	48	231	2	596
DAY TOTAL	6	1	8	12	2371	73	93	1	1184	537	1569	8	5863

PEAK PERIOD ANALYSIS FOR THE PERIOD: 6:30 AM - 8:30 AM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	..... VOLUMES ..... Right	Thru	Left	Total	.... PERCENTS ... Right	Thru	Left
North	7:15 AM	0.56	4	0	5	9	44	0	56
East	7:15 AM	0.88	8	1506	45	1559	1	97	3
South	7:00 AM	0.84	39	1	754	794	5	0	95
West	7:00 AM	0.88	369	902	5	1276	29	71	0
Entire Intersection									
North	7:15 AM	0.56	4	0	5	9	44	0	56
East		0.88	8	1506	45	1559	1	97	3
South		0.93	48	0	736	784	6	0	94
West		0.88	336	934	5	1275	26	73	0

MAUI COMMUNITY COLLEGE EXPANSION

SITE CODE : 2
Major St. : KAAHUMANU AVENUE
Minor St. : WAKEA AVENUE
Weather : DRY, SUNNY

FILE: KAAWAKEM

Primary Movements: Vehicles

DATE: 9/30/92

Time Begin	From North RT	THRU	LT	From East RT	THRU	LT	From South RT	THRU	LT	From West RT	THRU	LT	Vehicle Total
6:30	4	5	0	3	116	19	20	1	36	37	75	3	320
6:45	1	6	0	7	192	18	21	3	59	38	114	3	462
HR TOTAL	5	11	0	10	308	37	41	4	95	75	189	6	782
7:00 AM	6	6	3	9	196	32	20	12	60	59	110	7	520
7:15	12	7	2	16	284	32	22	11	84	85	143	16	714
7:30	14	23	3	25	321	44	8	14	93	80	146	21	792
7:45	16	13	8	36	282	25	11	21	63	93	174	28	770
HR TOTAL	48	49	16	86	1083	133	61	58	302	317	573	72	2796
8:00 AM	8	2	5	24	291	30	18	23	71	61	152	19	704
8:15	9	7	3	12	164	18	19	11	51	58	136	9	547
DAY TOTAL	70	69	24	132	1846	218	139	96	517	511	1101	126	4529

PEAK PERIOD ANALYSIS FOR THE PERIOD: 6:30 AM - 8:30 AM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	..... VOLUMES ..... Right	Thru	Left	Total	.... PERCENTS ... Right	Thru	Left
North	7:00 AM	0.71	48	49	16	113	42	43	14
East	7:15 AM	0.90	101	1178	131	1410	7	84	9
South	7:15 AM	0.94	59	69	311	439	13	16	71
West	7:30 AM	0.87	292	658	77	1027	28	64	7
Entire Intersection									
North	7:15 AM	0.71	50	48	18	113	44	40	16
East		0.90	101	1178	131	1410	7	84	9
South		0.94	59	69	311	439	13	16	71
West		0.86	319	619	84	1018	31	60	8

MAUI COMMUNITY COLLEGE EXPANSION

FILE: KAAHUMANU

SITE CODE : 3
Major St. : KAAHUMANU AVENUE
Minor St. : KANE STREET / BEACH RD.
Weather : DRY, SUNNY

Primary Movements: Vehicles

DATE: 9/30/92

Time Begin	From South RT	THRU	LT	From West RT	THRU	LT	From North RT	THRU	LT	From East RT	THRU	LT	Vehicle Total
6:30	8	29	12	20	63	11	16	30	139	162	113	18	621
6:45	13	12	16	15	104	13	17	23	166	192	190	15	766
HR TOTAL	21	41	28	35	167	24	33	53	305	354	293	33	1387
7:00 AM	12	19	12	4	106	11	17	22	140	175	176	7	732
7:15	15	39	32	21	131	16	23	18	164	337	304	12	1112
7:30	18	46	26	15	140	13	30	28	217	328	248	9	1124
7:45	18	46	29	17	169	23	26	21	192	207	289	11	1048
HR TOTAL	63	150	99	57	546	63	96	89	713	1043	1017	39	3916
8:00 AM	19	43	21	23	131	12	16	37	156	206	253	6	928
8:15	13	31	7	24	167	11	21	35	163	193	224	12	903
DAY TOTAL	116	265	155	139	1011	116	166	214	1334	1801	1582	90	7209

PEAK PERIOD ANALYSIS FOR THE PERIOD: 6:30 AM - 8:30 AM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
South	7:15 AM	0.95	70	174	108	352	20	49	31
West	7:30 AM	0.90	79	607	65	751	11	81	9
North	7:30 AM	0.85	93	121	725	939	10	13	77
East	7:15 AM	0.85	1078	1099	38	2215	49	50	1
Entire Intersection									
South	7:15 AM	0.95	70	174	108	352	20	49	31
West		0.86	76	571	70	717	11	80	10
North		0.84	95	104	729	928	10	11	79
East		0.85	1378	1099	38	2215	49	50	1

MAUI COMMUNITY COLLEGE EXPANSION

FILE: KAAHAHPM

SITE CODE : 1
Major St. : KAAHUMANU AVENUE
Minor St. : MAHALANI ROAD / KANALOA AVE.
Weather : DRY, SUNNY

Primary Movements: Vehicles

DATE: 9/29/92

Time Begin	From North RT	THRU	LT	From East RT	THRU	LT	From South RT	THRU	LT	From West RT	THRU	LT	Vehicle Total
3:30	4	8	45	39	218	23	81	12	26	3	143	164	765
3:45	14	8	76	47	220	39	78	5	24	16	267	11	905
HR TOTAL	18	16	121	86	438	62	159	17	50	19	410	175	1671
4:00 PM	5	7	48	68	223	22	60	19	36	17	386	20	811
4:15	6	5	52	53	232	15	66	16	25	21	341	12	844
4:30	6	7	83	55	273	23	105	17	35	13	404	7	1031
4:45	4	8	97	54	207	15	84	13	43	6	524	16	1168
HR TOTAL	21	27	280	230	935	75	315	65	139	57	1655	55	3854
5:00 PM	8	5	97	57	241	15	73	12	18	13	356	16	812
DAY TOTAL	47	48	498	373	1614	152	547	94	207	89	2423	245	6337

PEAK PERIOD ASALYSIS FOR THE PERIOD: 3:30 PM - 5:15 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	..... VOLUMES ..... Right	Thru	Left	Total	.... PERCENTS ... Right	Thru	Left
North	4:15 PM	0.86	24	25	329	378	6	7	87
East	3:45 PM	0.90	223	948	99	1270	18	75	8
South	4:00 PM	0.81	315	65	139	519	61	13	27
West	4:15 PM	0.71	53	1727	50	1830	3	94	3

Entire Intersection

North	4:15 PM	0.86	24	25	329	378	6	7	87
East		0.88	219	953	68	1240	18	77	5
South		0.79	323	58	121	507	63	11	24
West		0.71	53	1727	50	1830	3	94	3

MAUI COMMUNITY COLLEGE EXPANSION

SITE CODE : 1 — PAGE: 1
Major St. : KAAHUMANU AVENUE — FILE: KAAPAPPM
Minor St. : PAPA AVENUE / M.C.C
Weather : DRY, SUNNY — Primary Movements: Vehicles — DATE: 9/29/91

Time Begin	From North RT	THRU	LT	From East RT	THRU	LT	From South RT	THRU	LT	From West RT	THRU	LT	Vehicle Total
3:30	0	2	4	3	257	12	14	0	102	117	338	5	854
3:45	2	3	5	2	282	21	9	3	119	112	331	2	881
HR TOTAL	2	5	9	5	539	33	23	3	221	229	669	7	1735
4:00 PM	2	2	6	7	258	20	19	0	101	143	333	3	898
4:15	2	5	2	7	236	7	12	1	99	121	348	5	845
4:30	3	4	0	2	265	21	15	0	105	193	445	3	1049
4:45	4	3	5	1	195	19	16	0	106	204	401	5	961
HR TOTAL	11	14	13	17	954	67	62	1	415	661	1532	16	3753
5:00 PM	2	0	0	2	219	16	21	0	110	145	378	4	895
5:15	2	0	1	2	231	16	20	1	82	136	281	6	818
DAY TOTAL	17	19	23	26	1943	132	126	5	833	1161	3385	33	7139

PEAK PERIOD ANALYSIS FOR THE PERIOD: 3:30 PM - 5:30 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	..... VOLUMES ..... Right	Thru	Left	Total	.... PERCENTS ... Right	Thru	Left
North	4:00 PM	0.79	11	14	13	38	29	37	34
East	3:45 PM	0.92	18	1041	69	1128	2	92	6
South	3:45 PM	0.93	55	4	428	487	11	1	88
West	4:15 PM	0.88	653	1572	17	2242	29	70	1
Entire Intersection									
North	4:00 PM	0.79	11	14	13	38	29	37	34
East		0.90	17	954	67	1038	2	92	6
South		0.95	62	1	415	478	13	0	87
West		0.87	661	1532	16	2199	30	70	1

MAUI COMMUNITY COLLEGE EXPANSION

SITE CODE : 1
Major St. : KAAHUMANU AVENUE
Minor St. : WAKEA AVENUE
Weather : DRY, SUNNY

FILE: KAAWAKEM

Primary Movements: Vehicles

DATE: 9/29/92

Time Begin	From North RT	THRU	LT	From East RT	THRU	LT	From South RT	THRU	LT	From West RT	THRU	LT	Vehicle Total
3:30	6	12	8	10	218	48	22	8	69	75	291	15	782
3:45	13	15	12	12	191	36	29	10	80	87	245	5	735
HR TOTAL	19	27	20	22	409	84	51	18	149	162	536	20	1517
4:00 PM	24	25	13	9	188	42	42	10	78	79	251	14	785
4:15	7	12	13	12	174	40	28	20	60	94	270	10	740
4:30	17	19	6	19	183	47	30	4	68	102	307	33	824
4:45	11	13	7	29	147	39	32	14	53	103	346	17	811
HR TOTAL	59	69	39	69	692	168	132	48	259	378	1184	63	3160
5:00 PM	9	8	9	20	151	37	35	16	53	92	239	11	741
5:15	12	14	13	13	145	27	37	19	76	85	210	19	670
DAY TOTAL	99	118	81	124	1397	316	253	101	537	718	2229	114	6068

PEAK PERIOD ANALYSIS FOR THE PERIOD: 3:30 PM - 5:30 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	3:45 PM	0.71	61	71	44	176	35	40	25
East	3:30 PM	0.89	43	771	166	980	4	79	17
South	3:45 PM	0.88	129	44	286	459	28	10	62
West	4:15 PM	0.90	392	1221	61	1674	23	73	4
Entire Intersection									
North	4:00 PM	0.67	59	69	39	167	35	41	23
East		0.93	69	692	168	929	7	74	18
South		0.84	132	48	259	439	30	11	59
West		0.87	378	1184	63	1625	23	73	4

MAUI COMMUNITY COLLEGE EXPANSION

SITE CODE : 1
Major St. : KAAHUMANU AVENUE
Minor St. : KANE STREET / BEACH RD.
Weather : DRY, SUNNY

FILE: KAAKANEM

Primary Movements: Vehicles

DATE: 9/29/92

Time Begin	From South RT	THRU	LT	From West RT	THRU	LT	From North RT	THRU	LT	From East RT	THRU	LT	Vehicle Total
3:30	33	44	33	37	269	24	36	27	184	229	218	19	1142
3:45	25	47	25	44	243	18	36	27	193	209	208	20	1095
HR TOTAL	58	91	48	81	512	42	72	54	377	438	426	39	2237
4:00 PM	36	39	30	23	263	16	45	30	194	203	174	13	1063
4:15	35	49	16	27	299	14	35	38	197	178	158	13	1135
4:30	23	46	26	47	290	22	42	19	225	253	194	11	1200
4:45	33	47	20	33	306	22	36	28	191	231	153	8	1123
HR TOTAL	126	181	92	130	1158	74	158	105	807	862	731	50	4576
5:00 PM	20	41	17	35	259	29	33	39	210	204	147	9	1032
DAY TOTAL	204	313	157	236	1929	144	263	199	1394	1604	1335	97	7845

PEAK PERIOD ANALYSIS FOR THE PERIOD: 3:30 PM - 5:15 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	..... VOLUMES ..... Right	Thru	Left	Total	.... PERCENTS ... Right	Thru	Left
South	3:30 PM	0.96	129	179	94	402	32	45	23
West	4:15 PM	0.95	132	1154	86	1372	10	84	6
North	4:15 PM	0.95	146	115	823	1084	13	11	76
East	3:30 PM	0.92	916	752	69	1777	52	43	4
Entire Intersection									
South	4:00 PM	0.95	126	181	92	399	32	45	23
West		0.94	130	1158	74	1362	10	85	5
North		0.94	158	105	807	1071	15	10	75
East		0.90	962	732	50	1744	55	42	3

SITE CODE : MATI COM COLLEGE
Location : KAIHEE PL. & N. WAKEA AVENUE
Weather : DRY, SUNNY
Operator : SK

