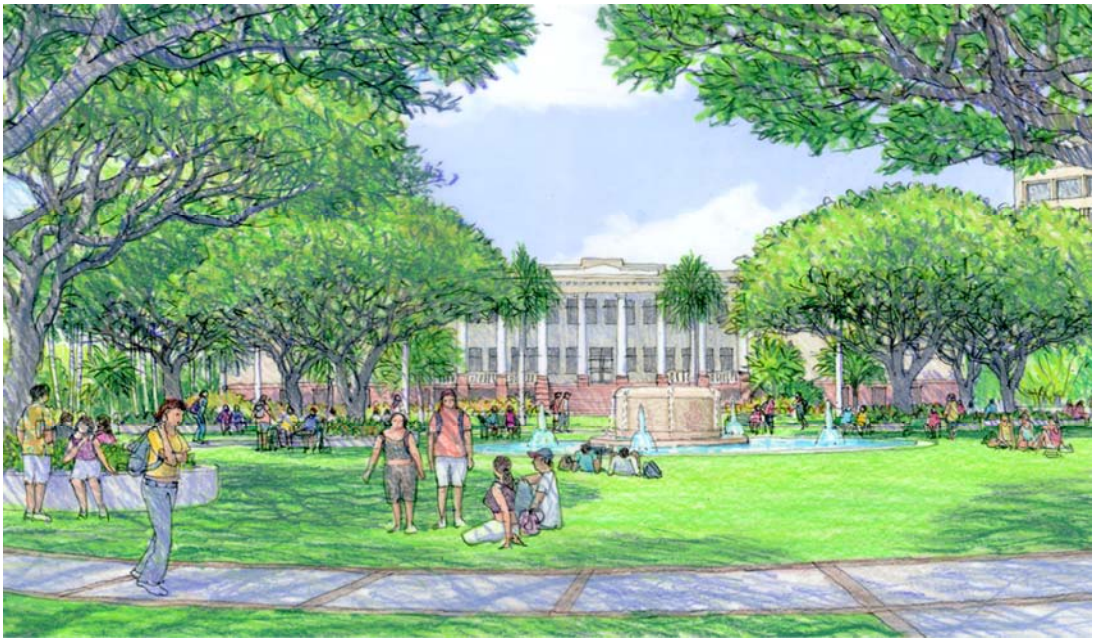
LONG RANGE DEVELOPMENT PLAN
UNIVERSITY OF HAWAIʻI , MĀNOA CAMPUS
2007 UPDATE

Plan Review Use



Applicant:

Office of the Chancellor
University of Hawaiʻi at Mānoa
2500 Campus Road
Hawaiʻi Hall 307
Honolulu, HI 96822

Prepared by:

Group 70 International, Inc.
Architecture • Planning & Environmental Services • Interior Design • Assets Management
Honolulu, Hawaiʻi

August 2009

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1.0 INTRODUCTION

1.0 INTRODUCTION

This Plan Review Use (PRU) application has been prepared in accordance with the provisions of Section 21-2.120 of the Land Use Ordinance, City and County of Honolulu, which sets forth the requirements for the PRU Application.

1.1 PROJECT INFORMATION SUMMARY

Type of Document:	Plan Review Use (PRU) Application
Applicant:	Office of the Chancellor University of Hawaiʻi at Mānoa 2500 Campus Road Hawaiʻi Hall 307 Honolulu, HI 96822
Name of Action:	University of Hawaiʻi, Mānoa Campus, Long Range Development Plan 2007 Update
Class of Action:	Public Use: University/College
Project Location:	Mānoa Valley, Honolulu, Island of Oʻahu *(Figure 1-1)*
Tax Map Key:	2-8-7:29; 2-8-15:1; 2-8-23:3, 10, 11, 12, 13 & 16; 2-8-26:14; 2-8-29:1, 30, 31; 2-9-2:12; 2-9-4:5, 7; 2-9-23:1, 26, 27; 2-9-26: 1, 2,3, 37; 2-9-27: 54; 2-9-13: 54; and 3-3-56: Portion of 1 *(Figure 1-2)*
Landowner:	State of Hawaiʻi, University of Hawaiʻi at Mānoa
Land Area:	304 Acres
State Land Use District:	Urban and Conservation *(Figure 1-3)*
City & County Development Plan:	Primary Urban Center, Public Facilities *(Figure 1-4)*
City& County Zoning:	R-5 Residential, R-7.5 Residential, P-1 Restricted Preservation and P-2 General Preservation *(Figure 1-5)* Plan Review Use Resolution 89-411, 92-286, & 06-255
SMA:	Not in SMA
Flood Zone:	Zone X (500 Year Flood) and AE *(Figure 1-6)*
Special Designation:	Not in a Special Design District
Master Plan:	Long Range Development Plan, University of Hawaiʻi, Mānoa Campus 2007 Update

Approval Action: Approved by the passage of a City Council Resolution.

1.2 PROJECT SITE

The University of Hawaiʻi, Mānoa Campus occupies some 304 acres of land in lower Mānoa Valley, bounded by the Mānoa, St. Louis Heights, Mōʻiliʻili and McCully communities. Its principal physical borders are the Mānoa residential community on the mauka side, Waʻahila Ridge on the Koko Head side, the H-1 Freeway on the makai side and the lower Mānoa and McCully residential communities on the ʻEwa side *(Figure 1-1).*

Its primary vehicular accesses are from the H-1 Freeway, University Avenue, Dole Street and Old Waiʻalae Road. Public transportation is primarily provided by regular bus services on King Street, University Avenue, Dole Street and Metcalf Street. The bus service includes routes through the campus via East-West Road and Maile Way. The Mānoa Campus is also served by direct express bus service from the outlying communities.

Current enrollment is approximately 20,000 students. In addition to student enrollment, faculty and staff number almost 6,000. The de facto daytime population is about 30,000.

1.3 OVERVIEW OF PROPOSED PROJECT

The Long Range Development Plan, University of Hawaiʻi, Mānoa Campus, 2007 Update (2007 LRDP) was prepared for the University by Group 70 International, Inc. The 2007 LRDP was adopted by the University's Board of Regents on November 15, 2007. Its purpose is to update the Plan, which was originally adopted in 1987, to reflect current and upcoming educational priorities. Future buildings and projects that are on the Capital Improvements Program and/or are anticipated for development within the next 5-10 years are projected into the Plan *(Figure 1-7).*

Proposed buildings and projects are as follows:

- Kennedy Theatre Expansion
- Parking Structure at Kennedy Theatre
- Instruction Building at Henke Hall Site
- Campus Center Expansion to Northeast
- Law School Expansion
- I.T.S. - Bilger Hall Addition, Phase II
- Research Space - Infill South Courtyard of Biomedical Building
- Klum Gym Replacement
- Instruction Building - College of Education
- Media Facilities at KHET Site
- Parking Structure IIB/Bookstore
- Faculty Housing - Waʻahila Ridge or Mauka Campus
- Research Buildings – North and East of Biomedical Building
- Research Buildings - Mauka Campus
- Johnson Hall - Replacement Dormitory
- Hale Noelani - Replacement Dormitory
- School of Hawaiian Knowledge
- Transitional Space Building

1.4 PURPOSE OF PLAN REVIEW USE APPLICATION

The purpose of this Plan Review Use application is to determine whether the implementation of the 2007 LRDP, could have major adverse impacts on surrounding land uses.

Future buildings and projects that are on the Capital Improvements Program (CIP) and/or are anticipated for development within the next 5-10 years are covered by this PRU application. Future projects beyond the 10-year CIP are listed and noted in the 2007 LRDP Update but are not included as part of this application.

This document does not consider the following types of projects which do not have significant impacts on the environment:

- Minor building renovations to meet program requirements, health and safety requirements, energy conservation measures, and accessibility requirements for disabled persons.
- General site, utility, and landscape improvements which will provide for infrastructure requirements for specific projects, enhance the aesthetic environment, and meet accessibility requirements for disabled persons.
- Land acquisition projects. None are being considered as current projects.

When determined to be appropriate, however, separate environmental assessments and plan review use applications will be prepared and filed for these projects. Depending on the project, then assessments may be EA's or Environmental Impact Statements (EIS).

As part of this PRU Application a copy of the 2007 LRDP Report (attached separately) and summary (*Appendix A*) has been enclosed, including the following supporting studies and information:

- 2007 UH Mānoa Long Range Development Plan Update, Summary Report
- Neighborhood Board Meeting Materials
- University of Hawai'i at Mānoa – Existing Buildings
- Parking Plans (Parking Striping Various Locations, UHM Honolulu, Oáhu, Hawai'i August 18, 1993)
- Archaeological Literature Review and Field Inspection Report
- Cultural Impact Assessment
- Utility Systems Report
- Traffic Impact Analysis Report
- UH Mānoa Traffic Demand Management Plan
- Parking Supply/Demand Study and Site Alternatives Evaluation

1.5 CONSULTATION WITH AGENCIES, ORGANIZATIONS AND INDIVIDUALS

The following agencies and groups with jurisdiction or interest have been consulted in the preparation of the Plan Review Use Application through the Environmental Assessment process.

State of Hawai'i Agencies
Department of Business, Economic Development & Tourism, Office of Planning
Department of Education
Department of Health

Department of Land and Natural Resources
Department of Land and Natural Resources, Historic Preservation Division
Department of Transportation
Office of Environmental Quality Control
Office of Hawaiian Affairs
University of Hawaiʻi, Mānoa Campus, Environmental Center

City and County of Honolulu Agencies
Councilmember, District 1, Todd Apo
Councilmember, District 2, Donovan Dela Cruz
Councilmember, District 4, Charles Djou
Councilmember, District 5, Duke Bainum
Councilmember, District 6, & Chair, Council Planning and Zoning Committee, Rod Tam
Councilmember, District 7, Romy Cachola
Councilmember, District 8, Gary Okino
Councilmember, District 9, Nester Garcia
Board of Water Supply
Department of Design and Construction
Department of Planning and Permitting
Department of Parks and Recreation
Department of Facility Maintenance
Department of Environmental Services
Department of Transportation Services
Department of Wastewater Management
Honolulu Fire Department
Honolulu Police Department

Community Groups and Associations
Neighborhood Board No. 5, Diamond Head/Kapahulu/St. Louis Heights
Neighborhood Board No. 7, Mānoa
Neighborhood Board No. 8, McCully/Mōʻiliʻili
Mālama O Mānoa
McCully/Mōʻiliʻili Business Association
The Outdoor Circle
Kimo Marion, CTAHR Alumni

The UHM LRDP 2007 Update was presented to agencies, organizations, community members, and to the Neighborhood Boards for Mānoa, McCully/Mōʻiliʻili, and Diamond Head/Kapahulu/St. Louis Heights in August 2007. Additional presentations on the update were recently presented to Neighborhood Board No. 7, Mānoa on July 1, 2009, Neighborhood Board No. 5, Diamond Head/Kapahulu/St. Louis Heights on July 9, 2009 and to Neighborhood Board No. 8, McCully/Moiliʻi on August 6, 2009. All adjoining neighbors of the UH Mānoa Campus were invited to attend and provided written notice of the meetings (*Appendix B*).

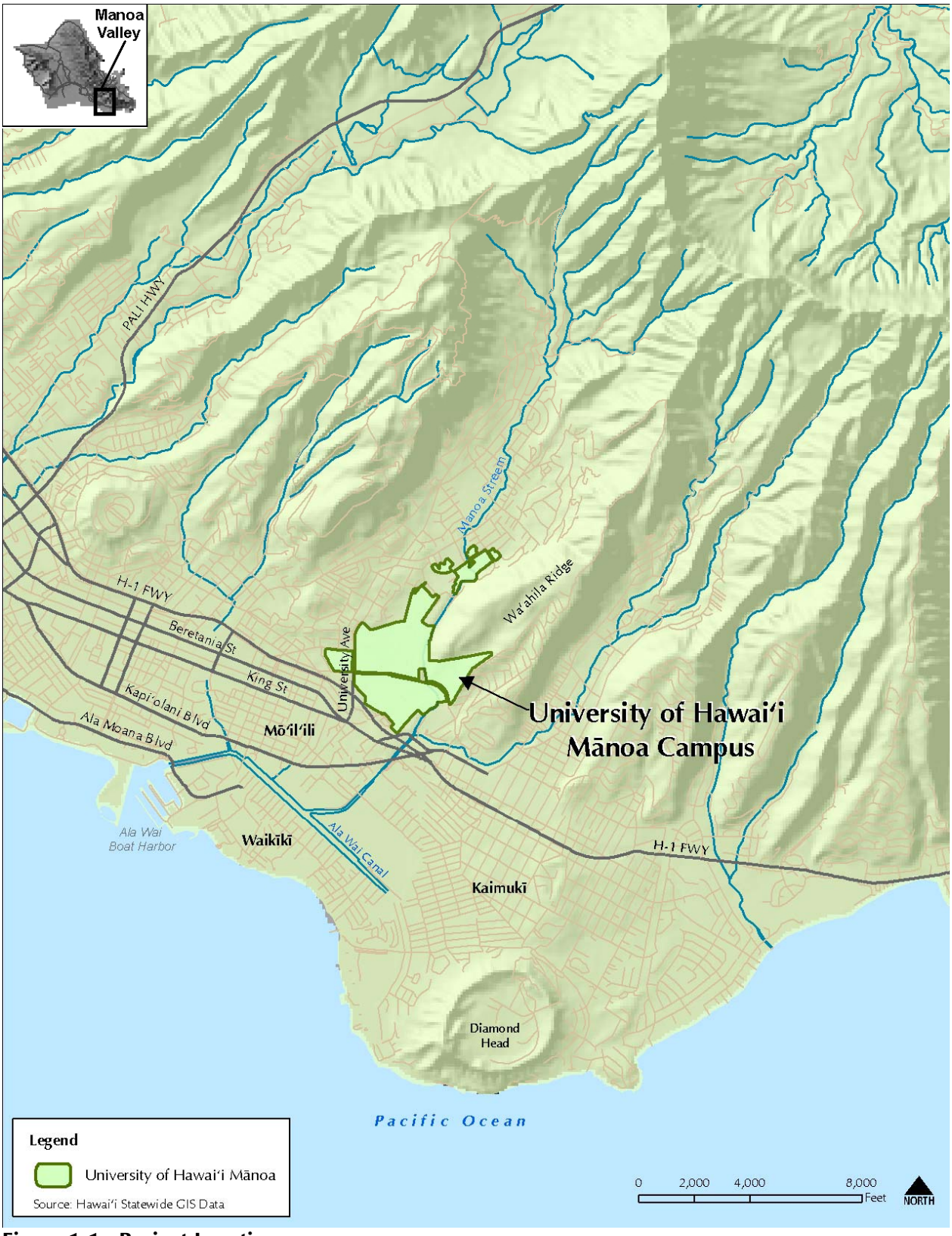


Figure 1-1: Project Location

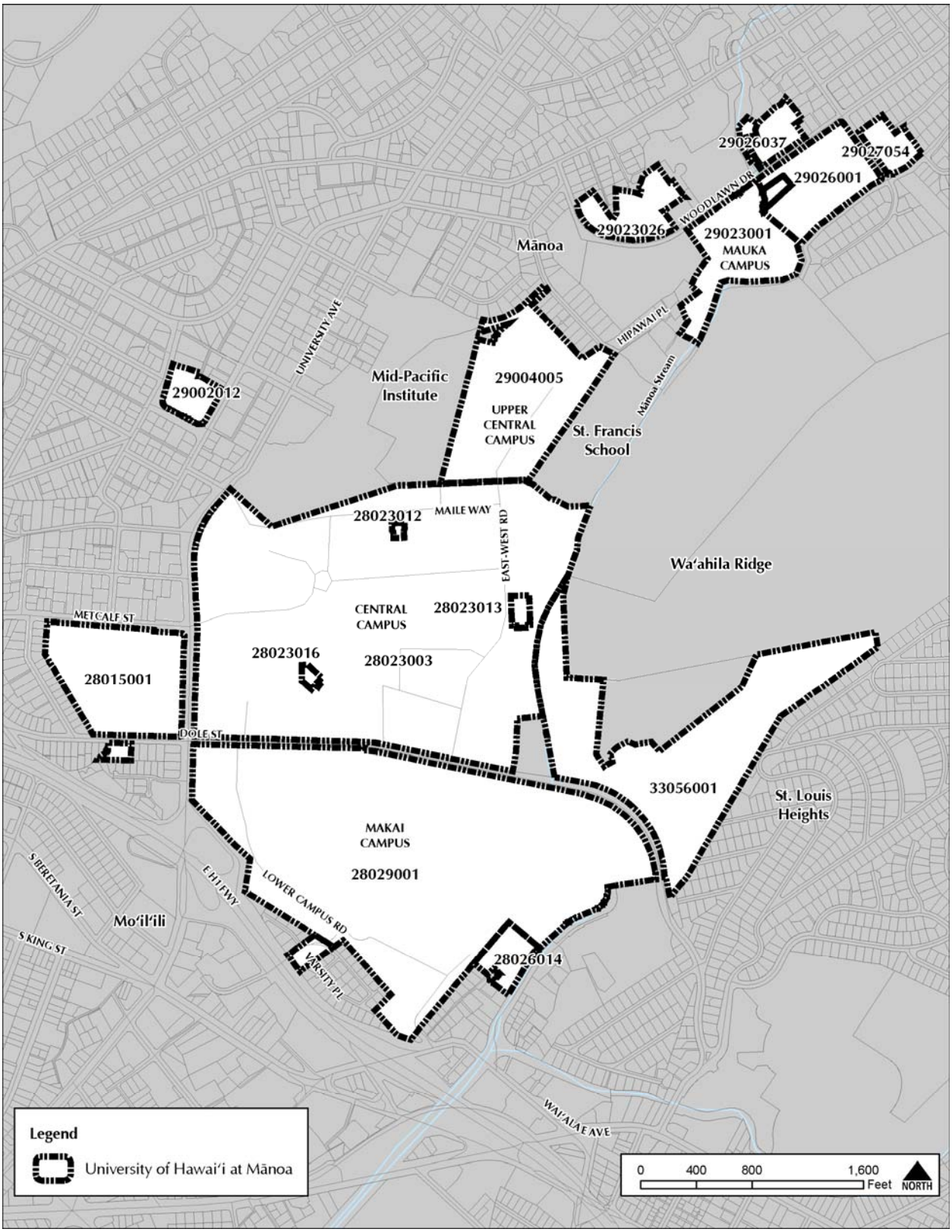


Figure 1-2: Tax Map Key

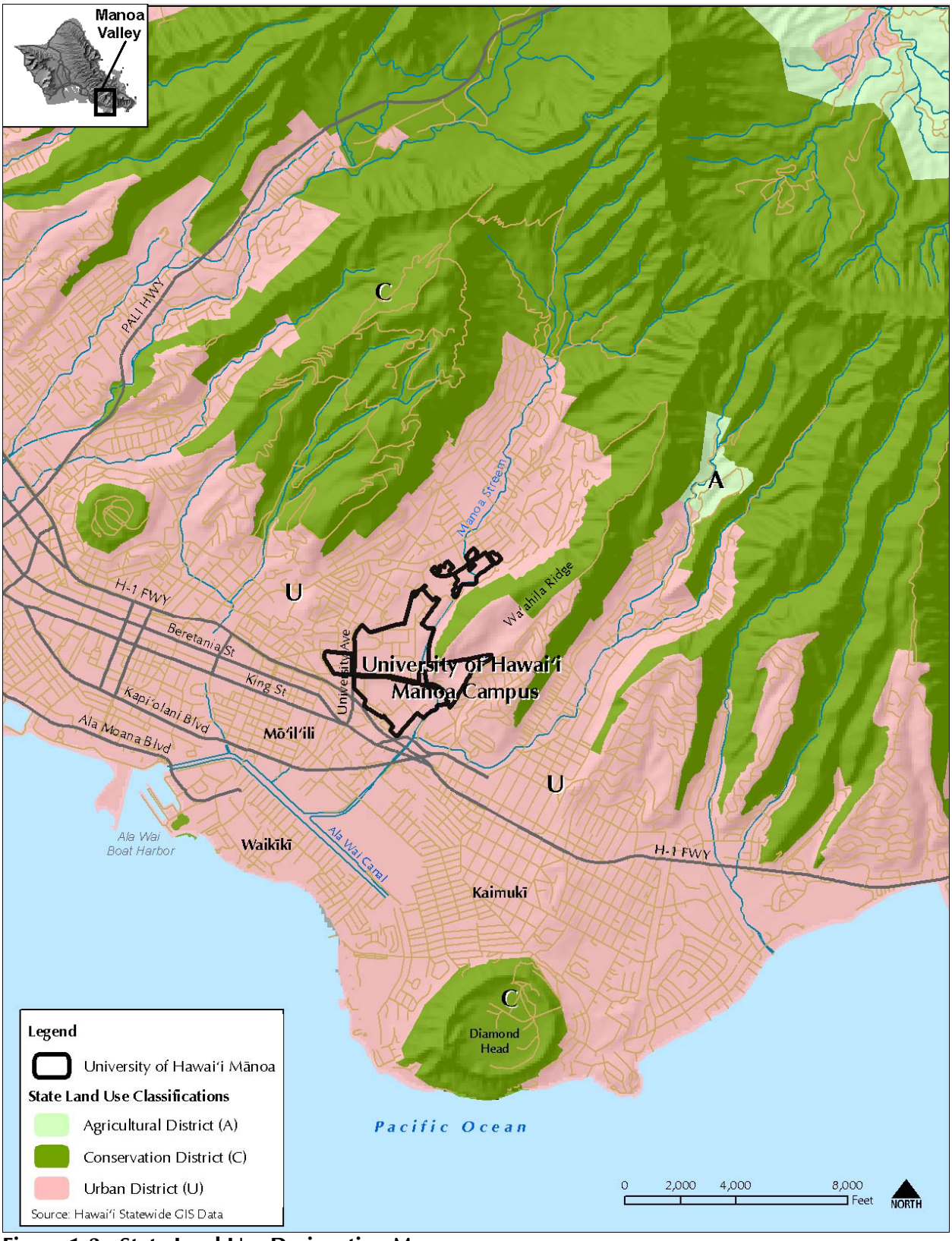


Figure 1-3: State Land Use Designation Map

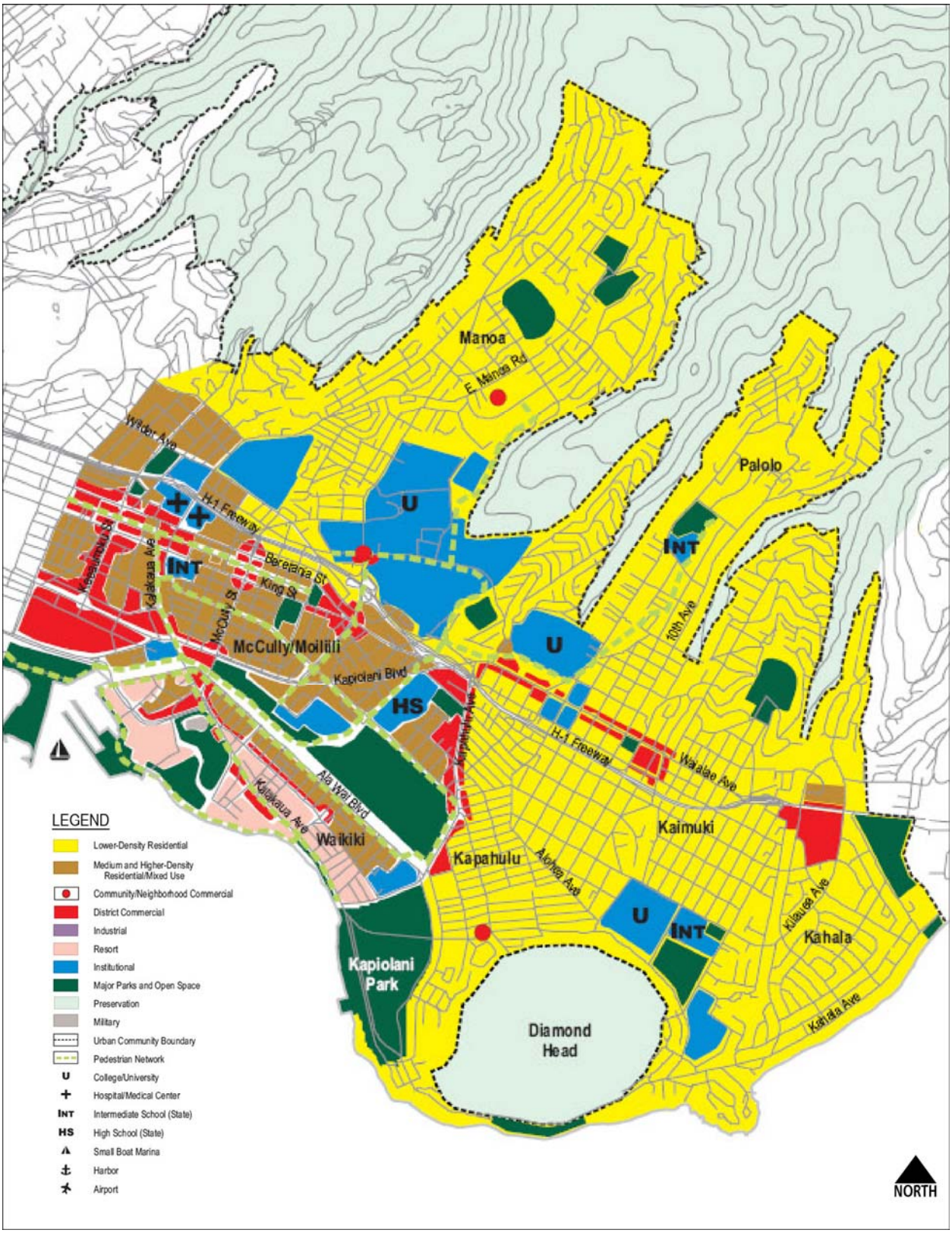


Figure 1-4: Primary Urban Center Development Map, Department of Planning and Permitting City and County of Honolulu, June 2004

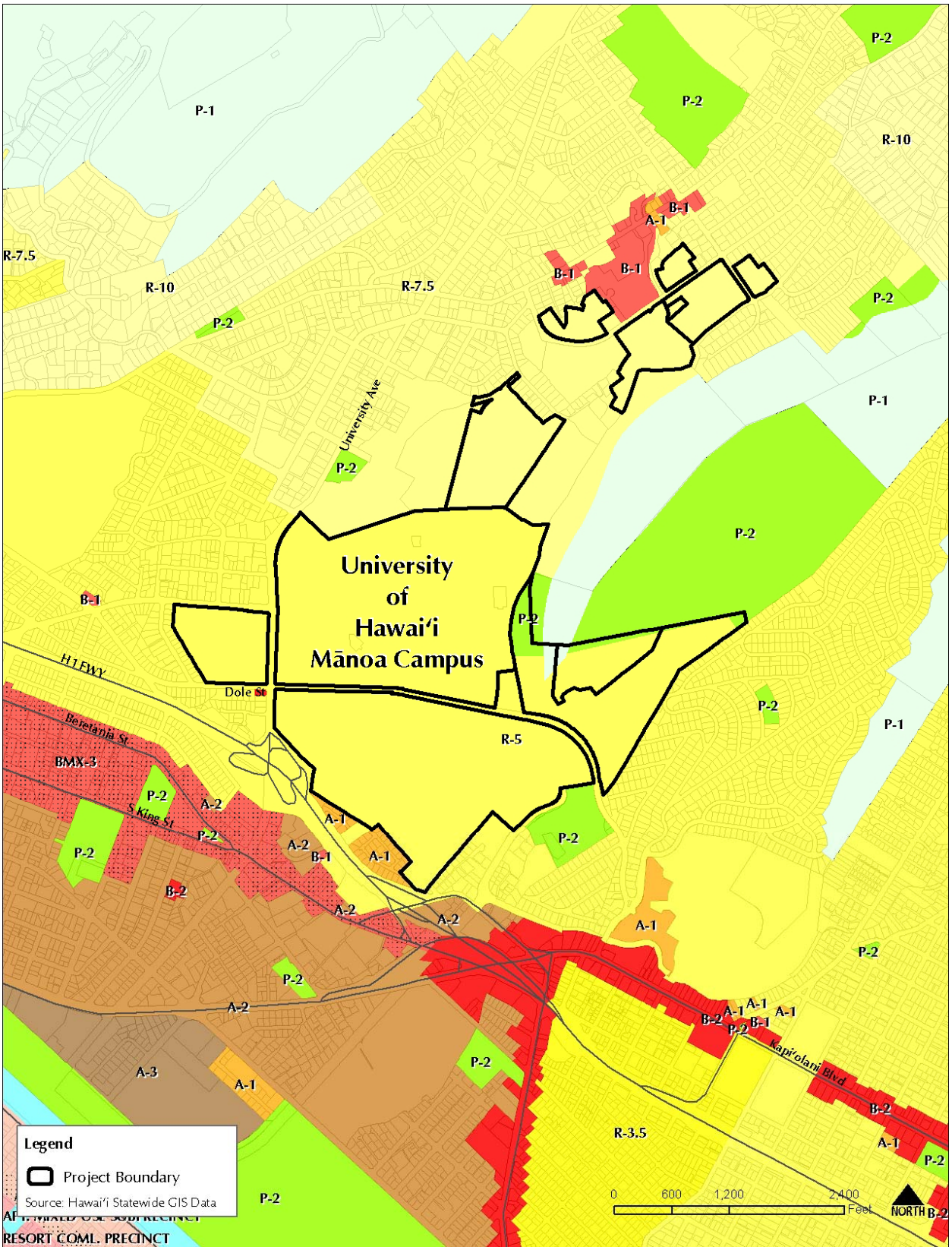


Figure 1-5: Zoning Map

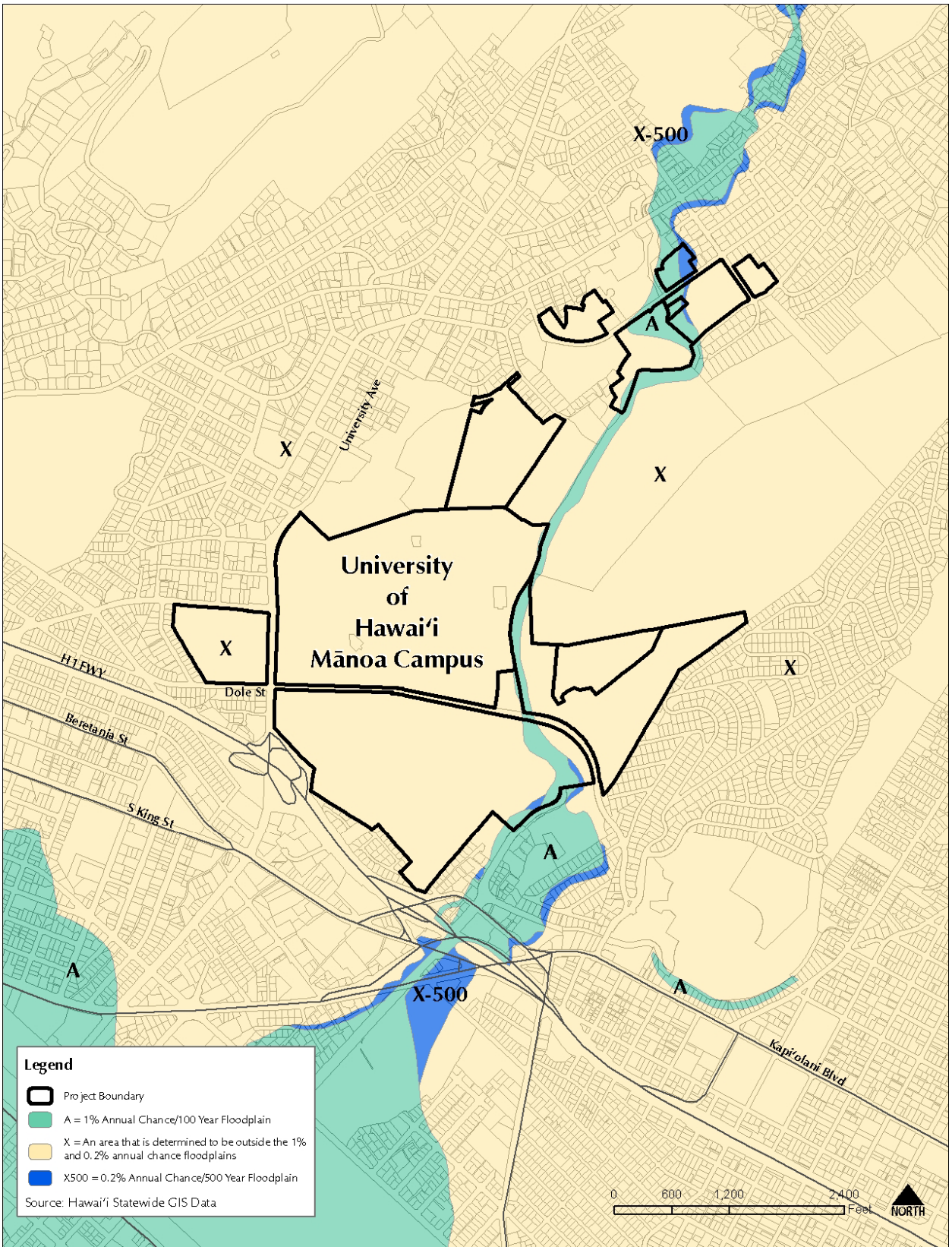


Figure 1-6: Flood Insurance Rate Map

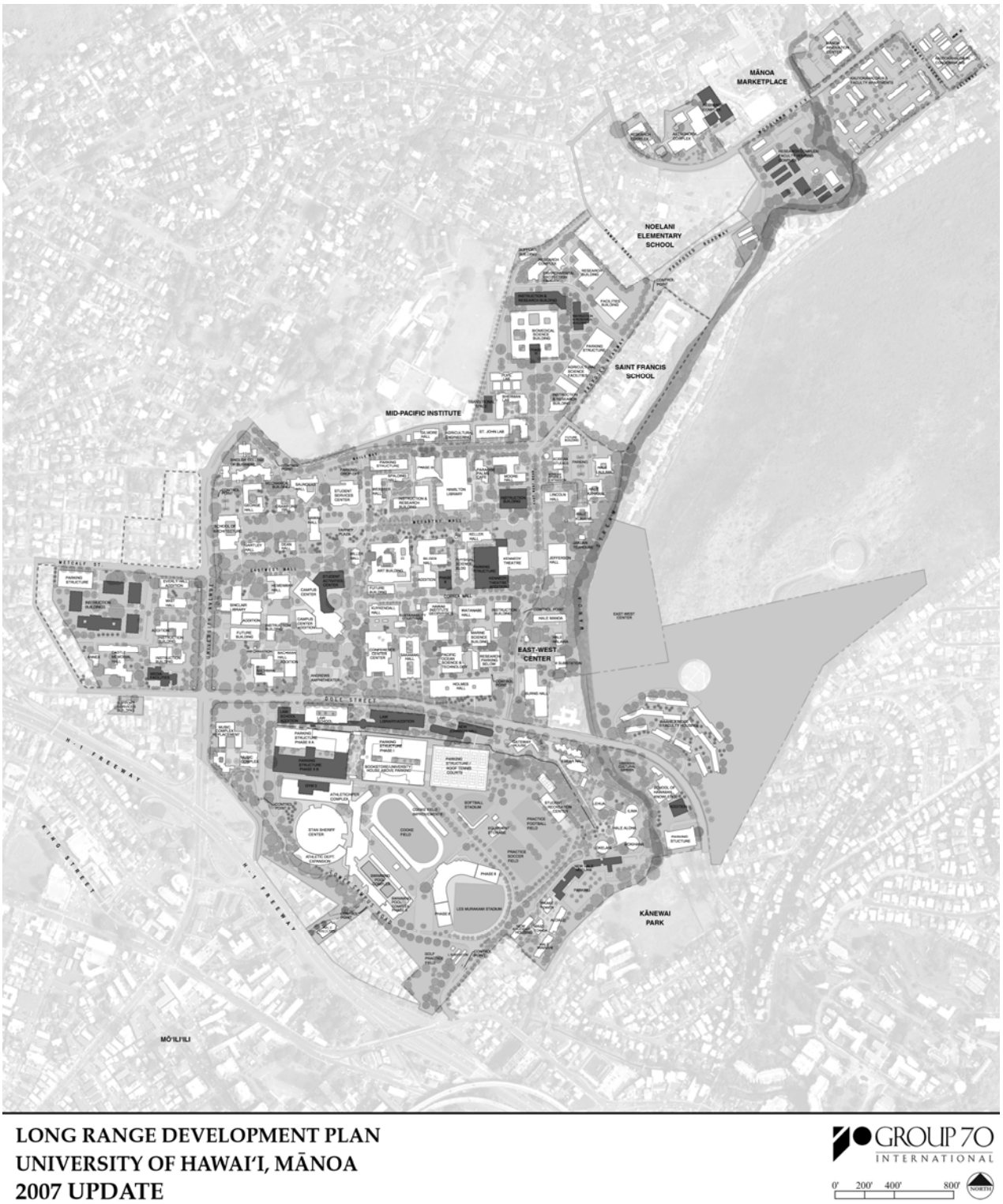


Figure 1-7: University of Hawai'i, Mānoa Campus, Long Range Development Plan Map

2.0 THE UNIVERSITY OF HAWAI'I ĀT MANOA

2.0 THE UNIVERSITY OF HAWAI'I AT MĀNOA

2.1 BACKGROUND

The University of Hawai'i at Mānoa is the flagship campus of the University of Hawai'i System, a center for research as well as undergraduate and graduate education. A destination of choice, students and faculty come from across the nation and the world to take advantage of UH Mānoa's unique research opportunities, diverse community, nationally-ranked Division I athletics program, and beautiful landscape. The 304-acre Mānoa Campus has approximately 8,183,113 sf of existing development to support its students and faculty. A detailed list of the existing development on the campus is provided in *Appendix C*.