MAUI COMMUNITY COLLEGE TRAFFIC STUDY

FILE: MAUICOMM
DATE: 9/29/92
DAY: TUESDAY

TIME BEGIN	OUT AM		OUT PM		IN AM		IN PM		COMBINED AM		COMBINED PM	
11:00	*		58		*		17		*		115	
12:15	*		37		*		23		*		57	
12:30	*		16		*		30		*		46	
12:45	*	*	26	177	*	*	35	103	*	*	61	279
1:00	*		24		*		20		*		44	
1:15	*		24		*		11		*		35	
1:30	*		11		*		7		*		18	
1:45	*	*	28	87	*	*	8	46	*	*	36	133
2:00	*		42		*		11		*		53	
2:15	*		69		*		17		*		86	
2:30	*		25		*		9		*		34	
2:45	*	*	28	164	*	*	19	56	*	*	46	219
3:00	*		29		*		15		*		44	
3:15	*		21		*		11		*		32	
3:30	*		33		*		14		*		47	
3:45	*	*	24	107	*	*	14	54	*	*	38	161
4:00	*		24		*		23		*		47	
4:15	*		24		*		21		*		45	
4:30	*		22		*		23		*		45	
4:45	*	*	19	89	*	*	20	87	*	*	39	176
5:00	*		20		*		10		*		30	
5:15	*		20		*		30		*		50	
5:30	*		14		*		20		*		34	
5:45	*	*	15	69	*	*	48	108	*	*	63	177
6:00	*		14		*		23		*		37	
6:15	*		22		*		12		*		34	
6:30	*		18		*		9		*		27	
6:45	*	*	27	81	*	*	11	55	*	*	38	136
7:00	*		14		*		12		*		26	
7:15	*		13		*		4		*		17	
7:30	*		11		*		7		*		18	
7:45	*	*	16	54	*	*	4	27	*	*	20	81
8:00	*		16		*		1		*		17	
8:15	*		13		*		7		*		20	
8:30	*		15		*		7		*		22	
8:45	*	*	23	67	*	*	6	21	*	*	29	88
9:00	*		0		*		3		*		3	
9:15	*		0		*		0		*		0	
9:30	*		0		*		0		*		0	
9:45	*	*	0	0	*	*	0	3	*	*	0	3
10:00	*		0		*		0		*		0	
10:15	*		0		*		0		*		0	
10:30	27		0		9		0		36		0	
10:45	23	50	0	0	11	20	0	0	34	70	0	0
11:00	21		0		15		0		36		0	
11:15	22		0		18		0		40		0	
11:30	21		0		13		0		34		0	
11:45	46	110	0	0	18	64	0	0	64	174	0	0
TOTALS	160		895		84		558		244		1453	
DAY TOTALS		1055				642				1697		
SPLIT %	65.6		61.6		34.4		38.4					
PEAK HOUR	11:00		12:00		11:00		5:15		11:00		12:00	
VOLUME	110		177		64		121		174		279	
P.H.F.	0.60		0.45		0.89		0.63		0.83		0.61	

SITE CODE : MAUI COM COLLEGE
Location : KAIHEE PL. @ N. WAKEA AVENUE
Weather : DRY, SUNNY
Operator : EK

MAUI COMMUNITY COLLEGE TRAFFIC STUDY

FILE: MAUICOMM

DATE: 9/30/92

DAY: WEDNESDAY

TIME BEGIN	OUT AM		OUT PM		IN AM		IN PM		COMBINED AM		COMBINED PM	
12:00	0		*		0		*		0		*	
12:15	0		*		0		*		0		*	
12:30	0		*		0		*		0		*	
12:45	0	0	*	*	0	0	*	*	0	0	*	*
1:00	0		*		0		*		0		*	
1:15	0		*		0		*		0		*	
1:30	0		*		0		*		0		*	
1:45	0	0	*	*	0	0	*	*	0	0	*	*
2:00	0		*		0		*		0		*	
2:15	0		*		0		*		0		*	
2:30	0		*		0		*		0		*	
2:45	0	0	*	*	0	0	*	*	0	0	*	*
3:00	0		*		0		*		0		*	
3:15	0		*		0		*		0		*	
3:30	0		*		0		*		0		*	
3:45	0	0	*	*	0	0	*	*	0	0	*	*
4:00	0		*		0		*		0		*	
4:15	0		*		0		*		0		*	
4:30	0		*		0		*		0		*	
4:45	0	0	*	*	0	0	*	*	0	0	*	*
5:00	0		*		0		*		0		*	
5:15	0		*		3		*		3		*	
5:30	0		*		4		*		4		*	
5:45	3	3	*	*	7	14	*	*	10	17	*	*
6:00	2		*		15		*		17		*	
6:15	2		*		10		*		12		*	
6:30	4		*		12		*		16		*	
6:45	3	11	*	*	6	43	*	*	9	54	*	*
7:00	2		*		10		*		12		*	
7:15	25		*		46		*		71		*	
7:30	15		*		49		*		64		*	
7:45	21	63	*	*	57	162	*	*	78	225	*	*
8:00	19		*		48		*		67		*	
8:15	12		*		34		*		46		*	
8:30	5		*		37		*		42		*	
8:45	20	55	*	*	49	169	*	*	69	224	*	*
9:00	10		*		22		*		32		*	
9:15	14		*		19		*		33		*	
9:30	10		*		34		*		44		*	
9:45	38	72	*	*	35	110	*	*	73	182	*	*
10:00	*		*		*		*		*		*	
10:15	*		*		*		*		*		*	
10:30	*		*		*		*		*		*	
10:45	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*		*		*		*		*		*	
11:15	*		*		*		*		*		*	
11:30	*		*		*		*		*		*	
11:45	*	*	*	*	*	*	*	*	*	*	*	*
TOTALS	204		*		498		*		702		*	
DAY TOTALS		204				498				702		
SPLIT %	29.1		*		70.9		*					
PEAK HOUR	7:15		*		7:15		*		7:15		*	
VOLUME	79		*		201		*		280		*	
P.H.F.	0.79		*		0.88		*		0.90		*	

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS

EXISTING PEAK HOUR TRAFFIC ANALYSIS

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE W. OF MAHALANI ST.
ANALYST..... PGP
TIME OF ANALYSIS..... 7:15-8:15 AM
DATE OF ANALYSIS..... 9/29/92
OTHER INFORMATION.... KAAMAHA. EXISTING

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E T	E B	E R	f HV	f w	f p	f E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1639
V/C RATIO.....	.49
LEVEL OF SERVICE.....	C
COMPUTED CAPACITY (pcphpl)..	939
SPEED (mph).....	40
DENSITY (pcpmpl).....	25

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE E. KANE ST
ANALYST..... PGP
TIME OF ANALYSIS..... 7:15-8:15
DATE OF ANALYSIS..... 9/29/92
OTHER INFORMATION.... KAAKANA. EXISTING

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1370
V/C RATIO.....	.41
LEVEL OF SERVICE.....	B
COMPUTED CAPACITY (pcphpl)..	785
SPEED (mph).....	42
DENSITY (pcpmpl).....	20

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/(MAHALANI RD. / KANALOA AVE.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....09/30/92
TIME.....7:15 - 8:15 AM
COMMENT.....1992 EXISTING TRAFFIC VOLUMES (KAANAHAM)

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	51	346	41	312	: L	11.0	L	11.0	LT	10.5	L	10.5	
TH	839	1460	16	74	: T	11.0	T	11.0	R	10.5	LT	10.5	
RT	147	0	98	135	: T	11.0	T	11.0		12.0	R	10.5	
RR	30	0	65	60	: R	10.5		10.5		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.86	15	Y	15.8	3
WB	0.00	2.00	N	0	0	0.85	0	N	15.8	3
NB	0.00	1.00	N	0	0	0.95	0	N	21.8	3
SB	0.00	1.00	N	0	0	0.84	20	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 180.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X		X		NB	LT		X		
	TH			X			TH		X		
	RT			X			RT		X		
	PD			X			PD				
WB	LT	X	X	X		SB	LT	X			
	TH		X	X			TH	X			
	RT						RT	X			
	PD						PD	X			
GREEN		5.0	15.0	94.0	0.0		GREEN	27.0	18.0	0.0	0.0
YELLOW		3.0	3.0	5.0	0.0		YELLOW	5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.732	0.561	52.8	E	20.4	C
	T	0.617	0.533	19.3	C		
	R	0.198	0.533	14.2	B		
WB	L	0.925	0.678	48.6	E	27.7	D
	T	0.915	0.633	23.0	C		
NB	LT	0.365	0.111	48.4	E	48.0	E
	R	0.243	0.111	47.4	E		
SB	L	0.951	0.161	89.7	F	80.0	F
	LT	0.989	0.161	84.2	F		
	R	0.433	0.161	44.8	E		

INTERSECTION: Delay = 33.1 (sec/veh) V/C = 0.857 LOS = D

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(PAPA ST. / M.C.C)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....09/30/92
TIME.....7:15 - 8:15 AM
COMMENT.....1992 EXISTING TRAFFIC VOLUMES (KAAPAPAH)

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	5	45	736	5	: L	11.0	L	11.0	L	11.0	LTR	11.0	
TH	934	1506	0	0	: T	11.0	T	11.0	LTR	11.0		12.0	
RT	336	8	48	4	: T	11.0	TR	12.0		12.0		12.0	
RR	90	6	10	0	: R	10.5		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.85	0	N	10.9	5
WB	0.00	2.00	N	0	0	0.99	20	Y	10.9	5
NB	0.00	1.00	N	0	0	0.76	10	Y	22.1	3
SB	0.00	0.00	N	0	0	0.92	20	Y	22.1	3

SIGNAL SETTINGS — CYCLE LENGTH = 90.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	41.0	0.0	0.0	GREEN		31.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.028	0.567	6.5	B	7.7	B
	T	0.776	0.478	8.3	B		
	R	0.468	0.478	5.0	A		
WB	L	0.165	0.567	7.1	B	32.3	D
	TR	1.060	0.478	33.0	D		
NB	L	0.945	0.367	40.4	E	48.6	E
	LTR	1.045	0.367	56.0	E		
SB	LTR	0.065	0.367	11.9	B	11.9	B

INTERSECTION: Delay = 27.6 (sec/veh) V/C = 0.969 LOS = D

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/(WAKEA AVE. / M.C.C)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....09/30/92
TIME.....7:15 - 8:15 AM
COMMENT.....1992 EXISTING TRAFFIC VOLUMES (KAAWAKAM)

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	84	131	311	18	L	11.0	L	11.0	LT	10.5	LTR	10.5	
TH	615	1178	69	45	T	11.0	T	11.0	R	10.5		12.0	
RT	319	101	59	50	T	11.0	T	11.0		12.0		12.0	
RR	90	25	35	15	R	10.5	R	10.5		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.86	15	Y	10.6	5
WB	0.00	2.00	N	0	0	0.90	0	N	10.6	5
NB	0.00	1.00	N	0	0	0.94	15	Y	24.4	3
SB	0.00	0.00	N	0	0	0.71	15	Y	24.4	3

SIGNAL SETTINGS — CYCLE LENGTH = 90.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	40.0	0.0	0.0	GREEN		32.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.462	0.556	10.9	B	5.7	B
	T	0.517	0.467	5.2	B		
	R	0.444	0.467	5.1	B		
WB	L	0.323	0.556	8.7	B	15.1	C
	T	0.947	0.467	16.5	C		
	R	0.139	0.467	4.2	A		
NB	LT	0.884	0.378	27.8	D	26.8	D
	R	0.053	0.378	11.5	B		
SB	LTR	0.528	0.378	15.4	C	15.4	C

INTERSECTION: Delay = 13.5 (sec/veh) V/C = 0.875 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/(KANE RD. / BEACH RD.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....09/30/92
TIME.....7:15 - 8:15 AM
COMMENT.....1992 EXISTING TRAFFIC VOLUMES (KAAKANAH)

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	70	38	108	729	L	11.0	L	11.0	L	11.0	L	11.0	
TH	571	1099	174	104	T	11.0	T	11.0	TR	11.0	LT	11.0	
RT	76	0	70	95	T	11.0	T	11.0		12.0	R	11.0	
RR	55	0	95	90	R	10.5		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.86	15	Y	16.4	5
WB	0.00	2.00	N	0	0	0.84	0	N	16.4	5
NB	0.00	1.00	N	0	0	0.95	15	Y	21.8	3
SB	0.00	2.00	N	0	0	0.84	15	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 140.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT		X		
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD				
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
GREEN		5.0	57.0	0.0	0.0	GREEN		40.0	20.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.599	0.479	27.9	D	11.1	B
	T	0.532	0.421	9.3	B		
	R	0.045	0.421	7.3	B		
WB	L	0.115	0.479	15.3	C	28.6	D
	T	0.993	0.421	29.1	D		
NB	L	0.487	0.157	42.2	E	42.8	E
	TR	0.745	0.157	43.1	E		
SB	L	1.174	0.300	146.3	F	103.2	F
	LT	0.991	0.300	56.7	E		
	R	0.015	0.300	22.3	C		

INTERSECTION: Delay = 47.0 (sec/veh) V/C = 0.985 LOS = E

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE W. OF MAHALANI ST.
ANALYST..... PGP
TIME OF ANALYSIS..... 4:00-5:00 PM
DATE OF ANALYSIS..... 9/29/92
OTHER INFORMATION.... KAAMAHP. EXISTING

A) *ADJUSTMENT FACTORS*

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1830
V/C RATIO.....	.55
LEVEL OF SERVICE.....	C
COMPUTED CAPACITY (pcphpl)..	1048
SPEED (mph).....	39
DENSITY (pcpmpl).....	29

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE E. KANE ST
ANALYST..... PGP
TIME OF ANALYSIS..... 4:00-5:00 PM
DATE OF ANALYSIS..... 9/29/92
OTHER INFORMATION.... KAAKANP. EXISTING

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	2093
V/C RATIO.....	.63
LEVEL OF SERVICE.....	D
COMPUTED CAPACITY (pcphpl)..	1199
SPEED (mph).....	38
DENSITY (pcpmpl).....	34

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

INTERSECTION..KAAHUMANU AVENUE/(MAHALANI RD. / KANALOA AVE.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....09/29/92
TIME.....4:15 - 5:15 PM
COMMENT.....1992 EXISTING TRAFFIC VOLUMES (KAAMAHPM)

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	50	68	121	329	L	11.0	L	11.0	LT	10.5	L	10.5	
TH	1727	953	58	25	T	11.0	T	11.0	R	10.5	LT	10.5	
RT	53	0	328	24	T	11.0	T	11.0		12.0	R	10.5	
RR	20	0	130	15	R	10.5		10.5		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.89	15	Y	15.8	5
WB	0.00	2.00	N	0	0	0.88	0	N	15.8	5
NB	0.00	1.00	N	0	0	0.79	0	N	21.8	3
SB	0.00	1.00	N	0	0	0.86	20	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 180.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT		X		
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD				
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT						RT	X			
	PD						PD	X			
GREEN		5.0	102.0	0.0	0.0	GREEN		28.0	27.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.226	0.622	11.7	B	59.9	E
	T	1.133	0.578	62.3	F		
	R	0.051	0.578	5.0	B		
WB	L	0.731	0.622	39.3	D	11.7	B
	T	0.633	0.578	9.9	B		
NB	LT	0.949	0.161	75.7	F	123.1	F
	R	1.193	0.161	166.0	F		
SB	L	0.789	0.167	65.4	F	65.6	F
	LT	0.901	0.167	67.0	F		
	R	0.051	0.167	40.7	E		

INTERSECTION: Delay = 53.8 (sec/veh) V/C = 1.084 LOS = E

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/PAPA AVENUE
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....09/29/92
TIME.....4:00 - 5:00 PM
COMMENT.....1992 EXISTING TRAFFIC VOLUMES (KAAPAPPM)