The University of Hawai'i began in 1907 as a land-grant college of agriculture and mechanical arts called the College of Hawai'i. The first classes were held at a temporary site in downtown Honolulu. In 1912, the school moved to its permanent site in Mānoa Valley and as other campuses were added, the original Mānoa Valley site became identified as UH Mānoa.

With the addition of the College of Arts and Sciences in 1920, the school became known as the University of Hawai'i. The campus grew slowly until the late 1950's. Through the 1960's, enrollment rose rapidly to a peak of 22,371 students in 1972. Today, UH Mānoa is a multi-dimensional institution of higher learning conducting education, research and public service programs for the state, the nation and the world community.

2.2 LOCATION

The University of Hawai'i at Mānoa is located in the island of O'ahu's Mānoa Valley. The Campus is bounded by the Mānoa, St. Louis Heights, Mō'ili'ili and McCully communities. Its principal physical borders are the Mānoa residential community on the mauka side, Wa'ahila Ridge on the Koko Head side, the H-1 Freeway on the makai side and the lower Mānoa and McCully residential communities on the 'Ewa side. The campus is approximately eight miles from Honolulu International Airport and is easily accessed from the H-1 highway *(Figure 1-1).*

2.3 ACADEMICS

UH Mānoa is a top public research university accredited by the Western Association of Schools and Colleges (WASC) and known for its diversity and excellence in academics, athletics, and community involvement.

At UH Mānoa, more than 200 degree programs through 20 colleges and schools are offered. Programs in the departments of oceanography, astronomy, international business, Pacific Islands and Asian area studies, earth science, marine biology, and library and information science are ranked among the nation's best.

The academic work of the UH Mānoa Campus is administered by these colleges and schools:

Colleges:

- Arts & Sciences
  - Arts & Humanities
  - Languages, Linguistics & Literature
  - Natural Sciences
  - Social Sciences
- Business
- Education
- Engineering
- Tropical Agriculture & Human Resources
- Outreach College

Schools:

- Architecture
- Hawaiian Knowledge
- Law
- Medicine
- Nursing & Dental Hygiene
- Ocean & Earth Science & Technology
- Pacific & Asian Studies
- Social Work
- Travel Industry Management

2.4 ENROLLMENT

Current enrollment is approximately 20,000 students. The student body consists of approximately 13,780 undergraduate and 6,220 graduate/professional students. Hawai'i (in-state) students make up about 69 percent of the student body, while 10 percent are international and 21 percent are out-of-state students. In addition to student enrollment, faculty and staff number almost 6,000. The de facto daytime population is about 30,000.

2.5 RESEARCH

UH Mānoa is one of only 13 institutions to hold the distinction of being a land-, sea-, and space-grant research institution. Classified by the Carnegie Foundation as having "very high research activity," UH Mānoa is known for its pioneering research in such fields as oceanography, astronomy, Pacific Islands and Asian area studies, linguistics, cancer research, and genetics. The National Science Foundation ranks UH Mānoa in the top 30 public universities in federal research funding for engineering and science and 49th overall. In 2007, the campus received over $209 million in research awards.

2.6 ATHLETICS

UH Mānoa offers a diverse NCAA Division I athletics program with approximately 450 student athletes on 20 men's, women's, and coed varsity teams in affiliation with the Western Athletic Conference (WAC), the Mountain Pacific Sports Federation, and the Pacific Coast Intercollegiate Yacht Racing Association. In addition to the varsity athletics program, Intramural Sports, the Fitness Center, and the Leisure Center are also offered.

2.7 CAMPUS LIFE

UH Mānoa student life offers hundreds of extracurricular recreational, cultural, and learning opportunities. Over 200-plus student clubs and organizations are dedicated to a range of themes and pursuits—from religious topics and social and political issues to arts & culture, community service, academic, and other activities. The campus offers sports & recreation opportunities including intramural and Division I varsity sports, as well as student publications and media outlets, on- and off-campus internships and employment opportunities, and study abroad programs around the world.

2.8 ALUMNI

Over 130,000 UH Mānoa Alumni reside in 50 states and more than 80 countries worldwide.

2.9 RANKINGS

The following is list of rankings provided by the University of Hawai'i, Institutional Research Office:

- Named a "Best Western College" and an "America's Best Value College" by *Princeton Review*
- The Shidler College of Business ranks among the top 20 undergraduate business schools in *U.S. News & World Report: America's Best Graduate Schools 2008*
- The William S. Richardson School of Law ranks in the top 20 for environmental law, diversity, and low student/faculty ratio according to *U.S. News & World Report: America's Best Graduate Schools 2008*. It is also the smallest law school among the top 100 law schools and ranks in the top 40 for first-time bar passage rate and lowest student debt.
- *U.S. News & World Report: America's Best Graduate Schools 2008* also ranks the John A. Burns School of Medicine geriatric medicine program 12th and the Shidler College of Business graduate program in international business 21st in the nation
- In 2007, *Princeton Review* ranked the Richardson School of Law third in the category "Best Environment for Minority Students" and fifth for "Most Diverse Faculty"
- The National Science Foundation ranks UH Mānoa in the top 30 public universities for federal research funding in engineering and science
- *U.S. News & World Report* ranks the Library and Information Science program school library media specialization among the top 10 in the nation

2.10 ACADEMIC YEAR

The academic year on the Mānoa Campus is divided into two seventeen-week semesters and a twelve-week summer session that offers two six-week terms.

In addition, the Outreach College, continuing education and summer sessions, offers evening programs which include credit and non-credit courses – three terms yearly, concerts, lectures, conferences, the John Young Museum of Art, and educational experiences designed for particular purposes or groups.

2.11 HOURS OF OPERATION

The normal hours of operation of academic activities on the Mānoa Campus are as follows:

Regular Session: 07:30am to 05:30pm (Mon-Fri)
Summer Session: 07:30am to 12:30pm (Mon-Fri)
Evening Session: 05:30pm to 10:30pm (Mon-Thu)
The hours of operation of intercollegiate athletic programs are strictly controlled by the Department of Athletics to avoid conflicts with academic activities to alleviate impacts of traffic and parking, noise, and the glare of floodlights into adjoining neighborhoods.

The designated hours of operation of the 10,000-Seat Special Events Center are as follows:

Major Events: 08:00am to 10:30pm (Sun-Thu)*
08:00am to 11:00pm (Fri & Sat)*
No Major Events: 04:00pm to 06:00pm (Mon-Fri)*
(Excluding Holidays)

*Waivers from these restrictions on hours of operation may be obtained from the Department of Land Utilization upon presentation of "strong" justification and three weeks notice.

3.0 PROJECT DESCRIPTION & JUSTIFICATION

3.0 PROJECT DESCRIPTION & JUSTIFICATION

3.1 1987 UHM LRDP

For at least three decades prior to 1987, the Mānoa Campus developed without the benefit of an approved physical development plan. A plan created by John Carl Warnecke and Associates in 1966 was approved in concept by the University's Board of Regents, but was never formally completed and adopted.

The 1987 UH Mānoa Campus Long Range Development Plan (LRDP) was commissioned to provide an organizing vision for the campus and to guide subsequent development in a manner so as to address and correct the deficiencies that were apparent after decades of unplanned growth. The LRDP was adopted by the Board of Regents in 1987 and has since served as the guiding document for campus development.

The 1987 LRDP envisioned a vital urban setting not unlike that of a successful small town. The plan proposed to reverse the existing orientation on campus from vehicles to pedestrians by proposing the removal of roads and parking facilities from the heart of the Central Campus to peripheral locations. The campus was to organize around gateways, malls, paths and plazas. The resulting plan offered significantly more landscaped areas on campus while providing for the addition of 3,000 parking spaces and approximately three million additional square feet of new construction. The design of new facilities was guided by criteria establishing height, bulk, density and character.

The 1987 LRDP received a Plan Review Use approval (PRU Resolution No. 89-411) in 1989.

3.2 1992 AMENDMENT TO THE 1987 UHM LRDP

In 1992 the University of Hawai'i amended (PRU Resolution No. 92-286) the LRDP for Mānoa with the addition of a new special events arena subsequently named the Stan Sheriff Center. Some additional minor amendments were also included during the amendment process.

3.3 1994 UHM LRDP UPDATE

The 1987 Plan anticipated that the document would require updating in five to six year intervals so as to adequately respond to changes in academic priorities, Capital Improvement Program (CIP) priorities, enrollment, environmental issues, funding, changes in the campus caused by the construction of new buildings, and other major factors influencing the campus development. This update is also necessitated by the City and County of Honolulu's requirement for Plan Review Use (PRU) approval prior to the issuance of building permits.

A comprehensive 1994 Update provided refinement to the 1987 master plan to guide the design of buildings and ensure a functional and aesthetically appropriate campus. The 1994 Plan was adopted by the Board of Regents.

3.4 2006 AMENDMENT TO THE 1987 UHM LRDP

In September of 2006 the University of Hawai'i Board of Regents approved a major amendment to the LRDP to allow for the development of Frear Hall (PRU Resolution No. 06-255).

3.5 COMPLETED PROJECTS

Projects completed or started in the last two decades are listed below:

- Agricultural Science Facilities, Phase III
- Hamilton Library, Phase III
- Hawai'i Hall Renovations
- Dole Street Parking Structure
- Hamilton Library Renovations to Phases I and II
- Webster Hall Renovations
- Spalding Hall Renovations
- Dean Hall Renovations
- Gartley Hall Renovations
- HIG Buildings Renovations
- Crawford Hall Renovations
- Center for Hawaiian Studies
- Holmes Hall Renovation
- Frear Hall
- Environmental Protection Facility
- Biogenesis Research Laboratory
- Center of Student Services
- George Hall Renovation
- Pacific Ocean Science and Technology Building
- Paradise Palm Café
- Softball Stadium
- Tennis Court Renovation
- Stan Sheriff Center
- Parking Structure IIA
- Architecture Building
- Makai Substation
- Wist Hall Annex Renovation
- Frear Hall – Replacement Dormitory

3.6 2007 UHM LRDP UPDATE

The 2007 LRDP Update builds on planning principles and concepts established in the 1987 LRDP. Its purpose is to update the Plan to reflect current and upcoming educational priorities. Future buildings and projects, with emphasis given to the next 5-10 years, are projected into the Plan. The Update also incorporates several new "Major Themes" developed through a process of consultation with the Mānoa campus administration and constituent bodies, which include students, faculty members, administrators and community representatives. This PRU Application is based on the 2007 LRDP which was adopted by the University's Board of Regents on November 15, 2007.

3.7 2007 UHM LRDP UPDATE PROPOSED PROJECTS

The 2007 LRDP Update focuses on projects that are on the six year Capital Improvement Program and/or are anticipated for development within the next 5-10 years. Refer to *Figure 3-1* and *Table 3-1* for a list of the proposed projects.

In addition to setting current and upcoming educational project priorities, the UHM LRDP 2007 Update includes a physical vision of the campus and an organizational schematic program that defines future uses of the campus. Within the LRDP, PlanBooks separate the campus into four distinct areas (Central, Upper Central, Makai, and Mauka) illustrating the design considerations for projects within these areas. The LRDP identifies building blocks, such as Arrival Areas, Gateways, Malls and Pathways, Plazas, Buildings, Landscaping, and Sustainability and Design Guidelines to define the overall relationship of the campus. Each of these building blocks are key elements, intended to provide a complete campus experience.

The 2007 LRDP Update includes guidelines to assist administrators, design consultants, campus client groups and review committees. These guidelines incorporate "best practices", national standards as well as campus specific design criteria to guide the design of future projects. The guidelines address building design, including maximum heights and widths, as well as guidelines for sustainability and landscape design. The guidelines are not intended to be prescriptive but are to assist project teams in their efforts to achieve the goals of the LRDP. The guidelines do not supercede County, State and national codes.

In addition to the acceptance of the Final EA/FONSI, a PRU amendment is needed for the 2007 UHM Update. A PRU with the City and County of Honolulu serves as a guideline for new facilities on campus. Updates to the UHM LRDP are required for PRU approval prior to the issuance of building permits.

All building projects will be designed and constructed to meet applicable codes and ordinances, rules and regulations governing the construction of facilities within the City and County of Honolulu. All frontage improvements within City right-of-ways that are required to support these projects will be constructed in accordance with City standards. The necessary permits and approvals will be secured prior to the commencement of construction, some of which are described by *Table 3-1*.

Table 3-1: UHM LRDP 2007 UPDATE Proposed Projects

Proposed Projects Within 5-10 Years	Required Agency Permits & Clearances	Project Areas
A. Kennedy Theatre Expansion	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC: EA	Building Area: 24.695 sf Floor Area: 81,800 sf Building Height: 3 stories
B. Parking Structure at Kennedy Theatre	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC: EA	Building Area: 28,000 sf Floor Area: 168,000 sf Building Height: 4 stories
C. Instruction Building at Henke Hall Site	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials DLNR/US NPS: Historical Review	Building Area: 20,862 sf Floor Area: 125,000 sf Building Height: 6 stories
D. Campus Center Expansion to Northeast	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC: EA/EIS or NEPA EHSO: Hazard Materials DLNR/US NPS: Historical Review	Building Area: 37,500 sf Floor Area: 75,000 sf Building Height: 2 stories
E. Law School Library Expansion	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC: EA EHSO: Hazard Materials	Building Area: 64,000 sf Floor Area: 141,516 sf Building Height: 2 stories
F. I.T.S. - Bilger Hall Addition, Phase II	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials	Building Area: 10,300 sf Floor Area: 70,000 sf Building Height: 7 stories
G. Research Space - Infill South Courtyard of Biomedical Building	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC: EA	Building Area: 10,265 sf Floor Area: 28,004 sf Building Height: 2 stories
H. Klum Gym Replacement	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials DLNR/US NPS: Historical Review	Building Area: 30,000 sf Floor Area: 30,000 sf Building Height: 1 story *Note: within existing athletic/HPER complex
I. Instruction Building - College of Education	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials	Building Area: 75,000 sf (total footprint for 5 buildings) Floor Area: 225,000 sf Building Height: 3 stories

Plan Review Use

J. Media Facilities at KHET Site	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC: EA EHSO: Hazard Materials	Building Area: 40,000 sf Floor Area: 125,000 sf Building Height: 3 stories
K. Parking Structure IIB/Bookstore	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials	Building Area: 87,500 sf Floor Area: 350,000 sf Building Height: 4 stories
L. Faculty Housing - Wa'ahila Ridge or Mauka Campus	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials	Building Area: 100,000 sf Floor Area: 300,000 sf Building Height: 3 stories
M. Research Buildings – North and East of Biomedical Building	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials	Building Area: 40,000 sf Floor Area: 200,000 sf Building Height: 5 stories
N. Research Buildings - Mauka Campus	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials	Building Area: 100,000 sf Floor Area: 200,000 sf Building Height: 2 stories
O. Johnson Hall - Replacement Dormitory	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials	Building Area: 17,000 sf Floor Area: 68,000 sf Building Height: 4-5 stories
P. Hale Noelani - Replacement Dormitory	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials	Building Area: 38,000 sf Floor Area: 340,000 sf Building Height: 9 stories
Q. School of Hawaiian Knowledge	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials	Building Area: 23,625 sf Floor Area: 165,375 sf Building Height: 16 stories
R. Transitional Space Building	DPP: PRU Amendment, Building, Grading, Sidewalk/Driveway, Sign Permits DOH: NPDES Permit OEQC or NEPA: EA/EIS EHSO: Hazard Materials	Building Area: 25,000 sf Floor Area: 50,000 sf Building Height: 2 stories

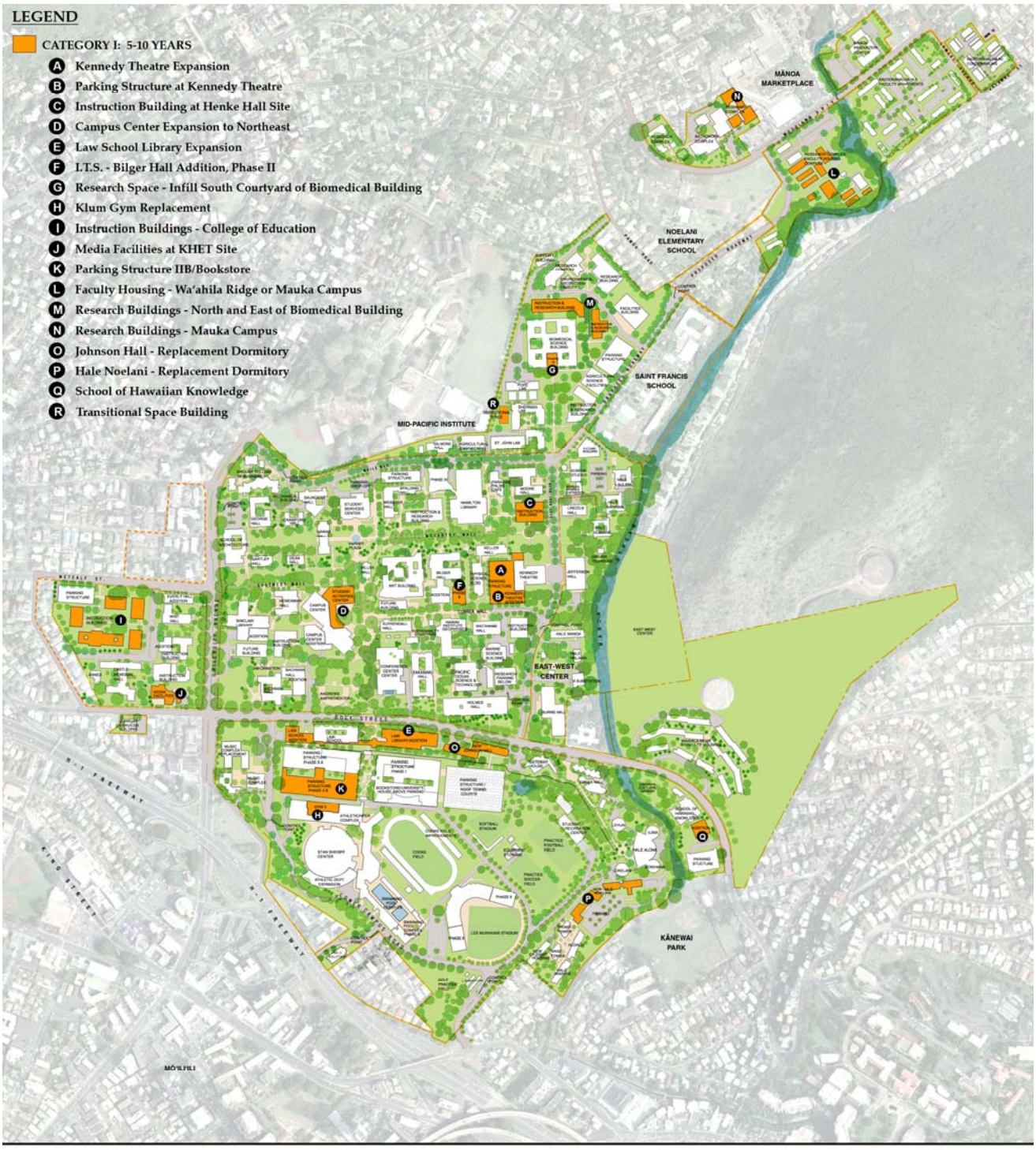


FIGURE 3-1: UHM LRDP 2007 Update Map

Proposed buildings and projects are as follows:

A: Kennedy Theatre Expansion

Kennedy Theatre is proposed to be expanded to include additional studio, rehearsal, classroom, hops, performance and theatre spaces. The proposed addition will occur on both sides of the Kennedy Theatre and to the rear of the building. The proposed addition will not significantly affect any other existing facilities.

According to the LRDP design criteria, the height of the additions on each side of Kennedy Theatre should be limited to three-stories and the rear addition should be limited to five-stories. The design of the addition should respect and relate to the architecture of Kennedy Theatre. A plan combining the Kennedy Theatre addition and the parking structure into a single building is an alternative. Parking would occupy the lower floors and the Kennedy Theatre addition would occupy the upper floors. All of the design criteria would apply including car count, height limits, setbacks and the overall building footprint. Refer to *Figures 3-1 to 3-8*.