	VOLUMES					GEOMETRY					
	EB	WB	NB	SB		EB		WB		NB	SB
LT	16	67	415	13	L	11.0	L	11.0	L	11.0	LTR 11.0
TH	1532	954	1	14	T	11.0	T	11.0	LTR	11.0	12.0
RT	651	17	62	11	T	11.0	TR	12.0		12.0	12.0
RR	150	6	10	0	R	10.5		12.0		12.0	12.0
						12.0		12.0		12.0	12.0
						12.0		12.0			

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.87	0	N	10.9	5
WB	0.00	2.00	N	0	0	0.90	20	Y	10.9	5
NB	0.00	1.00	N	0	0	0.96	10	Y	22.1	3
SB	0.00	0.00	N	0	0	0.79	10	Y	22.1	3

SIGNAL SETTINGS — CYCLE LENGTH = 120.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	70.0	0.0	0.0	GREEN		32.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.062	0.667	5.3	B	22.4	C
	T	0.990	0.600	26.3	D		
	R	0.742	0.600	10.6	B		
WB	L	0.470	0.667	10.0	B	6.4	B
	TR	0.595	0.600	6.2	B		
NB	L	0.578	0.283	29.7	D	32.0	D
	LTR	0.720	0.283	33.9	D		
SB	LTR	0.195	0.283	24.8	C	24.8	C

INTERSECTION: Delay = 19.0 (sec/veh) V/C = 0.873 LOS = C

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(WAKEA AVE. / M.C.C)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....09/29/92
TIME.....4:00 - 5:00 PM
COMMENT.....1992 EXISTING TRAFFIC VOLUMES (KAAWAKPM)

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	63	168	259	59	: L	11.0	L	11.0	LT	10.5	LTR	10.5	
TH	1184	692	48	69	: T	11.0	T	11.0	R	10.5		12.0	
RT	378	69	132	39	: T	11.0	T	11.0		12.0		12.0	
RR	90	20	50	15	: R	10.5	R	10.5		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR.	TYPE
EB	0.00	2.00	N	0	0	0.87	0	N	10.6		5
WB	0.00	2.00	N	0	0	0.93	15	Y	10.6		5
NB	0.00	1.00	N	0	0	0.84	15	Y	24.4		3
SB	0.00	0.00	N	0	0	0.67	15	Y	24.4		3

SIGNAL SETTINGS — CYCLE LENGTH = 90.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	37.0	0.0	0.0	GREEN		35.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.174	0.522	8.7	B	28.4	D
	T	1.060	0.433	34.6	D		
	R	0.591	0.433	6.4	B		
WB	L	0.855	0.522	40.4	E	12.1	B
	T	0.579	0.433	6.1	B		
	R	0.094	0.433	4.6	A		
NB	LT	0.768	0.411	19.1	C	17.4	C
	R	0.183	0.411	10.9	B		
SB	LTR	1.087	0.411	85.6	F	85.6	F

INTERSECTION: Delay = 26.0 (sec/veh) V/C = 1.052 LOS = D

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(KANE RD. / BEACH RD.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....09/29/92
TIME.....4:00 - 5:00 P.M
COMMENT.....1992 EXISTING TRAFFIC VOLUMES (KAAKANPM)

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	74	50	92	807	L	11.0	L	11.0	L	11.0	L	11.0	
TH	1158	732	181	106	T	11.0	T	11.0	TR	11.0	LT	11.0	
RT	130	0	126	158	T	11.0	T	11.0		12.0	R	11.0	
RR	55	0	95	90	R	10.5		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

	ADJUSTMENT FACTORS									
	GRADE (%)	HV (%)	ADJ PKG Y/N	Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.94	15	Y	16.4	5
WB	0.00	2.00	N	0	0	0.94	0	N	16.4	5
NB	0.00	1.00	N	0	0	0.95	15	Y	21.8	3
SB	0.00	2.00	N	0	0	0.94	15	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 120.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT		X		
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD		X		
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	44.0	0.0	0.0	GREEN		35.0	18.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.234	0.450	15.6	C	31.2	D
	T	1.027	0.383	33.6	D		
	R	0.161	0.383	7.4	B		
WB	L	0.326	0.450	16.9	C	12.6	B
	T	0.686	0.383	12.3	B		
NB	L	0.391	0.167	34.4	D	43.6	E
	TR	0.876	0.167	47.5	E		
SB	L	0.942	0.308	51.1	E	68.8	F
	LT	1.113	0.308	89.2	F		
	R	0.177	0.308	19.6	C		

INTERSECTION: Delay = 38.5 (sec/veh) V/C = 0.978 LOS = D

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS

YEAR 2000 PEAK HOUR TRAFFIC ANALYSIS WITHOUT PROJECT

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE W. OF MAHALANI ST
ANALYST..... PGP
TIME OF ANALYSIS..... AM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... KAAMAH0A. WOP\

A) *ADJUSTMENT FACTORS*

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1468
V/C RATIO.....	.44
LEVEL OF SERVICE.....	B
COMPUTED CAPACITY (pcphpl)..	841
SPEED (mph).....	41
DENSITY (pcpmpl).....	22

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE E. KANE ST
ANALYST..... PGP
TIME OF ANALYSIS..... AM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... KAAKAN0A. WOP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1265
V/C RATIO.....	.38
LEVEL OF SERVICE.....	B
COMPUTED CAPACITY (pcphpl)..	725
SPEED (mph).....	42
DENSITY (pcpmpl).....	18

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(MAHALANI RD. / KANALOA AVE.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....2000 WOP; KAAMAH0A

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	46	306	37	320	: L	11.0	L	11.0	LT	10.5	L	10.5	
TH	752	1293	14	76	: T	11.0	T	11.0	R	10.5	LT	10.5	
RT	132	0	88	138	: T	11.0	T	11.0		12.0	R	10.5	
RR	30	0	65	60	: R	10.5		10.5		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.86	15	Y	15.8	5
WB	0.00	2.00	N	0	0	0.85	0	N	15.8	5
NB	0.00	1.00	N	0	0	0.95	0	N	21.8	3
SB	0.00	1.00	N	0	0	0.84	20	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 180.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X		X		NB	LT		X		
	TH			X			TH		X		
	RT			X			RT		X		
	PD			X			PD				
WB	LT	X	X	X		SB	LT	X			
	TH		X	X			TH	X			
	RT						RT	X			
	PD						PD	X			
GREEN		5.0	15.0	79.0	0.0	GREEN		39.0	21.0	0.0	0.0
YELLOW		3.0	3.0	5.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.660	0.478	47.6	E	16.0	C
	T	0.656	0.450	15.1	C		
	R	0.205	0.450	9.1	B		
WB	L	0.800	0.594	34.3	D	24.1	C
	T	0.933	0.550	21.8	C		
NB	LT	0.284	0.128	46.1	E	45.8	E
	R	0.148	0.128	45.1	E		
SB	L	0.690	0.228	52.5	E	47.1	E
	LT	0.718	0.228	45.6	E		
	R	0.318	0.228	37.6	D		

INTERSECTION: Delay = 25.7 (sec/veh) V/C = 0.815 LOS = D

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/PAPA AVENUE
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....2000 WOP; KAAPAP0A

VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB
LT	4	37	560	5	L	11.0	L	11.0	L	11.0	LTR	11.0
TH	832	1254	0	0	T	11.0	T	11.0	LTR	11.0		12.0
RT	299	7	37	4	T	11.0	TR	12.0		12.0		12.0
RR	90	7	10	0	R	10.5		12.0		12.0		12.0
						12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS									
	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.85	0	N	10.9	5
WB	0.00	2.00	N	0	0	0.99	20	Y	10.9	5
NB	0.00	1.00	N	0	0	0.76	10	Y	22.1	3
SB	0.00	0.00	N	0	0	0.92	20	Y	22.1	3

SIGNAL SETTINGS — CYCLE LENGTH = 90.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	41.0	0.0	0.0	GREEN		31.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.022	0.567	6.5	B	6.9	B
	T	0.691	0.478	7.5	B		
	R	0.397	0.478	4.7	A		
WB	L	0.112	0.567	6.9	B	12.5	B
	TR	0.881	0.478	12.6	B		
NB	L	0.719	0.367	22.0	C	21.6	C
	LTR	0.790	0.367	21.2	C		
SB	LTR	0.042	0.367	11.8	B	11.8	B

INTERSECTION: Delay = 12.5 (sec/veh) V/C = 0.772 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(WAKEA AVE. / M.C.C)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....2000 WOP KAAWAK0A

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	84	109	237	18	: L	11.0	L	11.0	LT	10.5	LTR	10.5	
TH	548	981	69	45	: T	11.0	T	11.0	R	10.5		12.0	
RT	284	101	45	50	: T	11.0	T	11.0		12.0		12.0	
RR	90	25	35	15	: R	10.5	R	10.5		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.86	15	Y	10.6	5
WB	0.00	2.00	N	0	0	0.90	0	N	10.6	5
NB	0.00	1.00	N	0	0	0.94	15	Y	24.4	3
SB	0.00	0.00	N	0	0	0.71	15	Y	24.4	3

SIGNAL SETTINGS — CYCLE LENGTH = 90.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	40.0	0.0	0.0	GREEN		32.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.354	0.556	9.1	B	5.4	B
	T	0.461	0.467	5.0	B		
	R	0.376	0.467	4.8	A		
WB	L	0.249	0.556	8.1	B	8.4	B
	T	0.788	0.467	8.7	B		
	R	0.139	0.467	4.2	A		
NB	LT	0.703	0.378	18.1	C	17.9	C
	R	0.022	0.378	11.4	B		
SB	LTR	0.395	0.378	13.6	B	13.6	B

INTERSECTION: Delay = 8.7 (sec/veh) V/C = 0.712 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(KANE RD. / BEACH RD.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....2000 WOP; KAAKAN0P

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	61	34	99	701	: L	11.0	L	11.0	L	11.0	L	11.0	
TH	500	997	159	100	: T	11.0	T	11.0	TR	11.0	LT	11.0	
RT	67	0	64	91	: T	11.0	T	11.0		12.0	R	11.0	
RR	50	0	50	70	: R	10.5		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.86	15	Y	16.4	5
WB	0.00	2.00	N	0	0	0.84	0	N	16.4	5
NB	0.00	1.00	N	0	0	0.95	15	Y	21.8	3
SB	0.00	2.00	N	0	0	0.84	15	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 140.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT		X		
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD				
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
GREEN		5.0	52.0	0.0	0.0	GREEN		43.0	22.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.426	0.443	22.4	C	11.3	B
	T	0.509	0.386	10.1	B		
	R	0.040	0.386	8.2	B		
WB	L	0.101	0.443	17.3	C	29.2	D
	T	0.984	0.386	29.6	D		
NB	L	0.409	0.171	39.9	D	39.6	D
	TR	0.686	0.171	39.4	D		
SB	L	0.966	0.321	59.7	E	54.4	E
	LT	0.973	0.321	51.1	E		
	R	0.060	0.321	21.2	C		

INTERSECTION: Delay = 33.8 (sec/veh) V/C = 0.891 LOS = D

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE W. OF MAHALANI ST
ANALYST..... PGP
TIME OF ANALYSIS..... PM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... KAAMAH0P. WOP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1639
V/C RATIO.....	.49
LEVEL OF SERVICE.....	C
COMPUTED CAPACITY (pcphpl)..	939
SPEED (mph).....	40
DENSITY (pcpmpl).....	25

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE E. KANE ST
ANALYST..... PGP
TIME OF ANALYSIS..... PM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... KAAKAN0P. WOP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E T	E B	E R	f HV	f w	f p	f E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1906
V/C RATIO.....	.57
LEVEL OF SERVICE.....	C
COMPUTED CAPACITY (pcphpl)..	1092
SPEED (mph).....	39
DENSITY (pcpmpl).....	30

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/(MAHALANI RD. / KANALOA AVE.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....2000 WOP; KAAMAH0P

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	45	60	109	337	: L	11.0	L	11.0	LT	10.5	L	10.5	
TH	1547	844	52	26	: T	11.0	T	11.0	R	10.5	LT	10.5	
RT	47	0	194	25	: T	11.0	T	11.0		12.0	R	10.5	
RR	20	0	130	15	: R	10.5		10.5		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.89	15	Y	15.8	5
WB	0.00	2.00	N	0	0	0.88	0	N	15.8	5
NB	0.00	1.00	N	0	0	0.79	0	N	21.8	3
SB	0.00	1.00	N	0	0	0.86	20	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 180.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT		X		
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD				
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT						RT	X			
	PD						PD	X			
GREEN		5.0	95.0	0.0	0.0	GREEN		31.0	31.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.167	0.583	13.3	B	47.7	E
	T	1.089	0.539	49.4	E		
	R	0.045	0.539	6.0	B		
WB	L	0.645	0.583	31.8	D	10.2	B
	T	0.601	0.539	8.8	B		
NB	LT	0.751	0.183	51.3	E	48.6	E
	R	0.338	0.183	41.6	E		
SB	L	0.735	0.183	59.5	E	58.1	E
	LT	0.840	0.183	57.8	E		
	R	0.051	0.183	39.1	D		

INTERSECTION: Delay = 38.1 (sec/veh) V/C = 0.955 LOS = D

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

INTERSECTION..KAAHUMANU AVENUE/PAPA AVENUE
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....2000 WOP; KAAPAP0P

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	14	56	316	13	L	11.0	L	11.0	L	11.0	LTR	11.0	
TH	1364	794	1	14	T	11.0	T	11.0	LTR	11.0		12.0	
RT	580	14	47	11	T	11.0	TR	12.0		12.0		12.0	
RR	150	6	10	0	R	10.5		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.87	0	N	10.9	5
WB	0.00	2.00	N	0	0	0.90	20	Y	10.9	5
NB	0.00	1.00	N	0	0	0.96	10	Y	22.1	3
SB	0.00	0.00	N	0	0	0.79	10	Y	22.1	3

SIGNAL SETTINGS — CYCLE LENGTH = 120.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	64.0	0.0	0.0	GREEN		38.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.043	0.617	6.9	B	21.4	C
	T	0.962	0.550	24.5	C		
	R	0.694	0.550	11.4	B		
WB	L	0.393	0.617	10.2	B	7.3	B
	TR	0.538	0.550	7.1	B		
NB	L	0.379	0.333	23.5	C	24.1	C
	LTR	0.466	0.333	24.6	C		
SB	LTR	0.136	0.333	21.2	C	21.2	C