FIGURE 3-2: Kennedy Theatre Existing Site

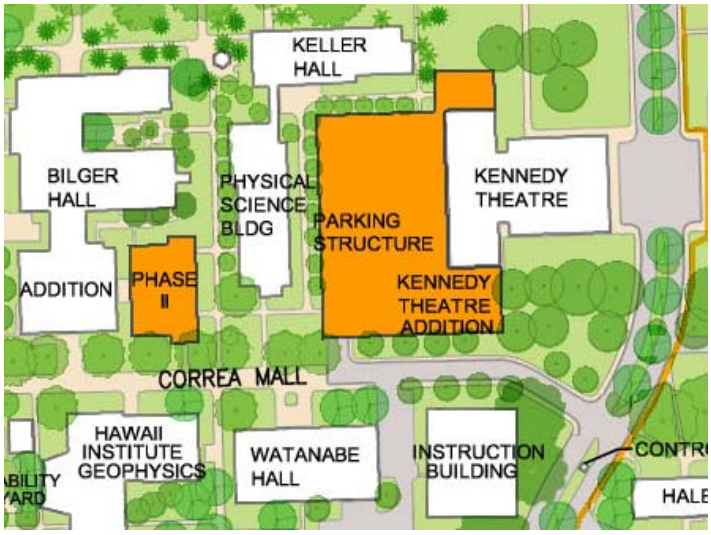


FIGURE 3-3: Kennedy Theatre Plan

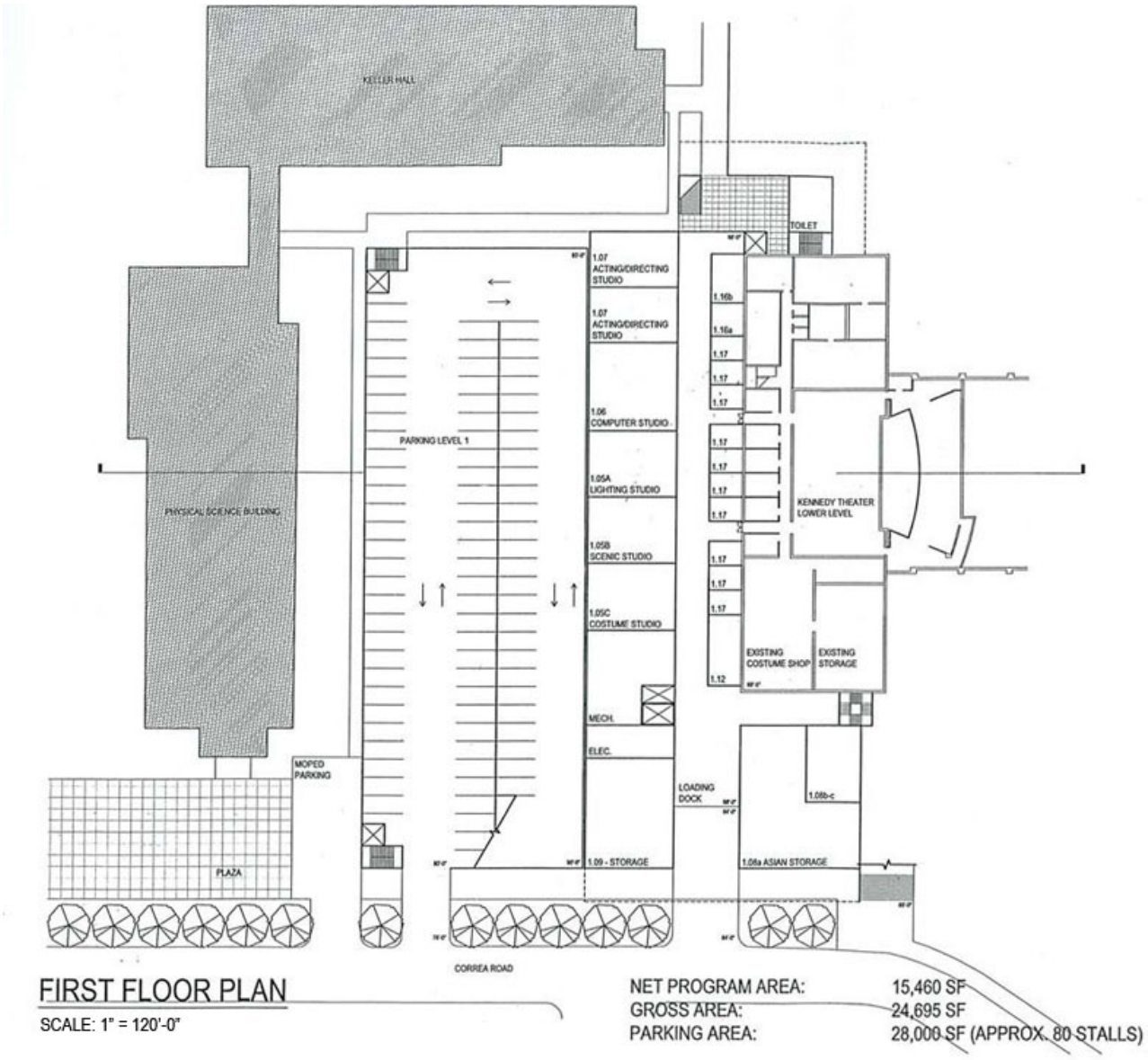


FIGURE 3-4: Kennedy Theatre First Floor Plan

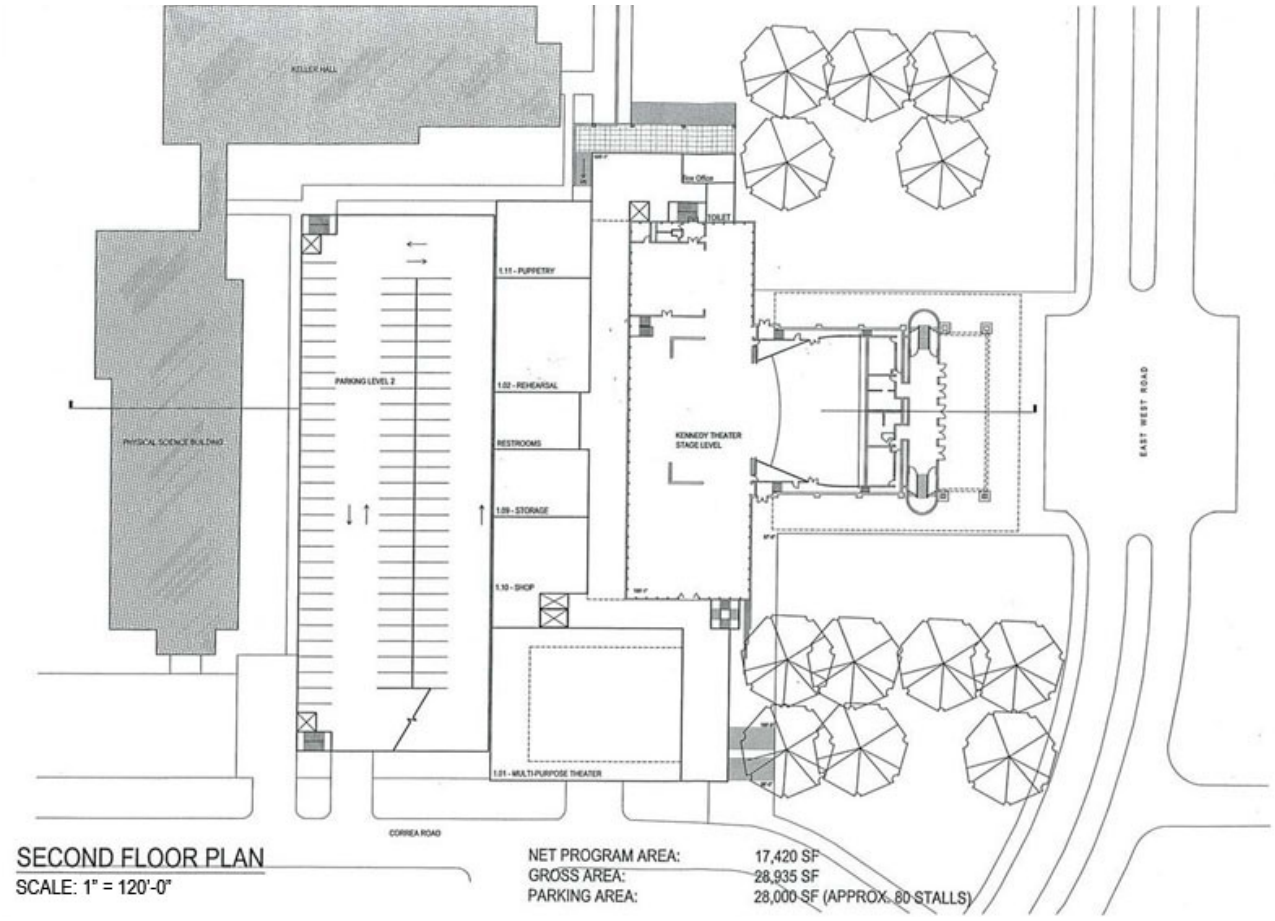


FIGURE 3-5: Kennedy Theatre Second Floor Plan

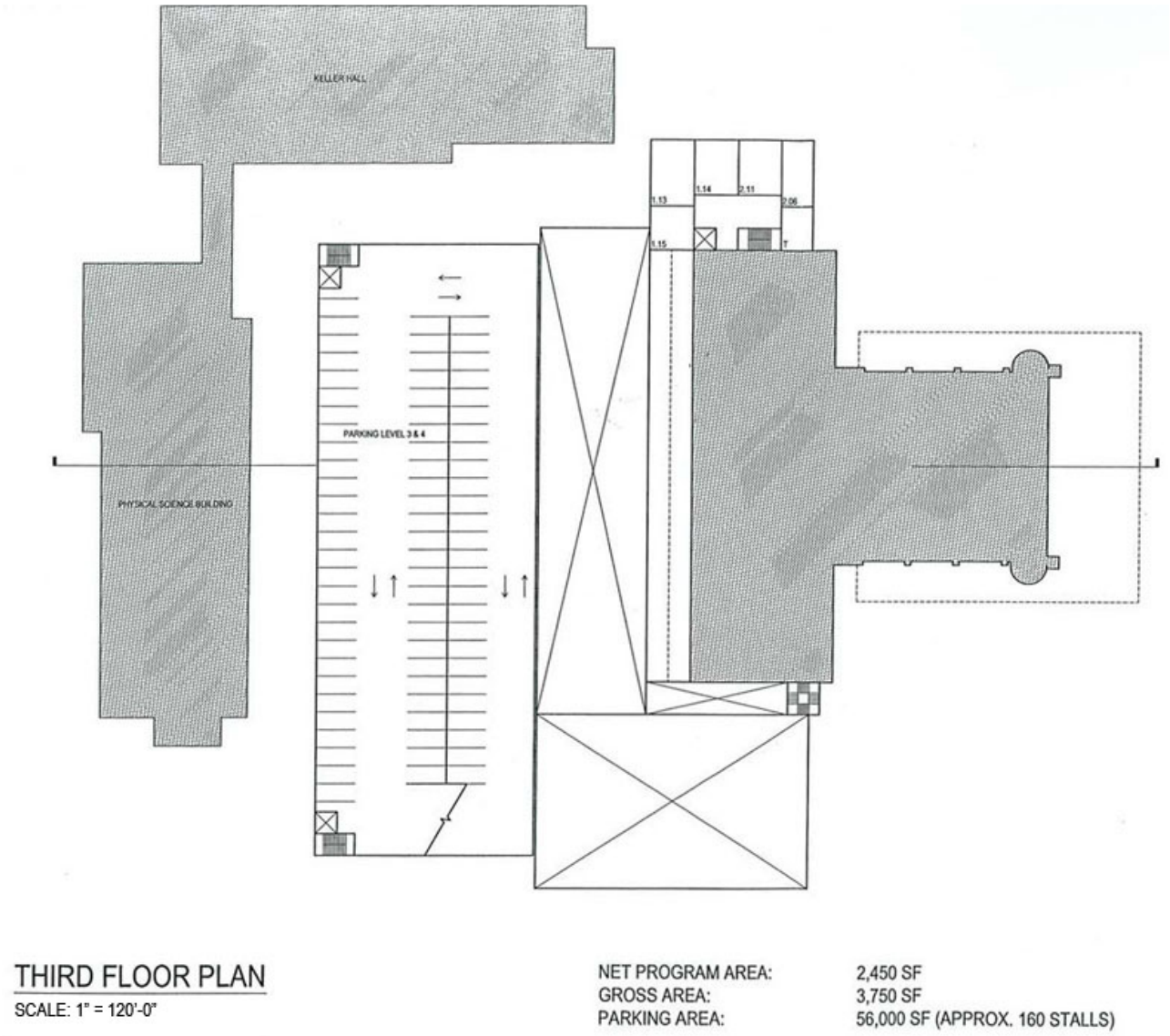


FIGURE 3-6: Kennedy Theatre Third Floor Plan

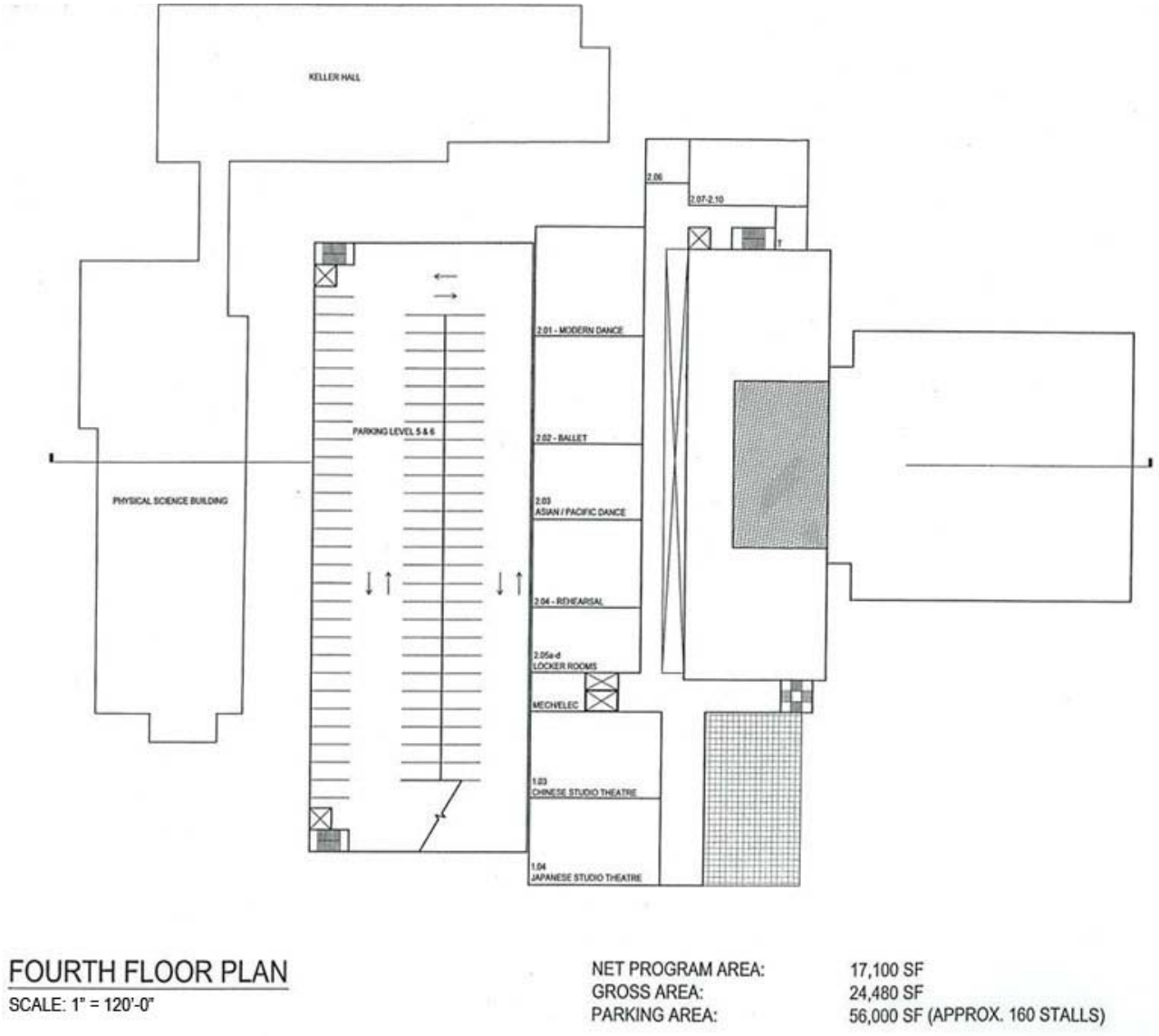


FIGURE 3-7: Kennedy Theatre Fourth Floor Plan

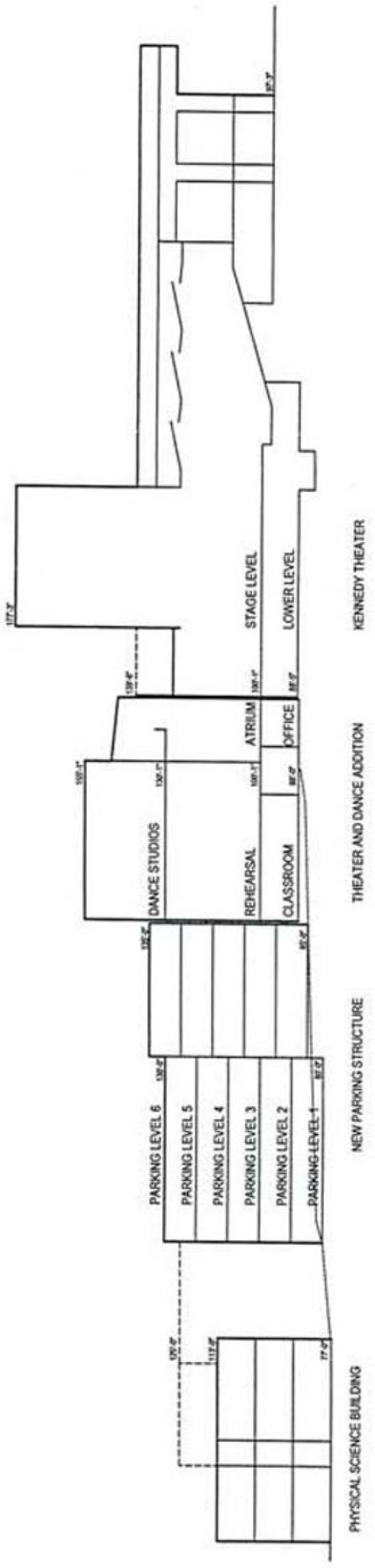


FIGURE 3-8: Kennedy Theatre Building: Section Plan

B: Parking Structure at Kennedy Theatre

An existing parking lot behind Kennedy Theatre can accommodate 142 cars. This lot is intensively used throughout the day and evening because of its central location within 100 yards of Hamilton Library and within 300 yards of the Campus Center. Due to the demand for parking in this area, the plan calls for the existing lot to be replaced with a six-story structure with a basement, including four floors of parking and three floors of classroom, studio and performance space. The proposed structure will provide approximately 480 stalls, or triple the amount of existing parking at this location.

Design criteria established by the LRDP for the proposed parking structure states that the maximum height should not exceed one (1) floor above Keller Hall. The visual impact of the structure will be minimized on three sides by the presence of Keller Hall and the Physical Science Building as well as the proposed Kennedy Theatre Expansion. However, the makai end of the proposed parking structure will be visible from Correa Mall. Therefore, the makai facade of the structure will be articulated to be part of the Kennedy Theatre facade. In addition, the façade will be screened by trees designated along Correa Mall. Also, a minimum of 25 feet of open space will be retained between the proposed parking structure and Keller Hall and the Physical Science Building and the makai end of the proposed parking structure will not extend more than 50 feet beyond the makai end of the Physical Science Building. This area will also be landscaped with trees. Additional design criteria is also established for open space, landscape design, moped and bicycle parking, consideration of noise and fumes impacts, natural ventilation and lighting aspects, and alternative designs. Refer to *Figure 3-2 through 3-8*.

C. Instruction Building at Henke Hall Site

A new Instruction Building is proposed to be located on the site of the existing Henke Hall. According to the LRDP design criteria, the proposed building will not exceed seven floors and will be designed as a distinctive structure to help define the mauka boundary of the East-West Gateway and McCarthy Mall. A historic sites review of Henke Hall will be completed before demolition and redevelopment of the site commences. Refer to *Figures 3-9 to 3-12*.

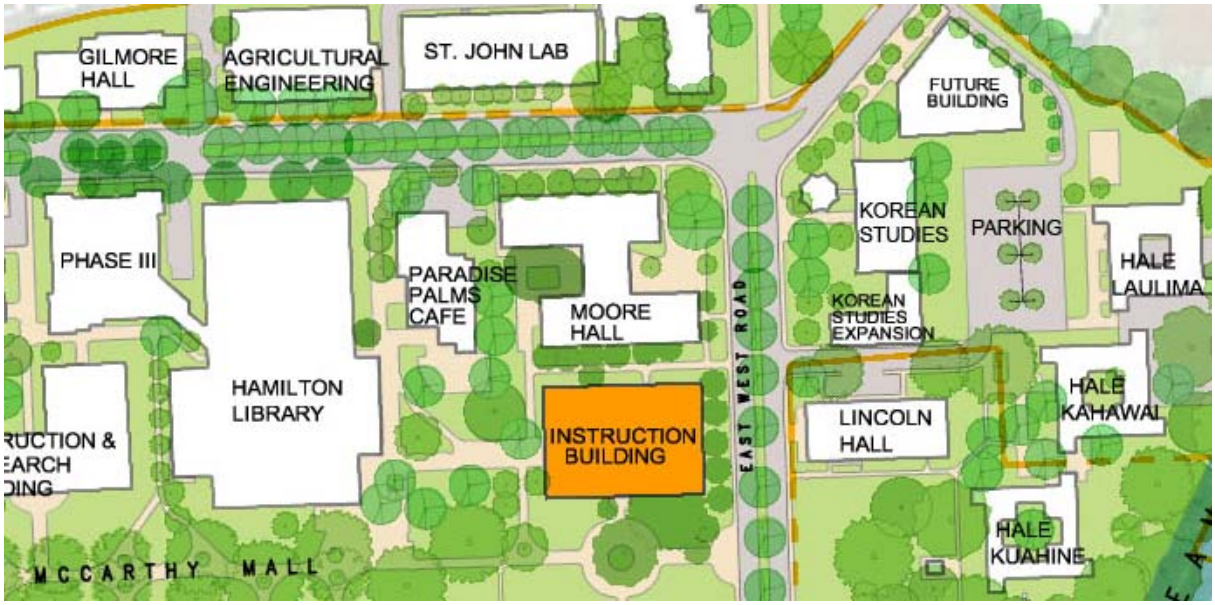


FIGURE 3-9: Instruction Building at Henke Hall Plan



FIGURE 3-10: Existing Henke Hall Site



FIGURE 3-11: Rendering of Henke Hall Site

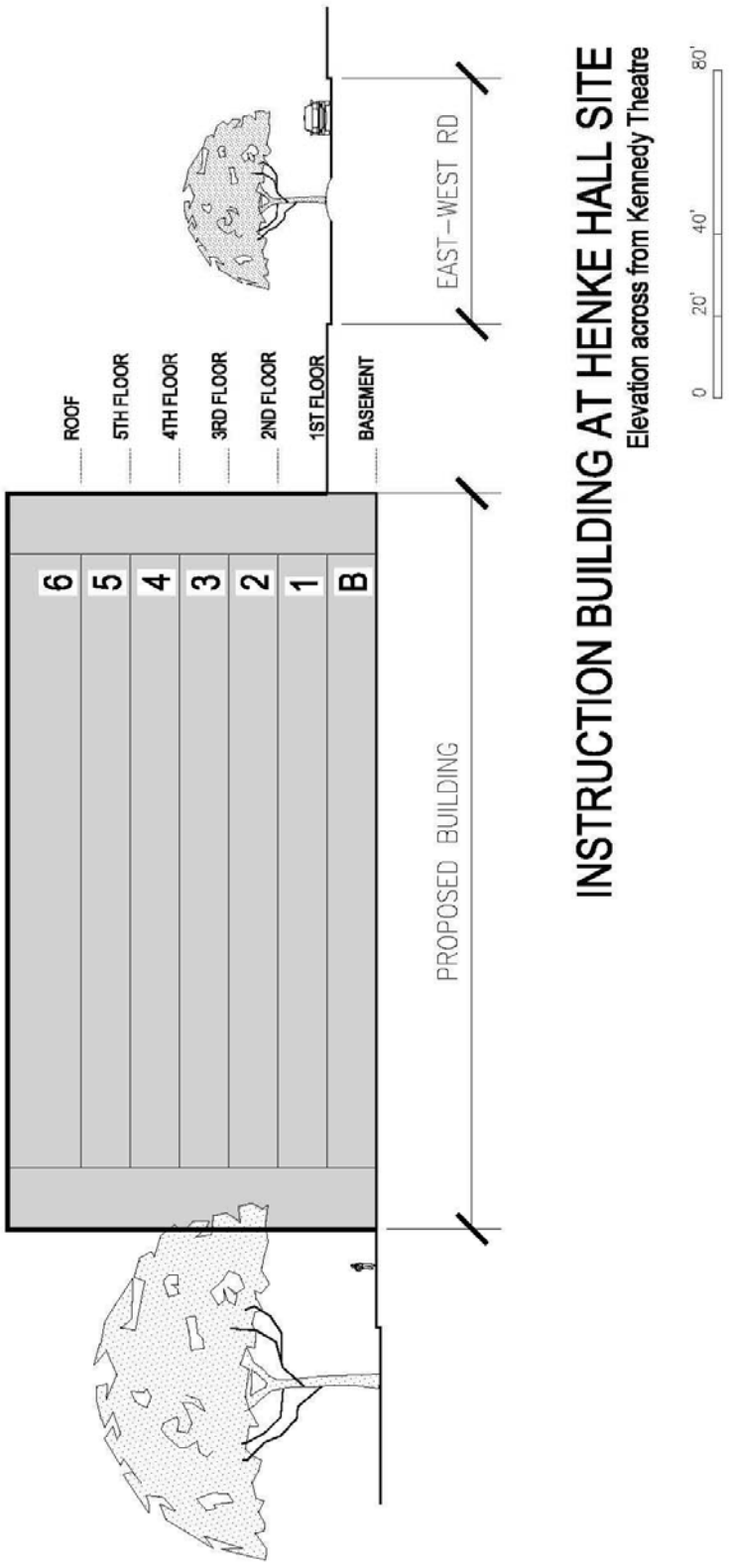


FIGURE 3-12: Henke Hall: Building Elevations

D. Campus Center Expansion to Northeast

This proposed project is intended to include the expansion of the student activities center for campus users. This expansion to the mauka side of existing Campus Center building will connect with and play a key role in the development of the Campus Center Plaza. Portions of the old Campus Center will be demolished as part of this project. Historic sites assessments of the old Engineering Quadrangle will be reviewed and evaluated before designs of the Campus Center Expansion are finalized. Design criteria established by the LRDP states that the height of the Campus Center Northeast Expansion should be no higher than the roof of the existing ballroom. Additional design criteria is also established for pedestrian arcades, the basement and ground floor inclusion, a courtyard, the mauka façade design and the Campus Center Plaza design. Refer to *Figures 3-13 to 3-15*.



FIGURE 3-13: Campus Center: Northeast Existing Site

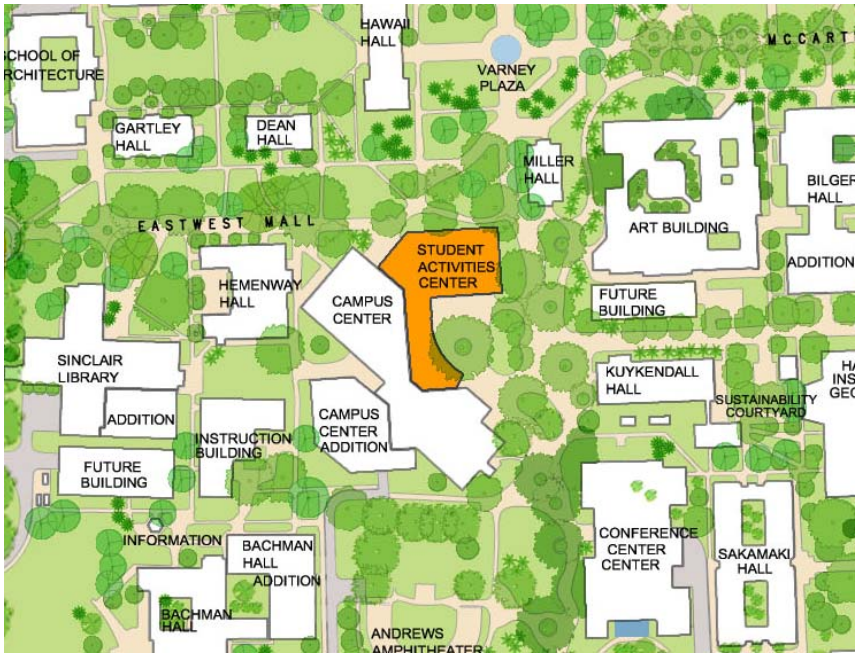


FIGURE 3-14: Campus Center: Northeast Plan

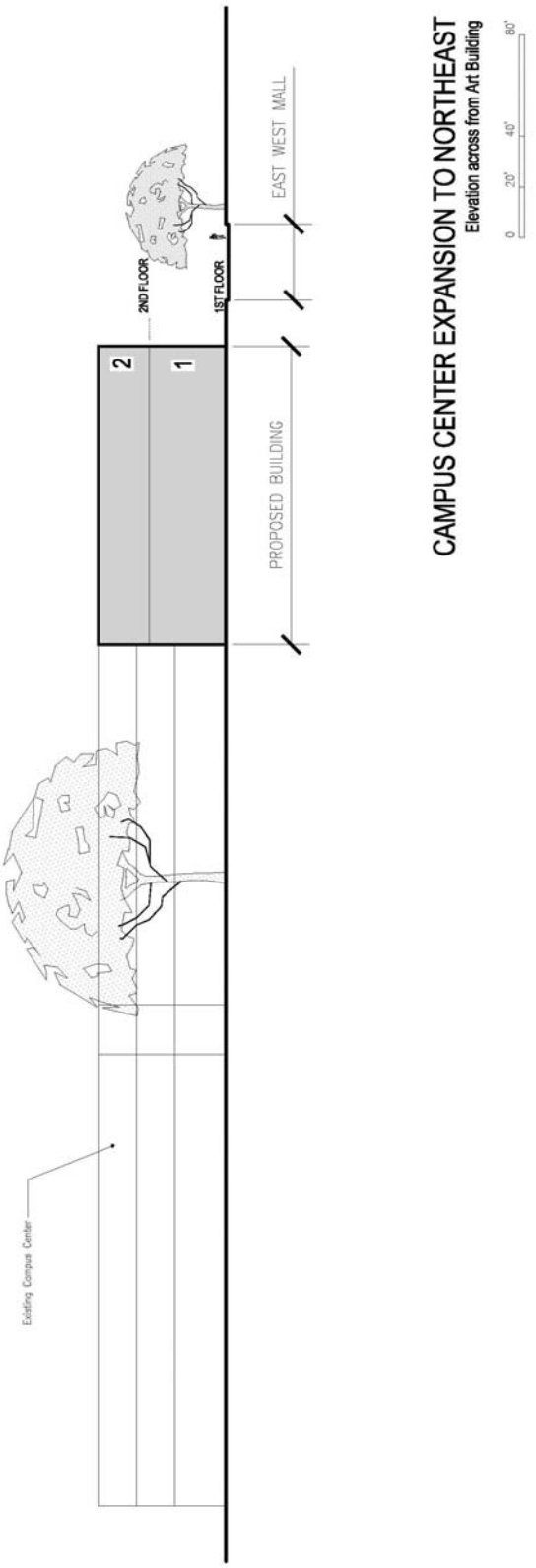


FIGURE 3-15: Campus Center Expansion to Northeast: Building Elevations

E. Law School Library Expansion

The expansion of the Law School Library is an opportunity to upgrade and unify the entire facility to provide a modern library space that accommodates new interactive forms of teaching and learning for both students and faculty. In addition, the improvements will accommodate the heavy pedestrian traffic between the quarry parking structure and Dole Street.