INTERSECTION: Delay = 17.7 (sec/veh) V/C = 0.748 LOS = C

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(WAKEA AVE. / M.C.C)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....2000 WOP; KAAWAK0P

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	63	140	197	39	L	11.0	L	11.0	LT	10.5	LTR	10.5	
TH	1054	576	48	69	T	11.0	T	11.0	R	10.5		12.0	
RT	337	69	100	59	T	11.0	T	11.0		12.0		12.0	
RR	90	20	50	15	R	10.5	R	10.5		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.87	0	N	10.6	5
WB	0.00	2.00	N	0	0	0.93	15	Y	10.6	5
NB	0.00	1.00	N	0	0	0.84	15	Y	24.4	3
SB	0.00	0.00	N	0	0	0.67	15	Y	24.4	3

SIGNAL SETTINGS — CYCLE LENGTH = 90.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	37.0	0.0	0.0	GREEN		35.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.154	0.522	8.5	B	14.9	B
	T	0.943	0.433	17.3	C		
	R	0.507	0.433	5.9	B		
WB	L	0.707	0.522	22.9	C	8.6	B
	T	0.482	0.433	5.6	B		
	R	0.094	0.433	4.6	A		
NB	LT	0.634	0.411	15.3	C	14.5	B
	R	0.111	0.411	10.6	B		
SB	LTR	0.649	0.411	16.2	C	16.2	C

INTERSECTION: Delay = 13.2 (sec/veh) V/C = 0.791 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(KANE RD. / BEACH RD.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....2000 WOP; KAAKAN0P

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	65	50	84	776	L	11.0	L	11.0	L	11.0	L	11.0	
TH	1013	664	166	102	T	11.0	T	11.0	TR	11.0	LT	11.0	
RT	114	0	117	152	T	11.0	T	11.0		12.0	R	11.0	
RR	55	0	95	90	R	10.5		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

	ADJUSTMENT FACTORS									
	GRADE (%)	HV (%)	ADJ PKG Y/N	Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.94	15	Y	16.4	5
WB	0.00	2.00	N	0	0	0.94	0	N	16.4	5
NB	0.00	1.00	N	0	0	0.95	15	Y	21.8	3
SB	0.00	2.00	N	0	0	0.94	15	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 120.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT		X		
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD		X		
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	40.0	0.0	0.0	GREEN		39.0	18.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	5.0	0.0	0.0

	LEVEL OF SERVICE						
	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.203	0.417	17.1	C	35.1	D
	T	1.039	0.350	37.7	D		
	R	0.139	0.350	8.1	B		
WB	L	0.252	0.417	17.6	C	13.6	B
	T	0.681	0.350	13.3	B		
NB	L	0.357	0.167	34.1	D	37.3	D
	TR	0.774	0.167	38.8	D		
SB	L	0.817	0.342	34.5	D	38.4	D
	LT	0.966	0.342	44.1	E		
	R	0.145	0.342	17.7	C		

INTERSECTION: Delay = 31.1 (sec/veh) V/C = 0.907 LOS = D

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APPENDIX C

CAPACITY ANALYSIS CALCULATIONS

YEAR 2000 PEAK HOUR TRAFFIC ANALYSIS WITH PROJECT

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE W. OF MAHALANI ST
ANALYST..... PGP
TIME OF ANALYSIS..... AM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... KAAMAH1A. WP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E T	E B	E R	f HV	f w	f p	f E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1472
V/C RATIO.....	.44
LEVEL OF SERVICE.....	B
COMPUTED CAPACITY (pcphpl)..	843
SPEED (mph).....	41
DENSITY (pcpmpl).....	22

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE E. KANE ST
ANALYST..... PGP
TIME OF ANALYSIS..... AM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... KAAKAN1A. WP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1268
V/C RATIO.....	.38
LEVEL OF SERVICE.....	B
COMPUTED CAPACITY (pcphpl)..	726
SPEED (mph).....	42
DENSITY (pcpmpl).....	18

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(HAHALANI RD. / KANALOA AVE.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....2000 WP; KAAMAHIA

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	46	306	37	320	: L	11.0	L	11.0	LT	10.5	L	10.5	
TH	820	1297	14	76	: T	11.0	T	11.0	R	10.5	LT	10.5	
RT	132	0	154	138	: T	11.0	T	11.0		12.0	R	10.5	
RR	30	0	65	60	: R	10.5		10.5		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.86	15	Y	15.8	5
WB	0.00	2.00	N	0	0	0.85	0	N	15.8	5
NB	0.00	1.00	N	0	0	0.95	0	N	21.8	3
SB	0.00	1.00	N	0	0	0.84	20	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 180.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X		X		NB	LT		X		
	TH			X			TH		X		
	RT			X			RT		X		
	PD			X			PD				
WB	LT	X	X	X		SB	LT	X			
	TH		X	X			TH	X			
	RT						RT	X			
	PD						PD	X			
GREEN		5.0	15.0	79.0	0.0	GREEN		39.0	21.0	0.0	0.0
YELLOW		3.0	3.0	5.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.660	0.478	47.6	E	16.6	C
	T	0.715	0.450	15.9	C		
	R	0.205	0.450	9.1	B		
WB	L	0.869	0.594	43.6	E	26.0	D
	T	0.936	0.550	22.0	C		
NB	LT	0.284	0.128	46.1	E	48.9	E
	R	0.566	0.128	50.4	E		
SB	L	0.690	0.228	52.5	E	47.1	E
	LT	0.718	0.228	45.6	E		
	R	0.318	0.228	37.6	D		

INTERSECTION: Delay = 27.1 (sec/veh) V/C = 0.824 LOS = D

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/PAPA AVENUE
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....2000 WP; KAAPAP1A

VOLUMES

	EB	WB	NB	SB
LT	97	37	560	5
TH	873	1255	46	2
RT	299	20	37	7
RR	90	7	10	0

GEOMETRY

EB	11.0	WB	11.0	NB	11.0
L	11.0	L	11.0	L	11.0
T	11.0	T	11.0	LTR	11.0
T	11.0	TR	12.0		12.0
R	10.5		12.0		12.0
	12.0		12.0		12.0
	12.0		12.0		12.0

										SB
									LTR	11.0
										12.0
										12.0
										12.0
										12.0
										12.0
										12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.85	0	N	10.9	5
WB	0.00	2.00	N	0	0	0.99	20	Y	10.9	5
NB	0.00	1.00	N	0	0	0.76	10	Y	22.1	3
SB	0.00	0.00	N	0	0	0.92	20	Y	22.1	3

SIGNAL SETTINGS

CYCLE LENGTH = 90.0

		PH-1	PH-2	PH-3	PH-4
EB	LT	X	X		
	TH		X		
	RT		X		
	PD		X		
WB	LT	X	X		
	TH		X		
	RT		X		
	PD		X		
GREEN		5.0	41.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0

		PH-1	PH-2	PH-3	PH-4
NB	LT	X			
	TH	X			
	RT	X			
	PD	X			
SB	LT	X			
	TH	X			
	RT	X			
	PD				
GREEN		31.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.540	0.567	12.6	B	7.6	B
	T	0.725	0.478	7.8	B		
	R	0.397	0.478	4.7	A		
WB	L	0.121	0.567	6.9	B	12.9	B
	TR	0.892	0.478	13.1	B		
NB	L	0.725	0.367	22.2	C	25.6	D
	LTR	0.896	0.367	28.3	D		
SB	LTR	0.065	0.367	11.9	B	11.9	B

INTERSECTION: Delay = 13.7 (sec/veh) V/C = 0.860 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/(WAKEA AVE. / M.C.C)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....2000 WP; KAAWAK1A

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB	:	EB		WB		NB		SB	
LT	125	109	237	19	: L	11.0	L	11.0	LT	10.5	LTR	10.5	
TH	548	985	111	47	: T	11.0	T	11.0	R	10.5		12.0	
RT	284	123	45	51	: T	11.0	T	11.0		12.0		12.0	
RR	90	25	35	15	: R	10.5	R	10.5		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	SUT. min T	ARR.	TYPE
EB	0.00	2.00	N	0	0	0.86	15	Y	10.6		5
WB	0.00	2.00	N	0	0	0.90	0	N	10.6		5
NB	0.00	1.00	N	0	0	0.94	15	Y	24.4		3
SB	0.00	0.00	N	0	0	0.71	15	Y	24.4		3

SIGNAL SETTINGS — CYCLE LENGTH = 90.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	40.0	0.0	0.0	GREEN		32.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.531	0.556	12.7	B	6.1	B
	T	0.461	0.467	5.0	B		
	R	0.376	0.467	4.8	A		
WB	L	0.249	0.556	8.1	B	8.4	B
	T	0.791	0.467	8.8	B		
	R	0.180	0.467	4.3	A		
NB	LT	0.782	0.378	20.8	C	20.6	C
	R	0.022	0.378	11.4	B		
SB	LTR	0.453	0.378	14.2	B	14.2	B

INTERSECTION: Delay = 9.4 (sec/veh) V/C = 0.763 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/(KANE RD. / BEACH RD.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....2000 WP; KAAKAN1A

VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB
LT	61	34	99	703	L	11.0	L	11.0	L	11.0	L	11.0
TH	501	1026	181	100	T	11.0	T	11.0	TR	11.0	LT	11.0
RT	67	0	64	91	T	11.0	T	11.0		12.0	R	11.0
RR	50	0	50	70	R	10.5		12.0		12.0		12.0
						12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.86	15	Y	16.4	5
WB	0.00	2.00	N	0	0	0.84	0	N	16.4	5
NB	0.00	1.00	N	0	0	0.95	15	Y	21.8	3
SB	0.00	2.00	N	0	0	0.84	15	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 140.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT		X		
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD				
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
GREEN		5.0	52.0	0.0	0.0	GREEN		43.0	22.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.463	0.443	23.6	C	11.4	B
	T	0.510	0.386	10.1	B		
	R	0.040	0.386	8.2	B		
WB	L	0.101	0.443	17.3	C	33.2	D
	T	1.012	0.386	33.7	D		
NB	L	0.409	0.171	39.9	D	42.2	E
	TR	0.773	0.171	43.3	E		
SB	L	0.969	0.321	60.3	F	54.9	E
	LT	0.975	0.321	51.5	E		
	R	0.060	0.321	21.2	C		

INTERSECTION: Delay = 35.8 (sec/veh) V/C = 0.922 LOS = D

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION.....	KAAHUMANU AVE W. OF MAHALANI ST
ANALYST.....	PGP
TIME OF ANALYSIS.....	PM PEAK HOUR
DATE OF ANALYSIS.....	PROJECTED
OTHER INFORMATION....	KAAMAH1P. WP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1679
V/C RATIO.....	.51
LEVEL OF SERVICE.....	C
COMPUTED CAPACITY (pcphpl)..	962
SPEED (mph).....	40
DENSITY (pcpmpl).....	27

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... KAAHUMANU AVE E. KANE ST
ANALYST..... PGP
TIME OF ANALYSIS..... PM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... KAAKAN1P. WP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	0	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	0	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	1	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	NO	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	SUBURBAN, DIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	1.00	0.97	1.00	0.90

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	1920
V/C RATIO.....	.58
LEVEL OF SERVICE.....	C
COMPUTED CAPACITY (pcphpl)..	1100
SPEED (mph).....	39
DENSITY (pcpmpl).....	31

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

INTERSECTION..KAAHUMANU AVENUE/(MAHALANI RD. / KANALOA AVE.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....2000 WP; KAAMAH1P

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	45	73	109	337	L	11.0	L	11.0	LT	10.5	L	10.5	
TH	1587	857	52	26	T	11.0	T	11.0	R	10.5	LT	10.5	
RT	47	0	331	25	T	11.0	T	11.0		12.0	R	10.5	
RR	20	0	130	15	R	10.5		10.5		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR.	TYPE
EB	0.00	2.00	N	0	0	0.89	15	Y	15.8		5
WB	0.00	2.00	N	0	0	0.88	0	N	15.8		5
NB	0.00	1.00	N	0	0	0.79	0	N	21.8		3
SB	0.00	1.00	N	0	0	0.86	20	Y	21.8		3

SIGNAL SETTINGS — CYCLE LENGTH = 180.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT		X		
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD				
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT						RT	X			
	PD						PD	X			
GREEN		5.0	95.0	0.0	0.0	GREEN		31.0	31.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.171	0.583	13.3	B	56.1	E
	T	1.117	0.539	58.1	E		
	R	0.045	0.539	6.0	B		
WB	L	0.785	0.583	50.9	E	14.1	B
	T	0.610	0.539	11.1	B		
NB	LT	0.751	0.183	51.3	E	80.9	F
	R	1.064	0.183	104.7	F		
SB	L	0.735	0.183	59.5	E	58.1	E
	LT	0.840	0.183	57.8	E		
	R	0.051	0.183	39.1	D		

INTERSECTION: Delay = 47.5 (sec/veh) V/C = 1.038 LOS = E

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/PAPA AVENUE
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....2000 WP; KAAPAP1P

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB
LT	67	56	316	16	L	11.0	L	11.0	L	11.0	LTR	11.0
TH	1388	802	32	30	T	11.0	T	11.0	LTR	11.0		12.0
RT	580	21	47	29	T	11.0	TR	12.0		12.0		12.0
RR	150	6	10	0	R	10.5		12.0		12.0		12.0
						12.0		12.0		12.0		12.0
						12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.87	0	N	10.9	5
WB	0.00	2.00	N	0	0	0.90	20	Y	10.9	5
NB	0.00	1.00	N	0	0	0.96	10	Y	22.1	3
SB	0.00	0.00	N	0	0	0.79	10	Y	22.1	3

SIGNAL SETTINGS — CYCLE LENGTH = 120.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	64.0	0.0	0.0	GREEN		38.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.208	0.617	7.8	B	22.8	C
	T	0.979	0.550	26.9	D		
	R	0.694	0.550	11.4	B		
WB	L	0.393	0.617	10.2	B	7.4	B
	TR	0.550	0.550	7.2	B		
NB	L	0.409	0.333	23.9	C	25.2	D
	LTR	0.558	0.333	26.2	D		
SB	LTR	0.259	0.333	22.3	C	22.3	C

INTERSECTION: Delay = 18.9 (sec/veh) V/C = 0.790 LOS = C

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(WAKEA AVE. / M.C.C)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....2000 WP; KAAWAK1P

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	87	140	197	43	: L	11.0	L	11.0	LT	10.5	LTR	10.5	
TH	1057	583	57	77	: T	11.0	T	11.0	R	10.5		12.0	
RT	337	81	100	67	: T	11.0	T	11.0		12.0		12.0	
RR	90	20	50	15	: R	10.5	R	10.5		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR.	TYPE
EB	0.00	2.00	N	0	0	0.87	0	N	10.6	5	
WB	0.00	2.00	N	0	0	0.93	15	Y	10.6	5	
NB	0.00	1.00	N	0	0	0.84	15	Y	24.4	3	
SB	0.00	0.00	N	0	0	0.67	15	Y	24.4	3	

SIGNAL SETTINGS — CYCLE LENGTH = 90.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	37.0	0.0	0.0	GREEN		35.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.214	0.522	8.9	B	15.0	B
	T	0.946	0.433	17.5	C		
	R	0.507	0.433	5.9	B		
WB	L	0.712	0.522	23.3	C	8.6	B
	T	0.488	0.433	5.7	B		
	R	0.117	0.433	4.6	A		
NB	LT	0.675	0.411	16.3	C	15.4	C
	R	0.111	0.411	10.6	B		
SB	LTR	0.754	0.411	19.9	C	19.9	C

INTERSECTION: Delay = 13.7 (sec/veh) V/C = 0.839 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..KAAHUMANU AVENUE/(KANE RD. / BEACH RD.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....2000 WP; KAAKAN1P

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	65	45	84	783	L	11.0	L	11.0	L	11.0	L	11.0	
TH	1020	683	179	106	T	11.0	T	11.0	TR	11.0	LT	11.0	
RT	114	0	117	152	T	11.0	T	11.0		12.0	R	11.0	
RR	55	0	95	90	R	10.5		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.94	15	Y	16.4	5
WB	0.00	2.00	N	0	0	0.94	0	N	16.4	5
NB	0.00	1.00	N	0	0	0.95	15	Y	21.8	3
SB	0.00	2.00	N	0	0	0.94	15	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 120.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT		X		
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD		X		
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	40.0	0.0	0.0	GREEN		39.0	18.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.207	0.417	17.1	C	36.5	D
	T	1.046	0.350	39.2	D		
	R	0.139	0.350	8.1	B		
WB	L	0.229	0.417	17.4	C	13.7	B
	T	0.701	0.350	13.5	B		
NB	L	0.357	0.167	34.1	D	40.0	D
	TR	0.826	0.167	42.5	E		
SB	L	0.825	0.342	35.0	D	40.0	E
	LT	0.980	0.342	46.7	E		
	R	0.145	0.342	17.7	C		

INTERSECTION: Delay = 32.4 (sec/veh) V/C = 0.923 LOS = D

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/(WAKEA AVE. / M.C.C)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....09/29/92
TIME.....4:00 - 5:00 PM
COMMENT.....1992 EXISTING TRAFFIC VOLUMES (KAANAKEM)

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	63	168	259	59	L	11.0	L	11.0	LT	10.5	LTR	10.5	
TH	1184	692	48	69	T	11.0	T	11.0	R	10.5		12.0	
RT	378	69	132	39	T	11.0	T	11.0		12.0		12.0	
RR	90	20	50	15	R	10.5	R	10.5		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR.	TYPE
EB	0.00	2.00	N	0	0	0.87	0	N	10.6		5
WB	0.00	2.00	N	0	0	0.93	15	Y	10.6		5
NB	0.00	1.00	N	0	0	0.84	15	Y	24.4		3
SB	0.00	0.00	N	0	0	0.67	15	Y	24.4		3

SIGNAL SETTINGS — CYCLE LENGTH = 90.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD	X			
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	37.0	0.0	0.0	GREEN		35.0	0.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.174	0.522	8.7	A	28.4	D
	T	1.060	0.433	34.6	D		
	R	0.591	0.433	6.4	B		
WB	L	0.855	0.522	40.4	E	12.1	B
	T	0.579	0.433	6.1	B		
	R	0.094	0.433	4.6	A		
NB	LT	0.768	0.411	19.1	C	17.4	C
	R	0.133	0.411	10.9	B		
SB	LTR	1.087	0.411	85.6	F	85.6	F

INTERSECTION: Delay = 26.0 (sec/veh) V/C = 1.052 LOS = D

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****

INTERSECTION..KAAHUMANU AVENUE/(KANE RD. / BEACH RD.)
AREA TYPE.....CBD
ANALYST.....PGP
DATE.....09/29/92
TIME.....4:00 - 5:00 P.M
COMMENT.....1992 EXISTING TRAFFIC VOLUMES (KAAKANPM)

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	74	50	92	807	L	11.0	L	11.0	L	11.0	L	11.0	
TH	1158	732	181	106	T	11.0	T	11.0	TR	11.0	LT	11.0	
RT	130	0	126	158	T	11.0	T	11.0		12.0	R	11.0	
RR	55	0	95	90	R	10.5		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	
						12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ PKG Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	2.00	N	0	0	0.94	15	Y	16.4	5
WB	0.00	2.00	N	0	0	0.94	0	N	16.4	5
NB	0.00	1.00	N	0	0	0.95	15	Y	21.8	3
SB	0.00	2.00	N	0	0	0.94	15	Y	21.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 120.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT	X	X			NB	LT		X		
	TH		X				TH		X		
	RT		X				RT		X		
	PD		X				PD		X		
WB	LT	X	X			SB	LT	X			
	TH		X				TH	X			
	RT		X				RT	X			
	PD		X				PD				
GREEN		5.0	44.0	0.0	0.0	GREEN		35.0	16.0	0.0	0.0
YELLOW		3.0	5.0	0.0	0.0	YELLOW		5.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
EB	L	0.234	0.450	15.6	C	31.2	D
	T	1.027	0.383	33.6	D		
	R	0.161	0.383	7.4	B		
WB	L	0.326	0.450	16.9	C	12.6	B
	T	0.686	0.383	12.3	B		
NB	L	0.391	0.167	34.4	D	43.6	E
	TR	0.876	0.167	47.5	E		
SB	L	0.942	0.308	51.1	E	68.8	F
	LT	1.113	0.308	89.2	F		
	R	0.177	0.308	19.6	C		

INTERSECTION: Delay = 38.5 (sec/veh) V/C = 0.978 LOS = D

Appendix C

Drainage Report

PRELIMINARY GRADING AND DRAINAGE REPORT

FOR

MAUI COMMUNITY COLLEGE

BUILDINGS "J", "S" AND SITE IMPROVEMENTS

KAHULUI, MAUI, HAWAII

TMK: 3-8-7:40

PREPARED FOR

DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES

DIVISION OF PUBLIC WORKS

STATE OF HAWAII

BY

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS * SURVEYORS

WAILUKU * HILO * HONOLULU, HAWAII

SEPTEMBER 1992

REVISED SEPTEMBER 23, 1992

TABLE OF CONTENTS

AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

TED S. KAWAHIGASHI, P.E.
GEORGE M. NEUFFER, P.E.
KENNETH K. KUROKAWA, P.E.
THOMAS S. OTAGURO
IVAN K. NAKATSUKA, P.E.

KEN K. KUROKAWA P.E.
Vice President &
Maui Branch Office Manager

PRELIMINARY GRADING AND DRAINAGE REPORT

FOR

MAUI COMMUNITY COLLEGE

BUILDINGS "J", "S" AND SITE IMPROVEMENTS

I. INTRODUCTION

The purpose of this report is to evaluate the existing site drainage conditions and to develop a preliminary grading and drainage plan for the proposed project.

II. PROPOSED PROJECT

A. LOCATION

The project site is located within the Maui Community College (MCC) campus in Kahului on the island of Maui, Hawaii. The MCC campus is located on the Makai side of Kaahumanu Avenue across the Kaahumanu Shopping Center. The campus site encompasses 61 acres and is designated by Tax Map Key Number 3-8-7, Parcel 40. (See Exhibits 1 & 2 for the location of the MCC campus.)

B. PROJECT

The proposed project consists of two new classroom buildings, a new parking lot area and a new storm drainage retention basin. (See Exhibit 2A for the location of the

REPLY TO:
1871 WILI PA LOOP, SUITE A
WAILUKU, MAUI, HAWAII 96793 • PHONE (808) 244-8044 • FAX NO. 242-9163

OFFICES IN:
HONOLULU, HAWAII
WAILUKU, MAUI, HAWAII • HILO, HAWAII

proposed improvements.)

III. EXISTING CONDITIONS

A. TOPOGRAPHY AND SOIL CONDITIONS

The general slopes of the MCC campus ranges from 0.5 percent at the eastern part of the campus to 2 percent at the western end. The majority of the campus slopes toward the northeast to Kahului Beach Road and the remaining area slopes toward the east. Onsite elevations range from 8 feet to 50 feet MSL (mean sea level). The MCC property is presently covered with buildings, sidewalks, parking areas, tennis courts, cultivated agricultural areas, and open grassed and overgrown areas. The soil classification for the MCC area is Puuone Sand (PZUE) as described by the USDA Soil Conservation Service ("Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai").

B. CLIMATE

Kahului is generally sunny and warm throughout the year. The annual rainfall is about 20 inches with a mean annual temperature of 75 degrees Fahrenheit.

C. DRAINAGE

Presently, the majority of the onsite runoff sheets flows across the campus towards Kahului Harbor and under the Kahului Beach Road via two off-site drainage ditch and drainline systems. The remaining on-site runoff drains towards the east. An existing 72" x 44" arch pipe, which collects approximately 16 acres of offsite drainage from Kaahumanu

Avenue, crosses the campus and outlets into onsite drainage ditch which connects to the existing offsite ditch and drainline system.

D. FLOOD ZONE

The Flood Insurance Rate Map (FIRM) for the area indicates that the majority of the campus is within Zone C, which is an area of minimal flooding. The remaining portion of the site lies within zone A4, which has a base flood elevation of approximately 16 feet MSL. (See Exhibit 3 for flood map).

IV. GRADING AND DRAINAGE PLAN

A. GRADING PLAN

The proposed grading plan will require embankment to bring the finish floor elevations of the proposed buildings to elevation 37 feet MSL for Building "J" and elevation 15 feet MSL for Building "S". The proposed parking area will also require embankment to bring the pavement surface to required finish grades which vary from elevation 12 feet MSL to 20 feet MSL. The site will be graded to dispose of the onsite storm runoff generated from the proposed improvements as shown in Exhibit 4 (Grading and Drainage Plan). An offsite storm drainage retention basin will be constructed in the area between the MCC campus and Kahului Beach Road to retain the difference in runoff between existing and proposed site conditions for the entire MCC campus. Erosion control measures will be incorporated during the construction period to minimize soil loss.

B. DRAINAGE PLAN

The proposed drainage plan for the Buildings "J", "S" and Site Improvements project will involve two underground drainage collection systems. Both systems will consist of inlets, catch basins, and underground piping which will discharge into the offsite storm drainage retention basin system. The retention basin system will consist of a 4 feet deep pond with a two feet of freeboard, approximately 140 feet wide and 900 feet long. The pond will retain the difference in runoff volume between the existing onsite runoff and the onsite runoff generated from the proposed improvements. Offsite runoff will continue to pass through the campus and will be directed through the retention basin before ultimate disposal into Kahului Harbor. The ultimate discharge flow into Kahului Harbor will be limited to not exceed existing discharge levels. The retention basin emergency spillway will be designed to control the discharge rate. See Exhibit 4 for the proposed drainage systems and retention basin system.

C. HYDROLOGY

The Rational Method as described in the "Storm Drainage Standards", May 1988, by the City and County of Honolulu was used to compute the storm water runoff quantity. Runoff calculations were based on a 10 - year, 50 - year and 100 - year storm recurrence intervals. The rainfall intensities were interpolated from the "Rainfall Frequency Atlas of the Hawaiian Islands", by the U.S. Department of Commerce, Weather

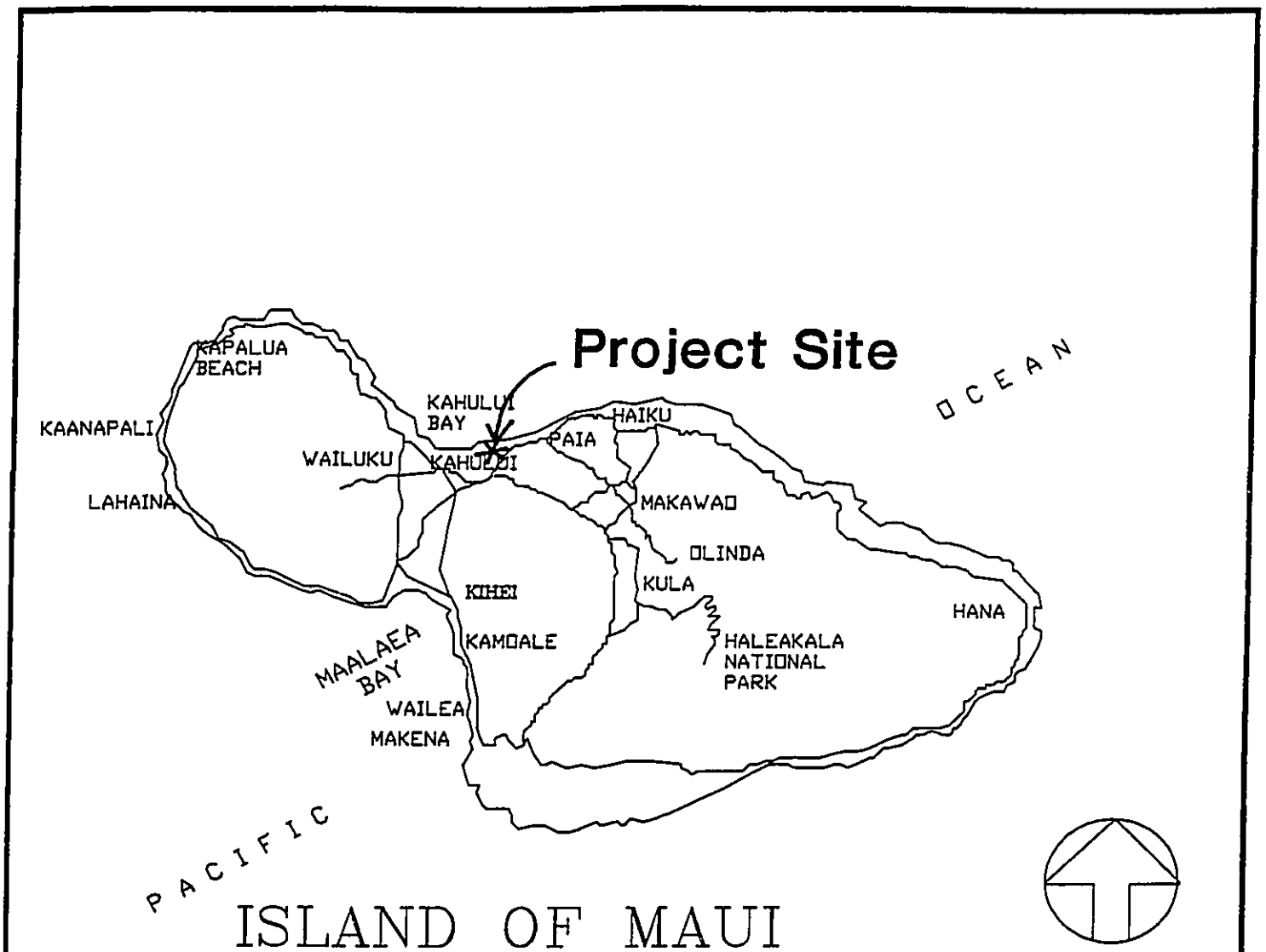
Bureau.