The LRDP design criteria for the proposed project, includes expansion of the structure to two-stories to allow for a functional connection of the two sides of the existing complex, modification of the existing facilities to appear more open and accessible, enhancement of the entrance to the Law School, modification of the existing court, pedestrian access between the quarry parking structure and Dole Street accommodation and gateway design influence. Landscape design criteria is also defined. Refer to *Figures 3-16 to 3-21*.

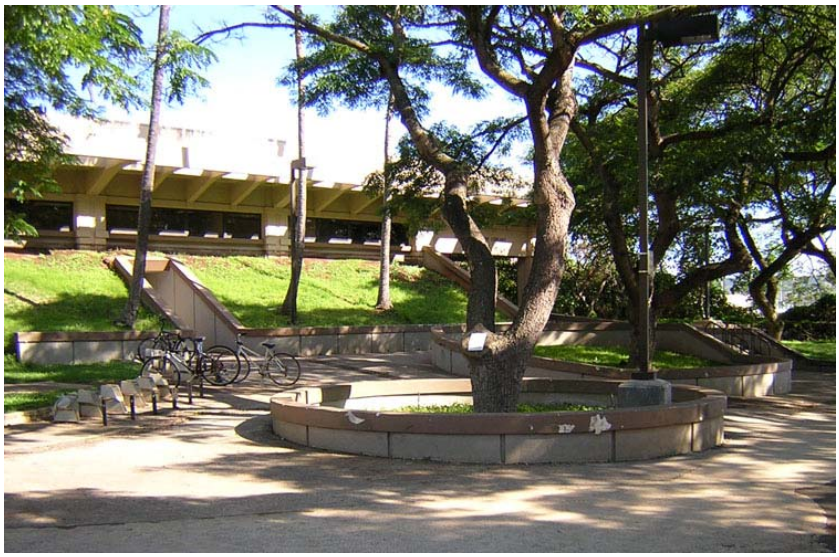


FIGURE 3-16: Law School Library Existing Site



FIGURE 3-17: Law School Library Plan



FIGURE 3-18: Rendering of Law School Library Plan Entry Courtyard



FIGURE 3-19: Rendering of Law School Library Plan Guest Entry



FIGURE 3-20: Law School Library Site Plan

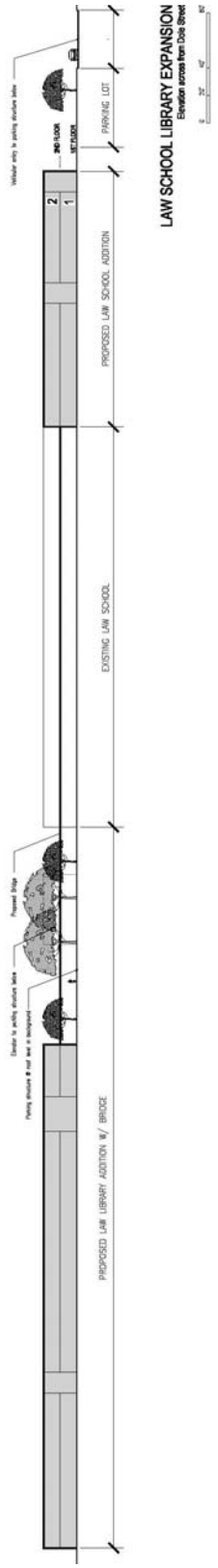


FIGURE 3-21: Law School Library Expansion: Building Elevations

F. I.T.S. - Bilger Hall Addition, Phase II

The site proposed for the I.T.S. Addition to Bilger Hall is currently an at-grade parking lot between Bilger Hall, Physical Science Building and Correa Mall. The proposed Phase II structure is intended to provide approximately 70,000 square feet in seven-stories to house system-wide information technology infrastructure such as data/telecommunications, infrastructure, IT public services facilities, and administrative and staff office spaces that are presently scattered in 8 separate locations on and off campus.

Design criteria established by the LRDP states that the addition will be seven-stories in height, with a basement, and a footprint of approximately 10,300 square feet. In order to be consistent with existing landscaping along Correa Mall, canopy trees and a large setback will be the dominant features along the makai side of the building. In addition, an arcade system on the ground floor will help maintain open pedestrian access to the adjoining buildings. Refer to *Figures 3-22 to 3-24*.

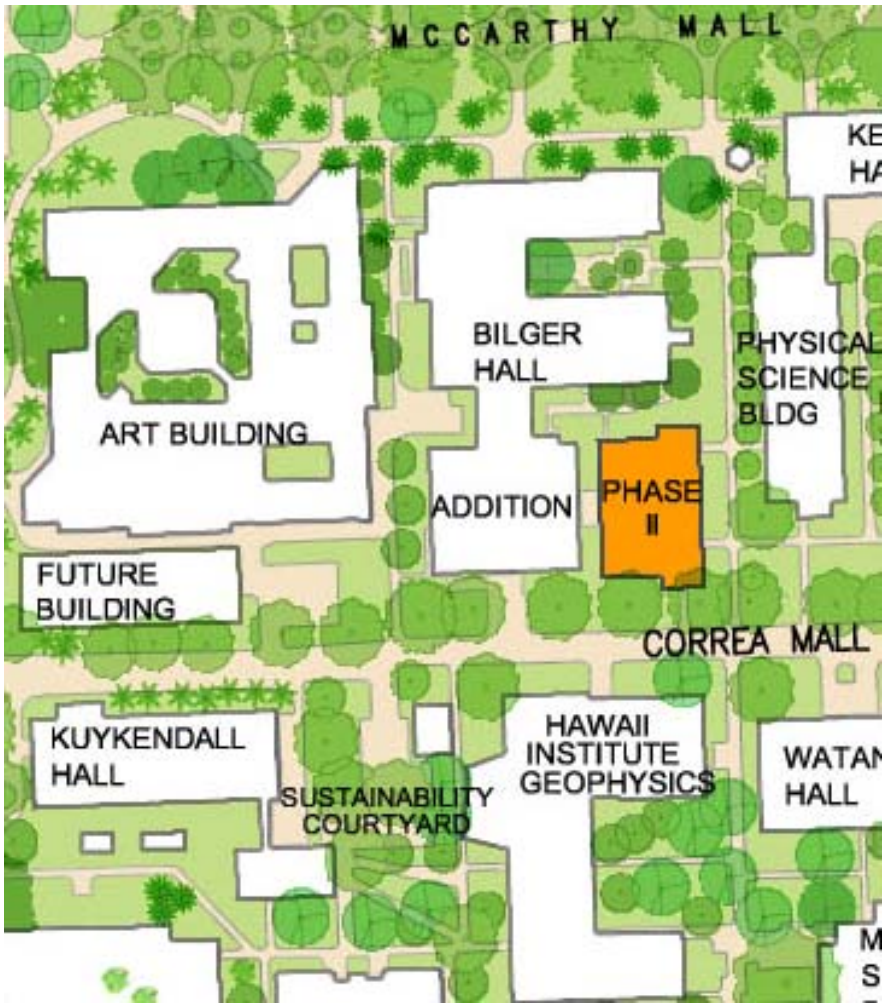


FIGURE 3-22: I.T.S. – Bilger Hall Addition Plan

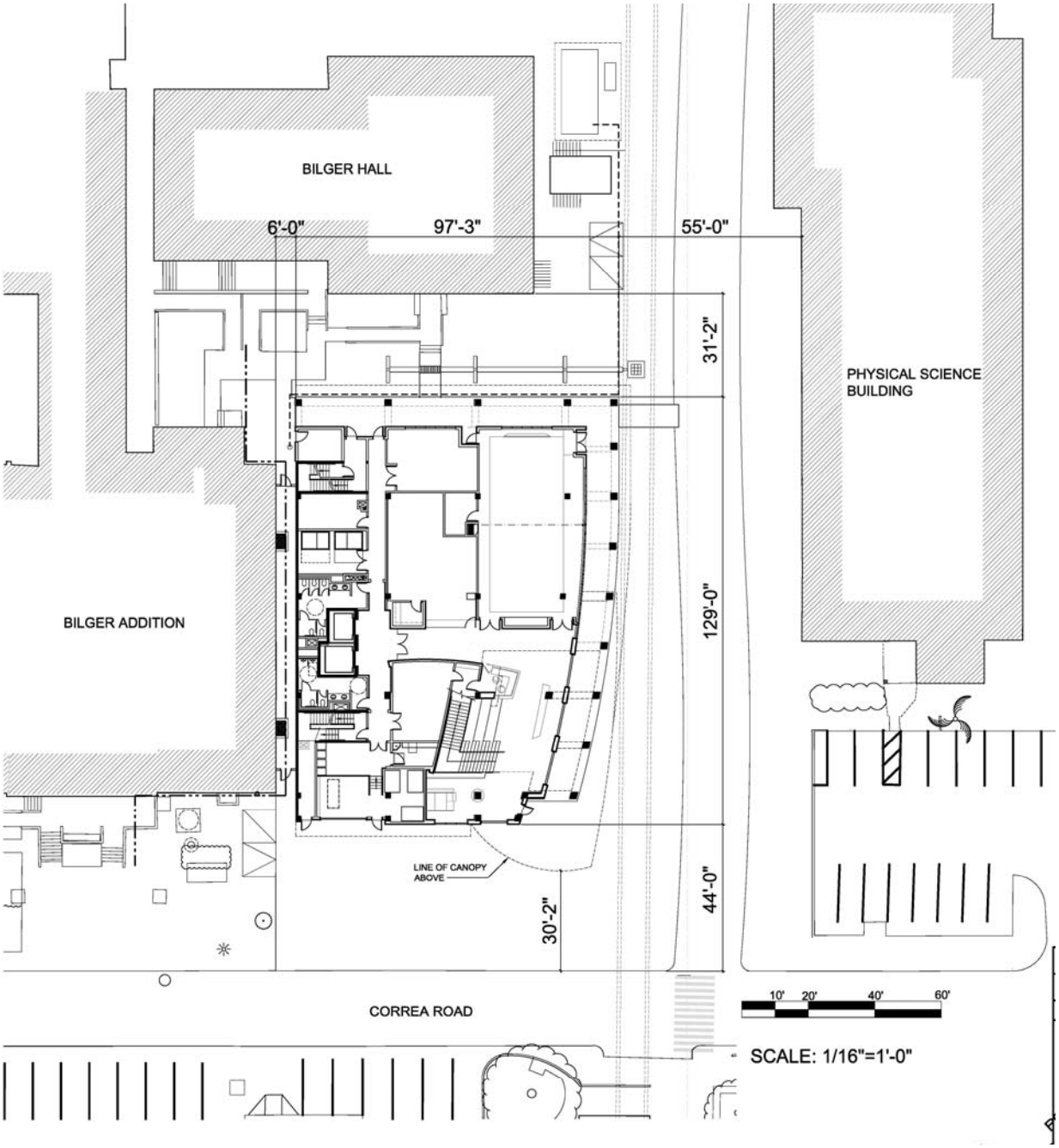


FIGURE 3-23: I.T.S. – Bilger Hall Addition Site Plan

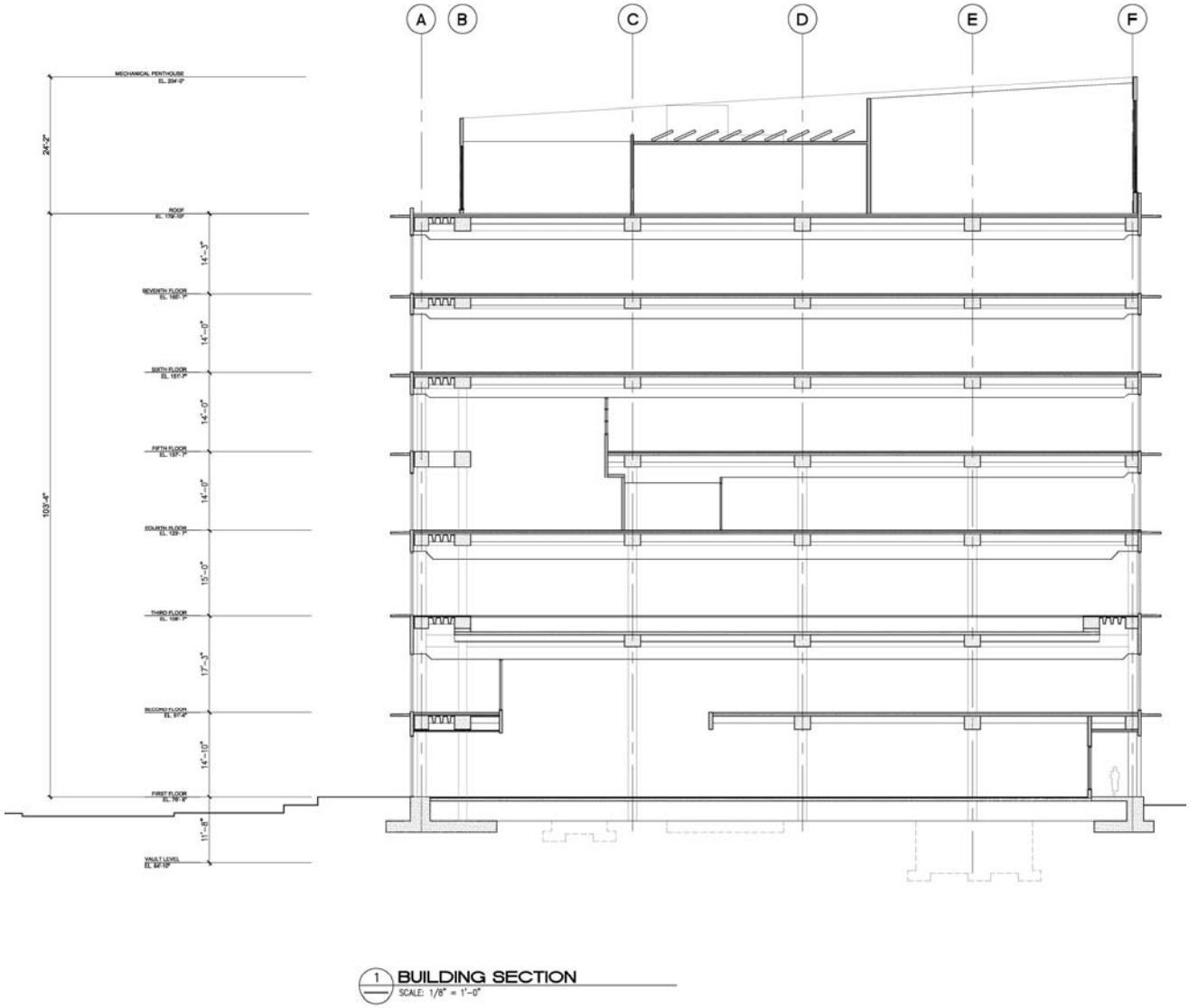


FIGURE 3-24: I.T.S. – Bilger Hall Addition: Section Plan

G. Research Space - Infill South Courtyard of Biomedical Building

The Research Space - Infill South Courtyard of Biomedical Building project, known as the Center for Microbial Oceanography Research and Education (C-MORE) Building, is currently undergoing construction. The C-MORE Building is intended to accommodate the needs of on-going microbial oceanography research and education, expanding the health/biological sciences facilities to include research laboratories, offices, classrooms, conference rooms, meeting spaces, laboratory support and building support spaces. Located within the south entrance courtyard of the existing Biomedical Science Building, the project will be a significant feature in the development of the Upper Campus Center. The 28,004 square foot research space will be a two-story structure with a roof that contains a penthouse area for mechanical equipment. The two-story limit on the building height meets the design criteria standards set in the 2007 LRDP Update. Design criteria states that the architectural character of the building should be compatible with the character and accessibility of the existing building. The structure creates a new gateway to the Biomedical Building fitting with its surroundings. The project also include the renovation of the existing courtyard with landscape pavers and a variety of new planting to create a welcoming and pleasant outdoor meeting, study and informal gathering space, which is also consistent with design criteria, set by the LRDP. In addition, food service is expected to be provided on the ground floor, making the refurbished courtyard an excellent space for casual dining in a café like setting for students, faculty and visitors. Refer to *Figures 3-25 to 3-29*.



FIGURE 3-25: Research Space – Infill South Courtyard of Biomedical Building Plan (C-MORE Building)



FIGURE 3-26: Biomedical Building Site



FIGURE 3-27: Rendering of C-MORE Building

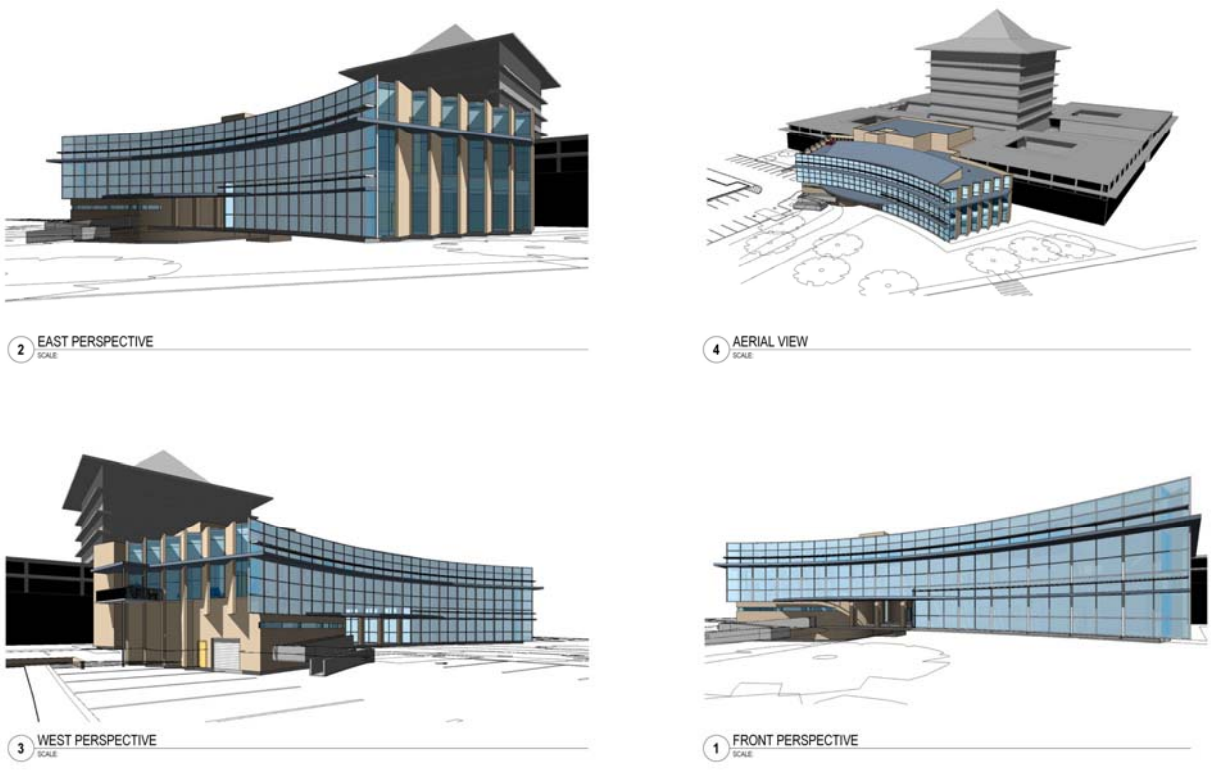


FIGURE 3-27: C-MORE Building 3-D Study View

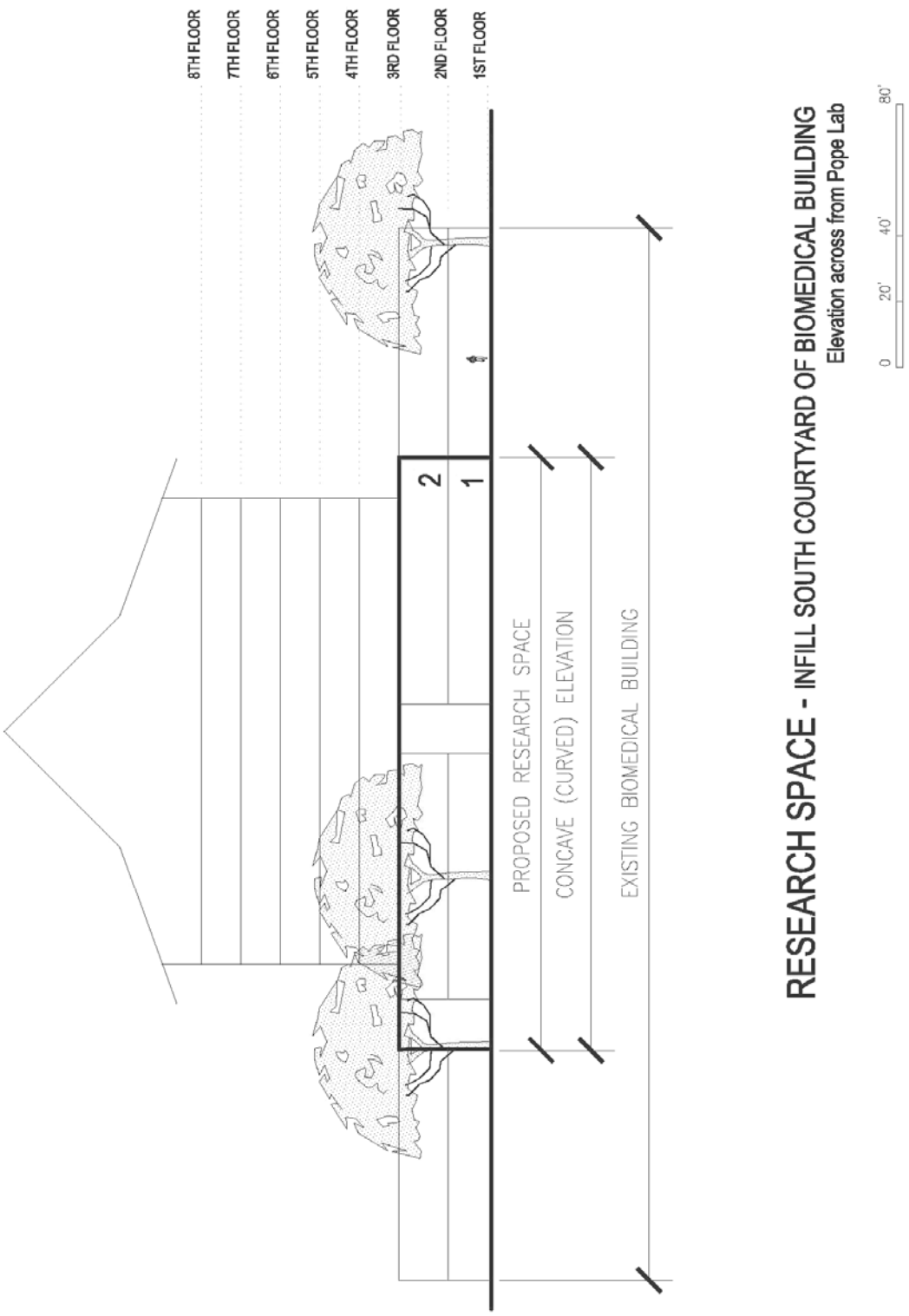


FIGURE 3-29: Research Space – Infill South Courtyard of Biomedical Building (C-MORE Building): Building Elevations

H. Klum Gym Replacement

Before the Phase IIB Parking Structure is developed, Klum Gym will need to be demolished and its functions relocated to other facilities within the Makai Campus. Refer to *Figures 3-30 and 3-31*.

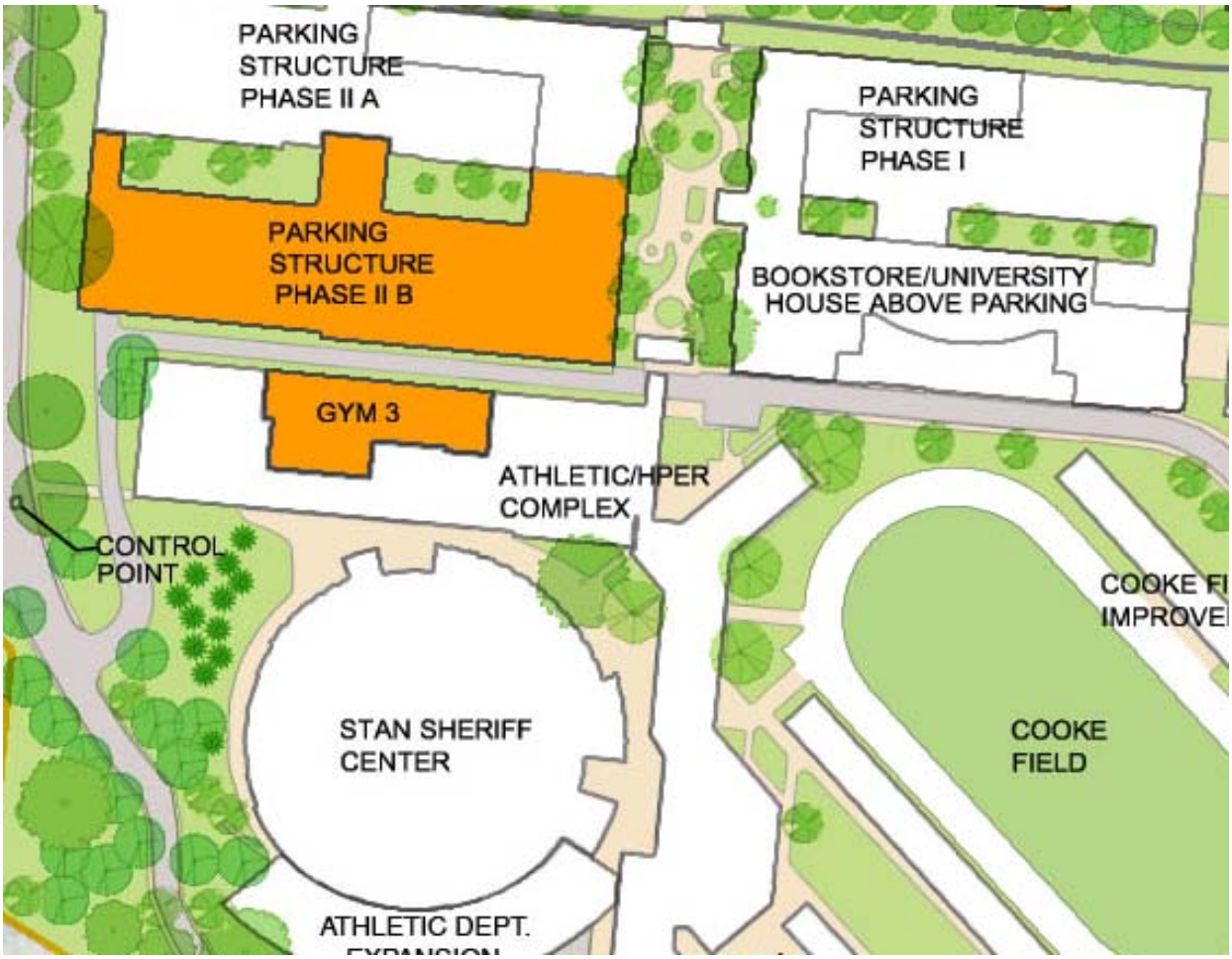


FIGURE 3-30: Klum Gym Replacement Plan

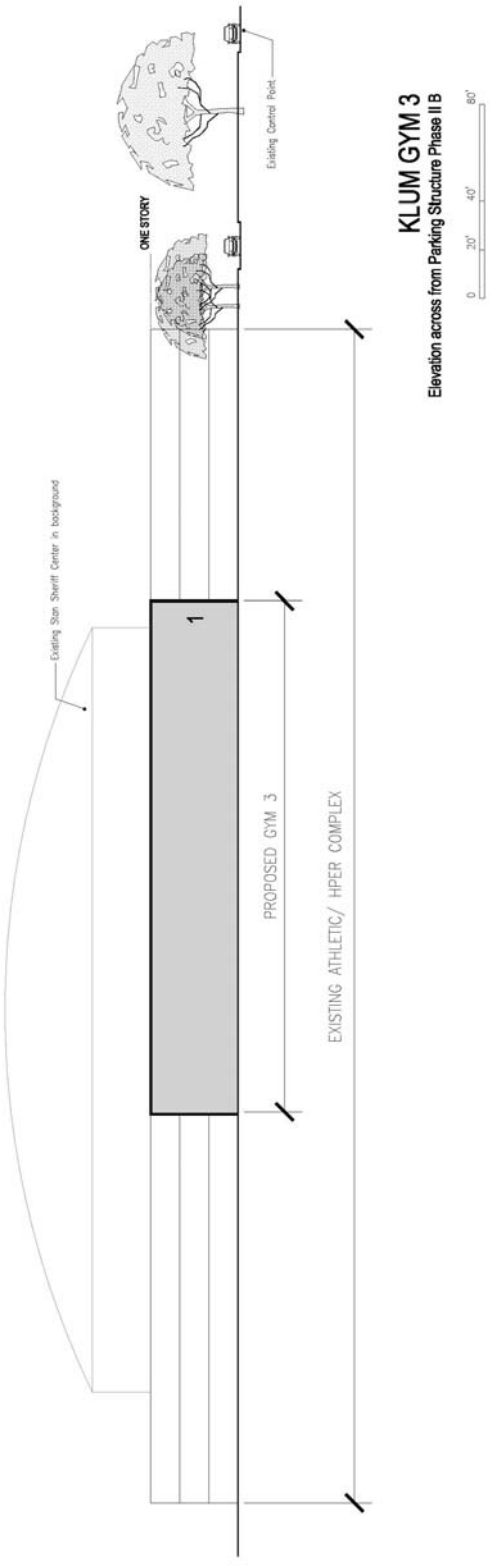


FIGURE 3-31: Klum Gym Replacement: Building Elevations

I. Instruction Buildings - College of Education

The College of Education Site occupies an area of approximately 15 acres and is bordered by Metcalf Street, University Avenue, Dole Street, and residences along Ho'onanea Street. There is an approximately 30-foot elevation change between the mauka and makai portion of the site. The intent for the site is to build five new instruction buildings, generally not to exceed three-stories in height, organized around quadrangles and courts. The buildings bordering the quadrangle will be linked together by arcades. Other buildings on the Site will be connected by a system of pedestrian streets.

Design criteria established by the LRDP states that the new Instruction Building will be organized around quadrangles and courts and linked together by arcades and a system of pedestrian streets. In addition, new buildings should generally not exceed three-stories in height. Existing parking facilities in the middle of the site will be eliminated, and a parking structure will be located along the Ewa boundary of the site. By taking advantage of topographical conditions, it will be possible to build a two-level parking structure with only the top level visible from Metcalf Street. The parking structure will be set back from the street and landscaped. Proper setbacks from nearby residential properties will be observed. Refer to *Figures 3-32 to 3-34.*



FIGURE 3-32: College of Education Existing Site



FIGURE 3-33: College of Education Plan

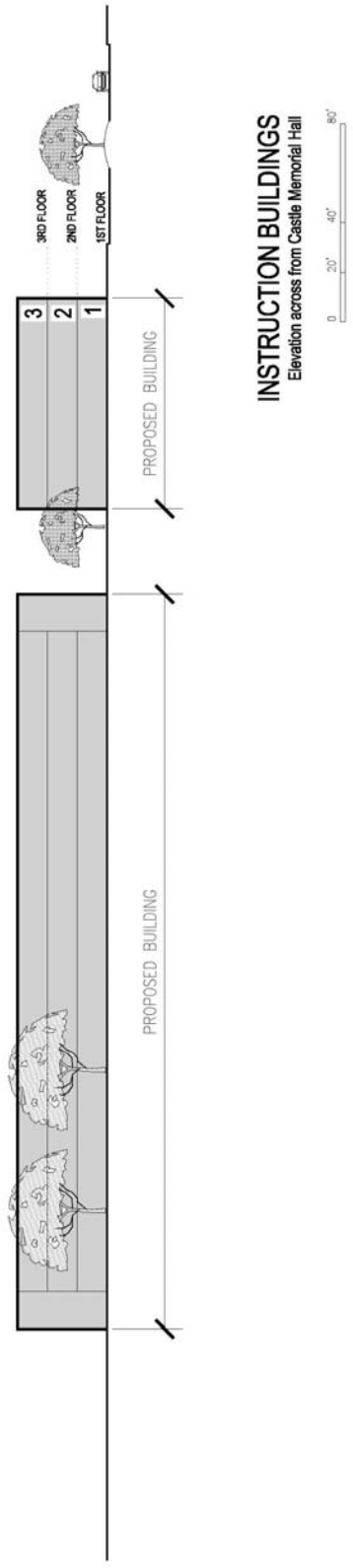


FIGURE 3-34: Instructional Building - College of Education: Building Elevations

J. Media Facilities at KHET Site

As technology keeps changing telecommunications instruction needs to keep up. The existing facilities at the KHET site will undergo a major renovation at and around the current location to meet their changing program and curricular needs. Refer to *Figures 3-35 and 3-36*.