The existing onsite storm runoff for the entire MCC campus for the 10 year storm event is approximately 91 CFS. For the improved site conditions, the projected runoff for the entire MCC campus is 146 CFS. The existing offsite runoff is 26 CFS. The difference in runoff volume for the 10 year storm is 3.0 acre-feet which includes the offsite drainage area. The retention pond also detains the 100 year storm difference in runoff volume of 5.5 acre-feet. See Appendix for site drainage and retention basin calculations. See Exhibit 5 for Drainage Sub basins.

IV. CONCLUSION

The proposed grading and drainage design for this project will produce no adverse effect by storm runoff to adjacent and downstream properties. The two proposed buildings will be designed to be constructed within the campus area designated by the FIRM as Zone C. The proposed retention basin system will retain the increase of runoff generated from the proposed ultimate improvements and will regulate the ultimate discharge rate into Kahului Harbor to not exceed existing values. Soil loss will be minimized during the construction period by implemented appropriate erosion control measures. Dust will also be minimized during construction by the implementation of water sprinkling. All drainage improvements will conform to the County Standards and will be coordinated with the Department of Public Works, County of Maui.

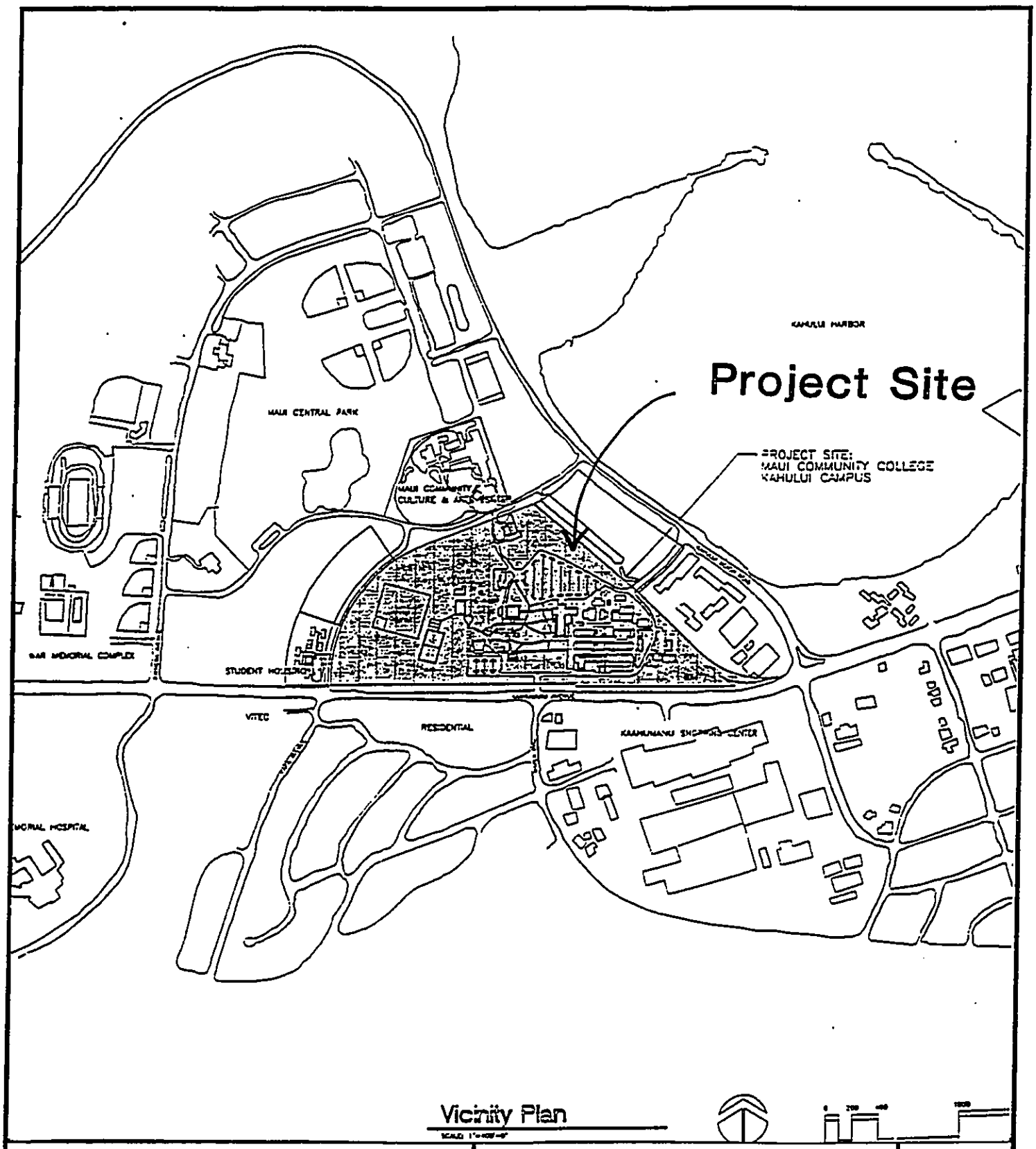
EXHIBITS



PRELIMINARY ENGINEERING REPORT MAUI COMMUNITY COLLEGE BUILDINGS J, S & SITE IMPROVEMENTS KAHULUI, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS • SURVEYORS LOCATION MAP	EXHIBIT 1

JOB NO. M-90-570
FILENAME : M90531EX

9/90

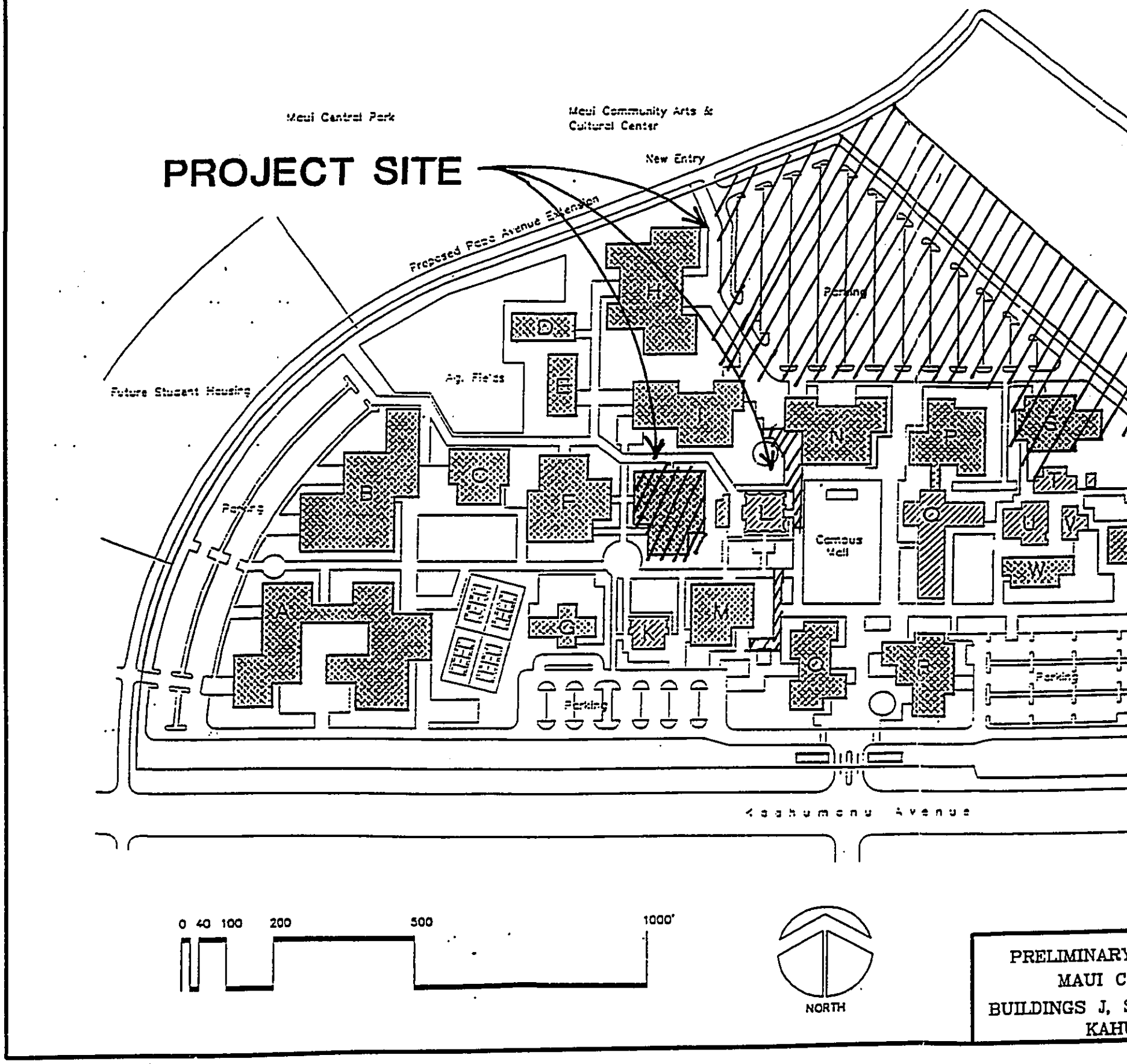


Vicinity Plan

PRELIMINARY ENGINEERING REPORT MAUI COMMUNITY COLLEGE BUILDINGS J, S & SITE IMPROVEMENTS KAHULUI, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS • SURVEYORS HONOLULU, HILO, WAILUKU, HAWAII VICINITY MAP	EXHIBIT 2

JOB NO. M-90-531
FILENAME : M90531EX

9/90



PRELIMINARY
MAUI C
BUILDINGS J, S
KAHU

JOB NO. M-90-531
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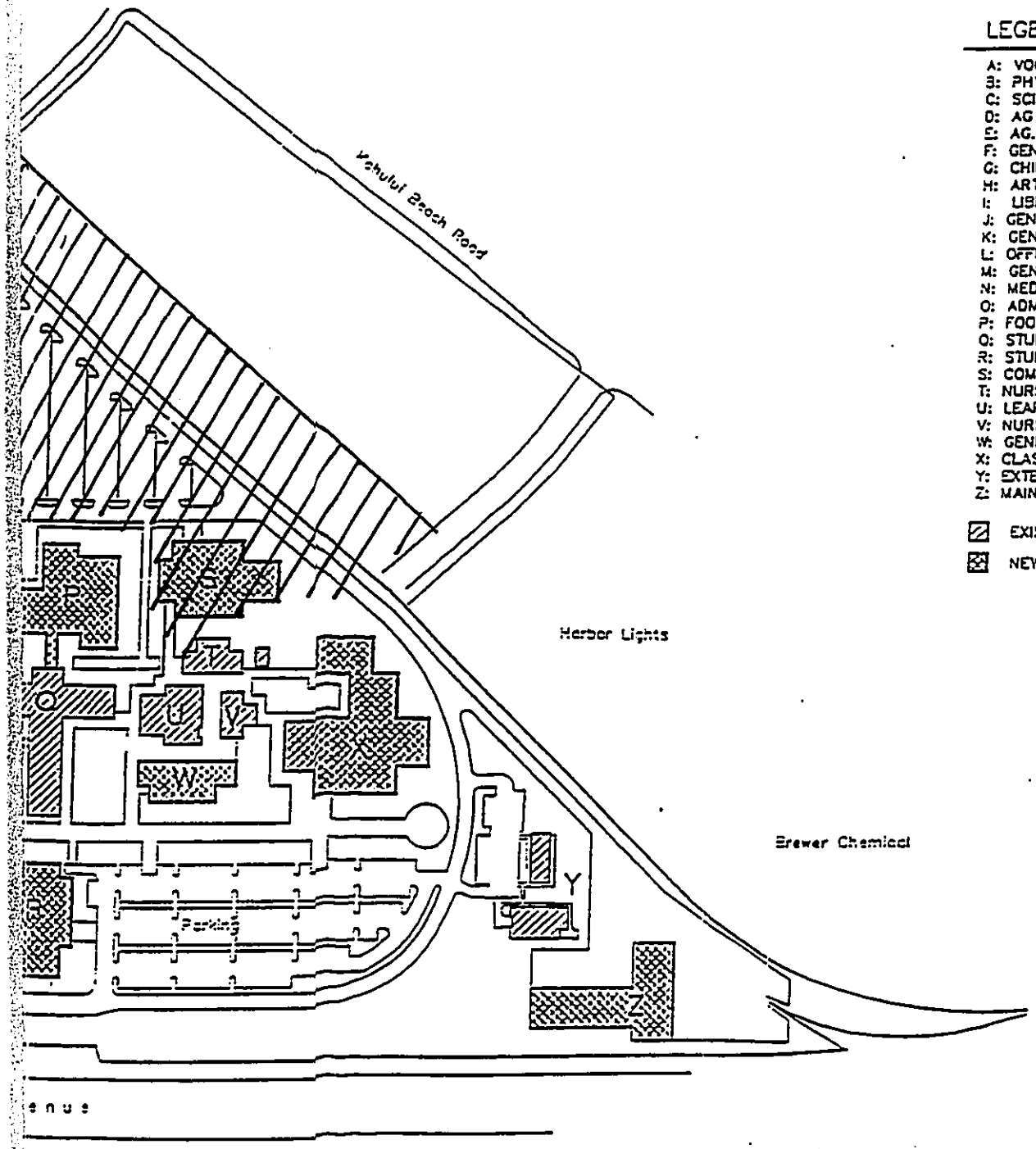


LEGEND:

- A: VOCATIONAL
- B: PHYSICAL EDUCATION
- C: SCIENCE
- D: AG GREENHOUSE/SHED
- E: AG. CLASSROOMS
- F: GENERAL CLASSROOMS
- G: CHILD CARE
- H: ART, MUSIC, DRAMA
- I: LIBRARY
- J: GENERAL CLASSROOMS
- K: GENERAL CLASSROOMS
- L: OFFICES
- M: GENERAL CLASSROOMS
- N: MEDIA CENTER
- O: ADMIN. & SUPPORT
- P: FOOD SERVICE
- Q: STUDENT CENTER
- R: STUDENT SERVICES
- S: COMMUNITY SERVICE
- T: NURSING
- U: LEARNING SKILLS
- V: NURSING
- W: GENERAL CLASSROOMS
- X: CLASSROOMS/ OFFICES
- Y: EXTERNAL AGENCIES
- Z: MAINTENANCE/ STORAGE

▨ EXISTING BUILDING

▩ NEW BUILDING

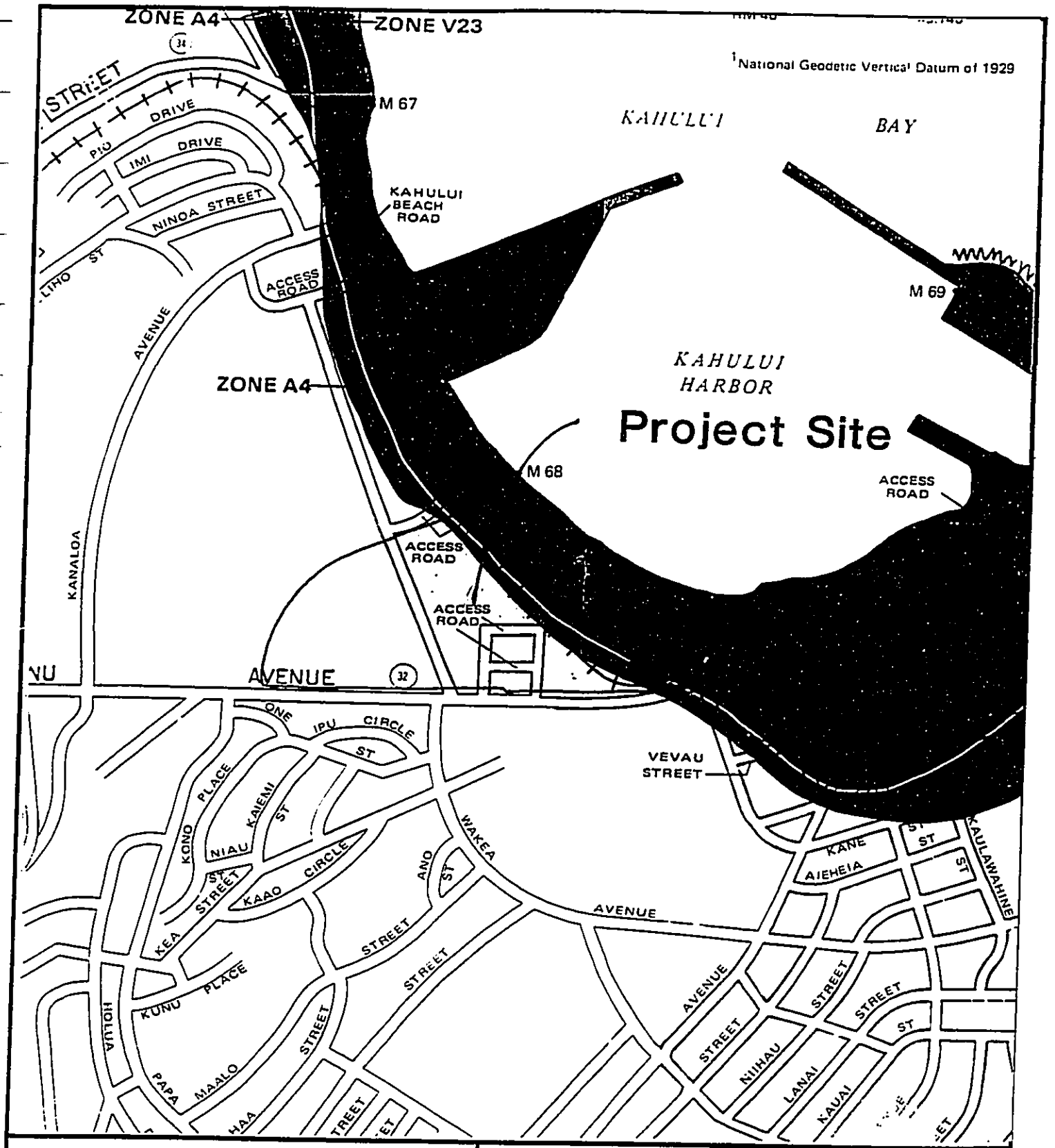
PRELIMINARY ENGINEERING REPORT
MAUI COMMUNITY COLLEGE
BUILDINGS J, S & SITE IMPROVEMENTS
KAHULUI, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS • SURVEYORS
HONOLULU, HAWAII; WAILUKU, HAWAII

SITE PLAN

EXHIBIT 2A

9/92

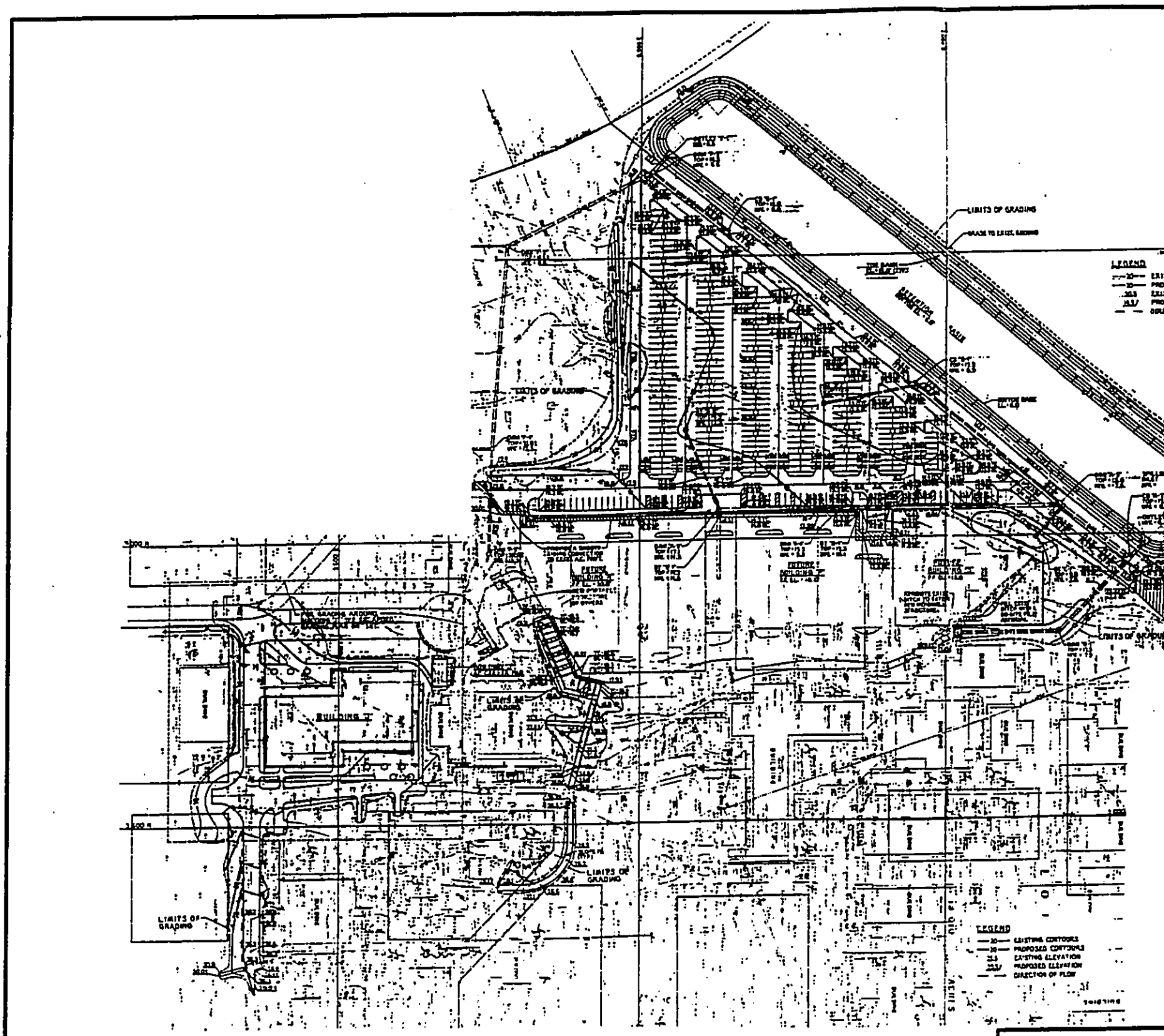


PRELIMINARY ENGINEERING REPORT MAUI COMMUNITY COLLEGE BUILDINGS J, S & SITE IMPROVEMENTS KAHULUI, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS • SURVEYORS HONOLULU, HILO, WAILUKU, MAUI FLOOD ZONING MAP F.I.R.M. PANEL 150003–0153B	EXHIBIT 3

JOB NO. M–90–531
FILENAME : M90531EX

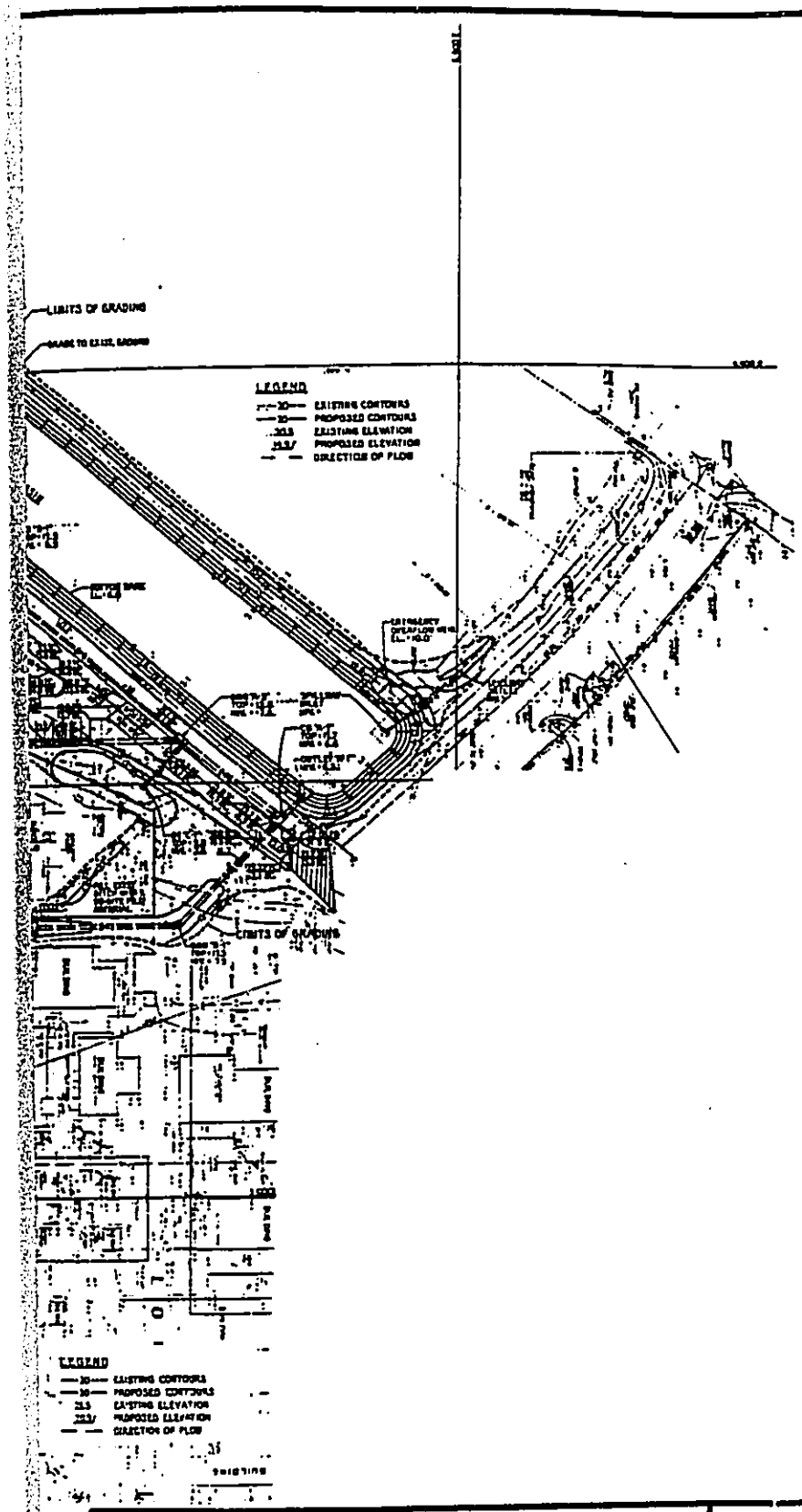
Scale 1"=1000'

9/90



PRELIMINARY
MAUI CO
BUILDINGS J, S
KAHU

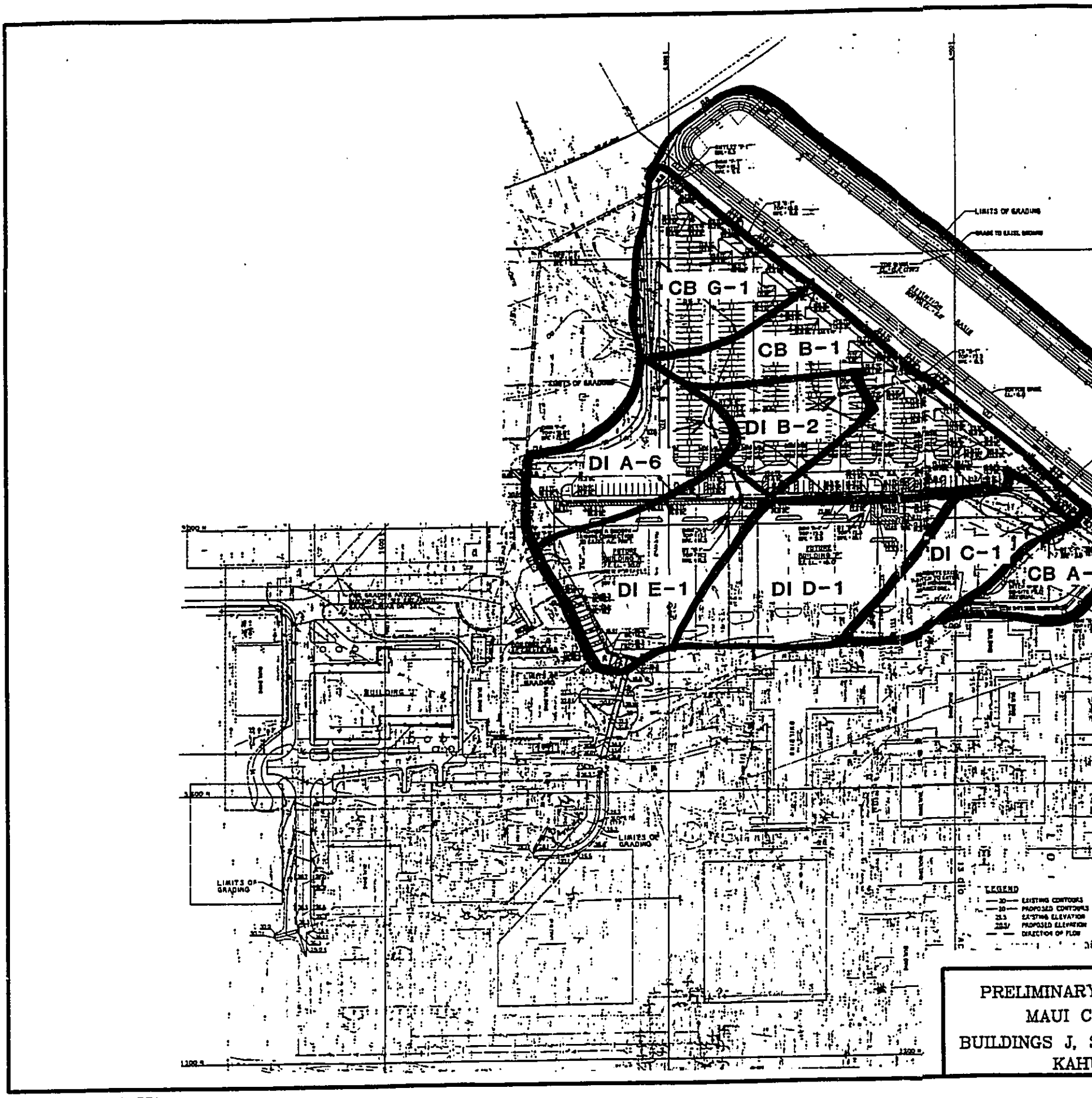
JOB NO. M-90-531
FILENAME : M90531EX



SCALE : 1" = 160'

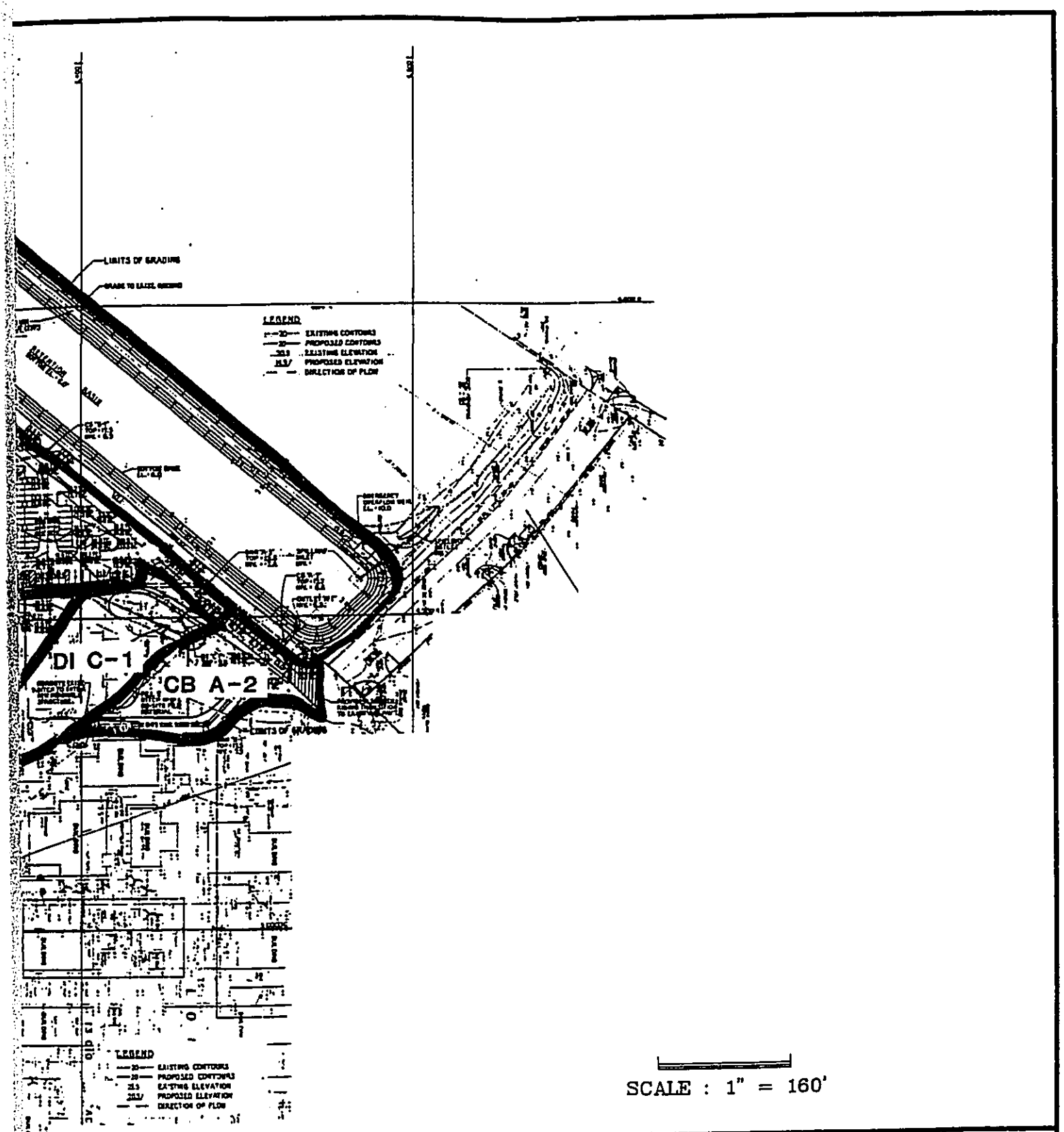
PRELIMINARY ENGINEERING REPORT MAUI COMMUNITY COLLEGE BUILDINGS J, S & SITE IMPROVEMENTS KAHULUI, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS • SURVEYORS HONOLULU, HILO, WAILUKU, HAWAII GRADING & DRAINAGE PLAN	EXHIBIT 4

9/92



PRELIMINARY
MAUI C
BUILDINGS J,
KAH

JOB NO. M-90-531
FILENAME : M90531EX



SCALE : 1" = 160'

PRELIMINARY ENGINEERING REPORT MAUI COMMUNITY COLLEGE BUILDINGS J, S & SITE IMPROVEMENTS KAHULUI, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS • SURVEYORS DRAINAGE SUB BASINS PLAN	EXHIBIT 5

9/92

APPENDIX

TR-55 GRAPHICAL DISCHARGE METHOD VERSION 1.11

Project : MAUI COMMUNITY COLLEGE User: lvt Date: 08-28-92
County : MAUI-CENTRAL State: HI Checked: ..... Date:
Subtitle: EXISTING CONDITIONS- ONSITE

Data: Drainage Area : 55.8 Acres
Runoff Curve Number : 83
Time of Concentration: 0.42 Hours
Rainfall Type : I
Pond and Swamp Area : NONE

Storm Number	1	2	3	4	5	6	7
Frequency (yrs)	1	2	5	10	25	50	100
24-Hr Rainfall (in)	2.6	3	5	5	7.5	8	8.8
Ia/P Ratio	0.16	0.14	0.08	0.06	0.05	0.05	0.05
Used	0.16	0.14	0.10	0.10	0.10	0.10	0.10
Runoff (in)	1.13	1.45	3.17	3.17	5.50	5.98	6.74
Unit Peak Discharge (cfs/acre/in)	0.434	0.449	0.475	0.475	0.475	0.475	0.475
Pond and Swamp Factor 0.0% Ponds Used	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Peak Discharge (cfs)	27	36	84	84	146	158	179

TR-55 GRAPHICAL DISCHARGE METHOD VERSION 1.11

Project : MAUI COMMUNITY COLLEGE User: lvt Date: 08-28-92
County : MAUI-CENTRAL State: HI Checked: _____ Date: _____
Subtitle: EXISTING CONDITIONS- ONSITE

Data: Drainage Area : 5.2 Acres
Runoff Curve Number : 80
Time of Concentration: 0.42 Hours
Rainfall Type : I
Pond and Swamp Area : NONE

Storm Number	1	2	3	4	5	6	7
Frequency (yrs)	1	2	5	10	25	50	100
24-Hr Rainfall (in)	2.6	3	5	5	7.5	8	8.8
Ia/P Ratio	0.19	0.17	0.10	0.10	0.07	0.06	0.06
Used	0.19	0.17	0.10	0.10	0.10	0.10	0.10
Runoff (in)	0.96	1.25	2.89	2.89	5.16	5.63	6.38
Unit Peak Discharge (cfs/acre/in)	0.409	0.428	0.475	0.475	0.475	0.475	0.475
Pond and Swamp Factor 0.0% Ponds Used	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Peak Discharge (cfs)	2	3	7	7	13	14	16

TR-55 GRAPHICAL DISCHARGE METHOD VERSION 1.11

Project : MAUI COMMUNITY COLLEGE User: lvt Date: 08-28-92
County : MAUI-CENTRAL State: HI Checked: ____ Date: ___
Subtitle: EXISTING CONDITIONS- OFFSITE

Data: Drainage Area : 16 Acres
Runoff Curve Number : 84
Time of Concentration: 0.37 Hours
Rainfall Type : I
Pond and Swamp Area : NONE

Storm Number	1	2	3	4	5	6	7
Frequency (yrs)	1	2	5	10	25	50	100
24-Hr Rainfall (in)	2.6	3	5	5	7.5	8	8.8
Ia/P Ratio	0.15	0.13	0.08	0.08	0.05	0.05	0.04
Used	0.15	0.13	0.10	0.10	0.10	0.10	0.10
Runoff (in)	1.19	1.52	3.27	3.27	5.62	6.10	6.87
Unit Peak Discharge (cfs/acre/in)	0.466	0.481	0.501	0.501	0.501	0.501	0.501
Pond and Swamp Factor 0.0% Ponds Used	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Peak Discharge (cfs)	9	12	26	26	45	49	55

TR-55 GRAPHICAL DISCHARGE METHOD VERSION 1.11

Project : MAUI COMMUNITY COLLEGE User: lvt Date: 08-28-92
County : MAUI-CENTRAL State: HI Checked: _____ Date: _____
Subtitle: DEVELOPED CONDITIONS- ONSITE

Data: Drainage Area : 61 Acres
Runoff Curve Number : 92
Time of Concentration: 0.25 Hours
Rainfall Type : I
Pond and Swamp Area : NONE

Storm Number	1	2	3	4	5	6	7
Frequency (yrs)	1	2	5	10	25	50	100
24-Hr Rainfall (in)	2.6	3	5	5	7.5	8	8.8
Ia/P Ratio	0.07	0.06	0.03	0.03	0.02	0.02	0.02
Used	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Runoff (in)	1.79	2.16	4.09	4.09	6.55	7.04	7.84
Unit Peak Discharge (cfs/acre/in)	0.584	0.584	0.584	0.584	0.584	0.584	0.584
Pond and Swamp Factor 0.0% Ponds Used	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Peak Discharge (cfs)	64	77	146	146	233	251	279

TR-55 STORAGE VOLUME FOR DETENTION BASINS VERSION 1.11

Project : MAUI COMMUNITY COLLEGE User: lvt Date: 08-28-92
County : MAUI-CENTRAL State: HI Checked: ____ Date: ____
Subtitle: RETENTION VOLUME : 10-YR STORM

Drainage Area: 61 Acres Rainfall Frequency: 10 years
Rainfall-Type: I
24-Hour Rainfall: 5 inches Runoff Curve Number: 92
Peak Inflow: 172 cfs
Peak Outflow: 110 cfs
Runoff Volume: 4.1 inches
Detention Basin Storage Volume: 0.59 inches or 3.0 acre feet

TR-55 STORAGE VOLUME FOR DETENTION BASINS VERSION 1.11

Project : MAUI COMMUNITY COLLEGE User: lvt Date: 08-28-92
County : MAUI-CENTRAL State: HI Checked: ____ Date: _____
Subtitle: RETENTION VOLUME : 50-YR STORM

Drainage Area: 61 Acres Rainfall Frequency: 50 years
Rainfall-Type: I
24-Hour Rainfall: 8 inches Runoff Curve Number: 92
Peak Inflow: 300 cfs
Peak Outflow: 207 cfs
Runoff Volume: 7.0 inches
Detention Basin Storage Volume: 0.98 inches or 5.0 acre feet

TR-55 STORAGE VOLUME FOR DETENTION BASINS VERSION 1.11

Project : MAUI COMMUNITY COLLEGE User: lvt Date: 08-28-92
County : MAUI-CENTRAL State: HI Checked: _____ Date: _____
Subtitle: RETENTION VOLUME : 100 YR

Drainage Area: 61 Acres Rainfall Frequency: 100 years
Rainfall-Type: I
24-Hour Rainfall: 8.8 inches Runoff Curve Number: 92
Peak Inflow: 334 cfs
Peak Outflow: 234 cfs
Runoff Volume: 7.8 inches
Detention Basin Storage Volume: 1.08 inches or 5.5 acre feet