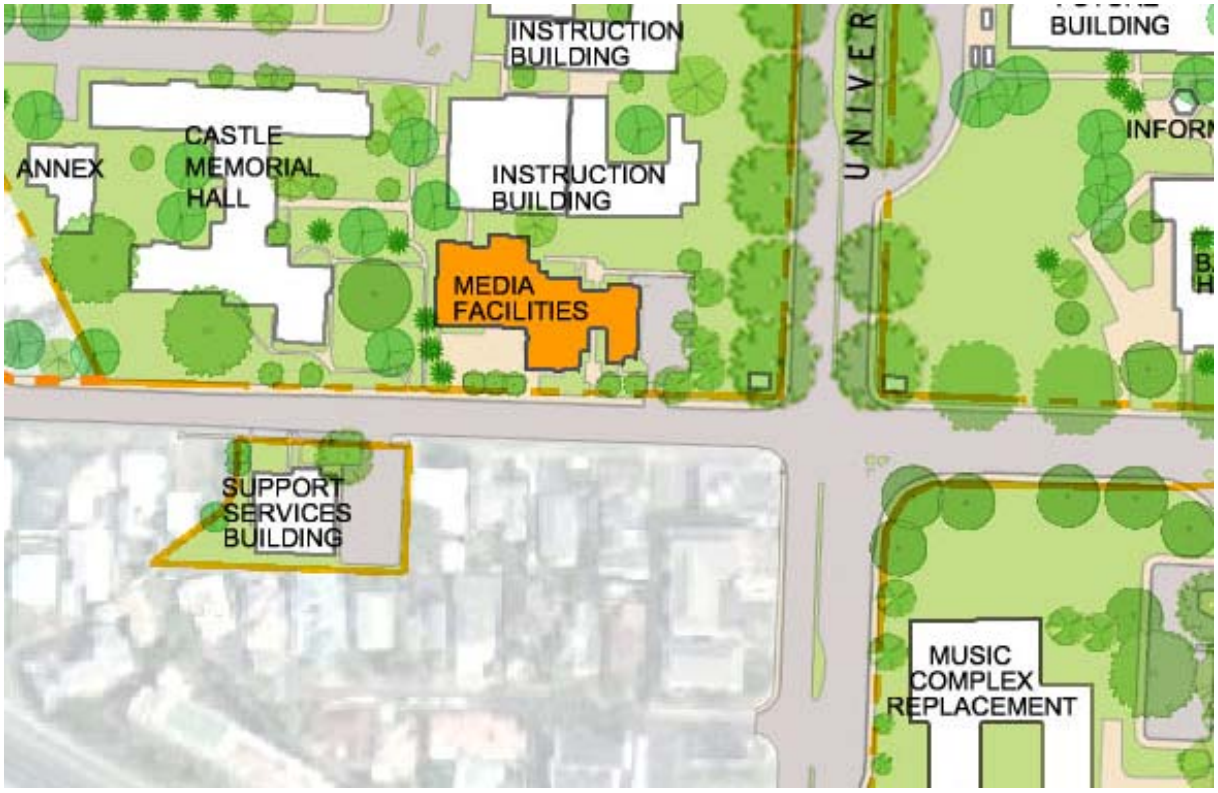


FIGURE 3-35: Media Facilities at KHET Plan

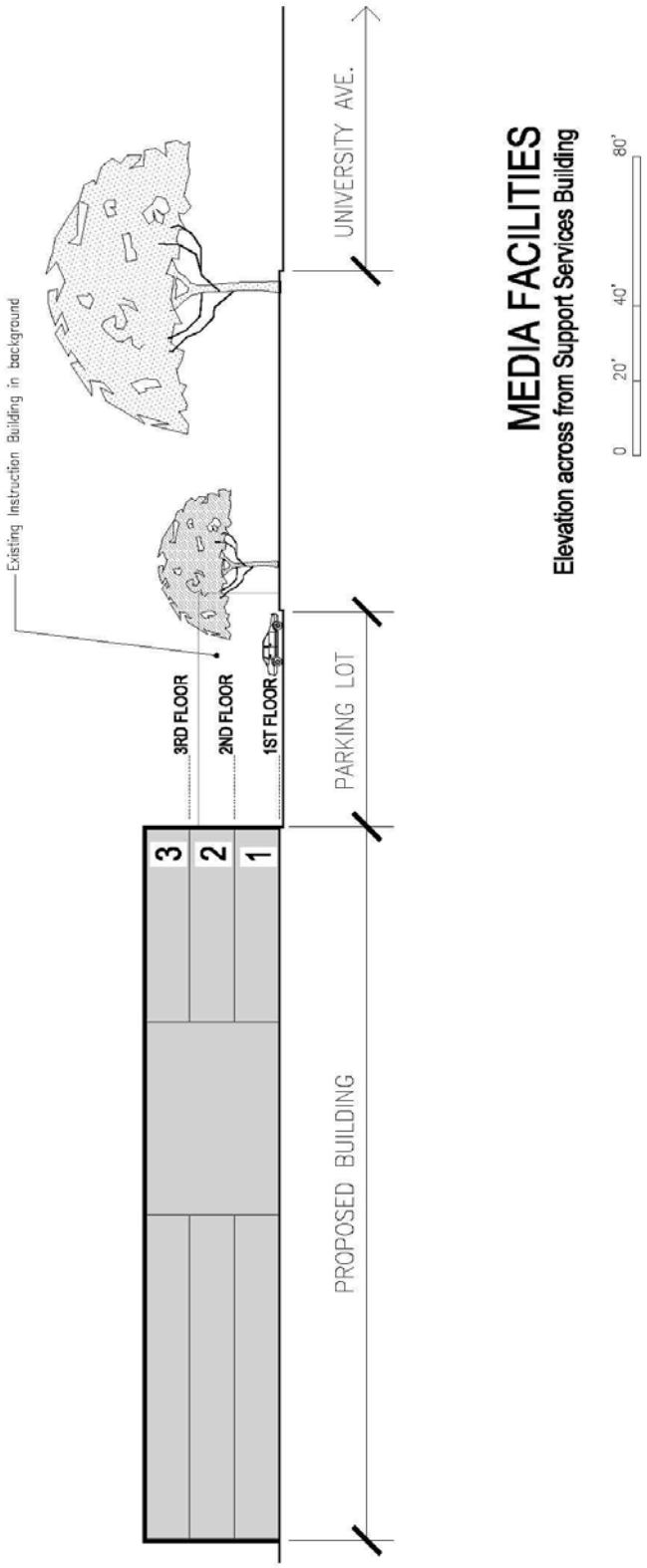


FIGURE 3-36: Media Facilities at KHET Site: Building Elevations

K. Parking Structure IIB/Bookstore

Parking Structure Phase IIB is proposed to provide 900 stalls of parking. According to design criteria defined by the LRDP, the height of the proposed parking structure will be identical to that of Phase I (no higher than the cliffs on the mauka portion of the Makai Campus) and Phase IIA. The structure will be built using a sloped ramp system with a general use top deck. Phase IIB will provide a new ramp circulation system for both Parking Structures (Phases I and II). A 3-lane ramp with a reversible center lane will be constructed along the makai edge of the Parking Structures which will join the Lower Campus Road near the Music Complex. To reduce congestion during peak hours, a new entry will be constructed along the Koko Head end of the existing Parking Structure. The Parking Plans (2008-2009 Parking Permit Zone Map) in *Appendix D* provide parking facility dimensions and configurations for Parking Structure Phase I. The Parking Structure Phase IIB will be of a similar configuration and dimension since it is the final phase of the planned structure and will complete the fourth modular section of the main parking structure for the campus.

A dedicated walkway system will be provided within the proposed Parking Structure and should be designed to include open, landscaped interior courts. Design may provide a landscaped façade or possible athletic playing field. Development of the Law School Expansion, Parking Structure IIB, and Student Housing in the Quarry area might stimulate a development of a bookstore branch, campus offices, meeting areas, and the long discussed University Club at this site. Refer to *Figures 3-37 and 3-38*.

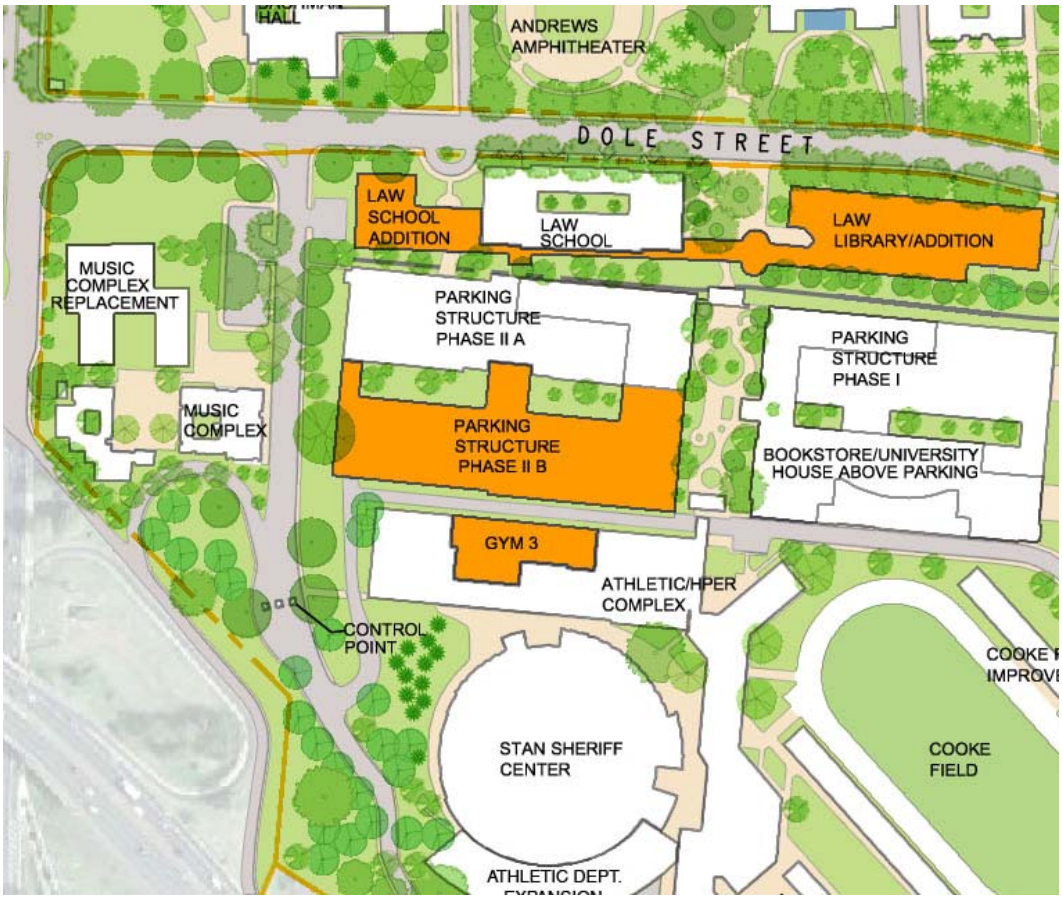


FIGURE 3-37: Parking Structure IIB Plan

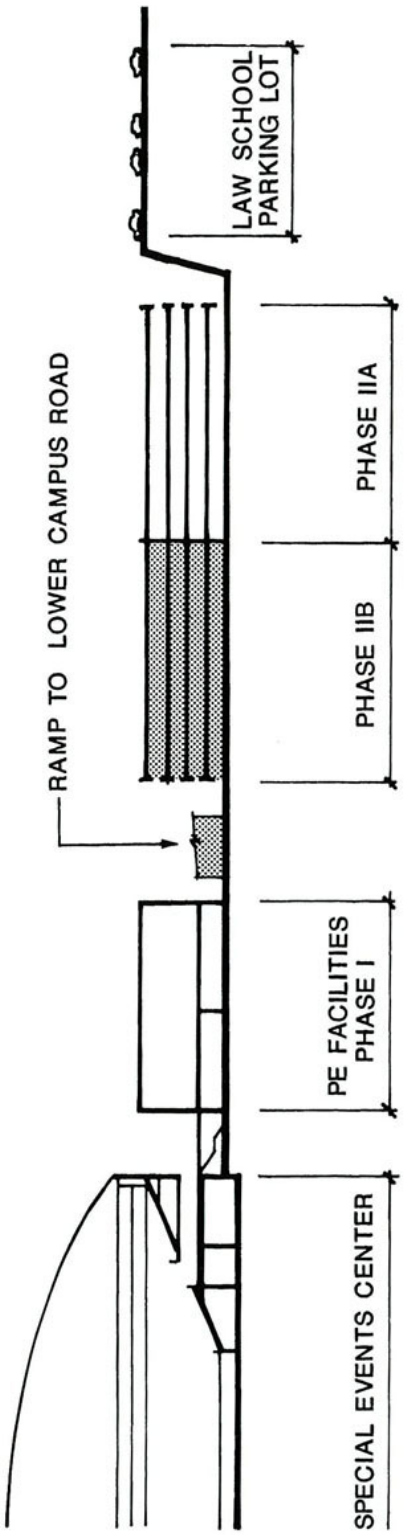


FIGURE 3-38: Parking Structure IIB: Section Plan

L. Faculty Housing - Wa'ahila Ridge or Mauka Campus

Additional faculty housing is proposed for either a site on Wa'ahila Ridge or a site on the Mauka Campus. Currently, Wa'ahila Ridge Faculty Housing is one of three housing units available to faculty members at UH Mānoa. The existing 3-story Wa'ahila Ridge Faculty Housing (1960) would be replaced with new, higher density, housing. The alternative would be new faculty housing at the proposed Mauka Campus Woodlawn Drive site. Planned redevelopment of the CTAHR agricultural research facility for additional low-rise faculty housing is intended to address the transient housing needs of faculty. Redevelopment would follow the low-rise, residential pattern established in the adjacent Kauiokaloa Nui and Iki faculty housing complexes. On-site day care facilities would also be provided. The site on the Mauka Campus is directly across from Mānoa Marketplace, Mānoa Library and Noelani Elementary School, and is accessible to the main campus via a short footpath, characteristics that make it ideal for faculty housing. The existing CTAHR facilities are vestiges of Mānoa Valley's rural past and can be relocated to a more appropriate suburban or rural setting. Redevelopment of the site for faculty housing would also allow for the restoration of its Mānoa Stream frontage as a flood mitigation project. Redevelopment for housing would address sustainability goals including smart location and compact development. The concentration of faculty housing at this site would also support the development of "campus life" elements described in the LRDP. Refer to *Figures 3-39 to 3-41.*



FIGURE 3-39: Faculty Housing Facilities



FIGURE 3-40: Faculty Housing Facilities Plan

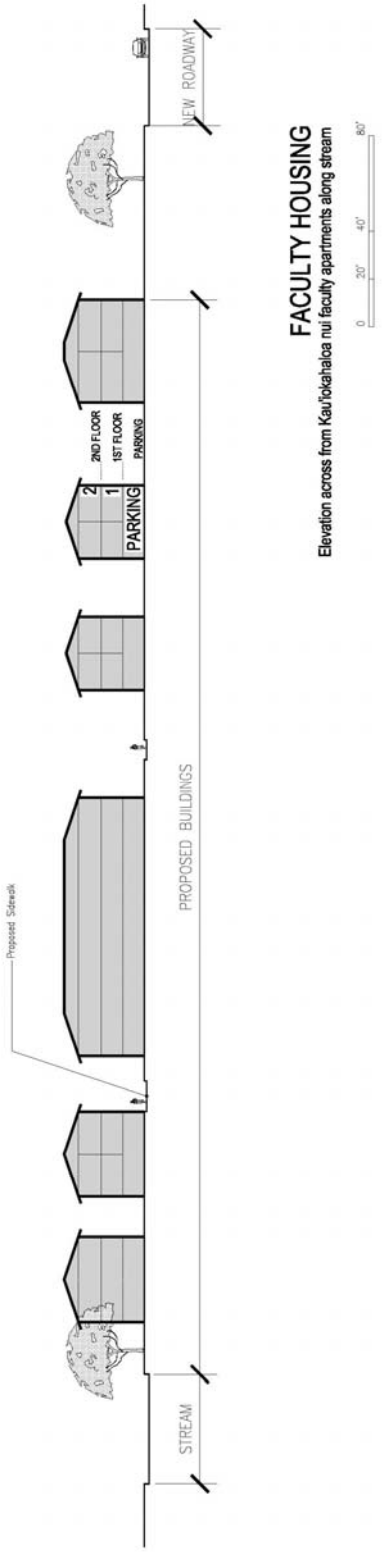


FIGURE 3-41: Faculty Housing – Wa'a Ridge or Mauka Campus: Building Elevations

M. Research Buildings – North and East of Biomedical Building

Two research buildings are proposed in the area between the existing Biomedical Sciences Building and the proposed realigned Upper Central Campus Roadway. This area is currently occupied in part by temporary buildings housing the University of Hawai'i Federal Credit Union, caretakers' cottages, and air conditioning equipment for the Biomedical Sciences Building. These proposed buildings along with the proposed Instruction Buildings will play a key role in the development of a unified Upper Central Campus.

The proposed Research Buildings will complement existing health/ biological sciences facilities in the Biomedical Sciences Building. According to design criteria defined by the LRDP, the architectural character of the buildings will be compatible with the character of the Biomedical Building and will be a maximum of four to five-stories high, since the court buildings of the Biomedical Sciences Building are two-stories high. The elevation of the new buildings will be approximately 6 to 8 feet above the elevation of the current buildings on the Biomedical Sciences Building. In addition, the existing service road between the facilities should be maintained. Landscape design criteria is also defined. Refer to *Figures 3-42 to 3-44*.



FIGURE 3-42: Research Buildings - North and East of Biomedical Building Existing Site

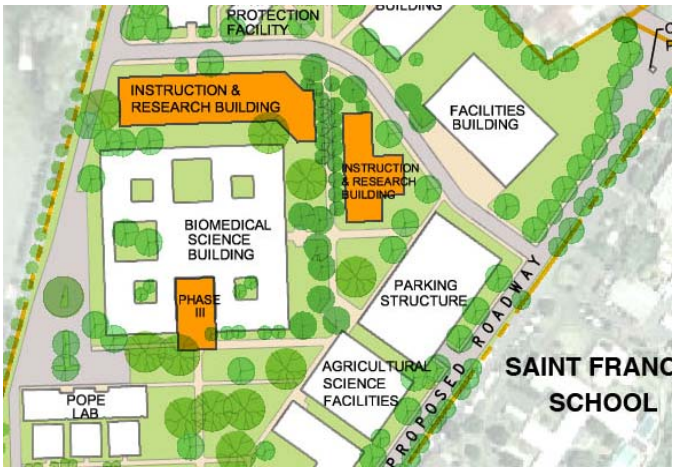


FIGURE 3-43: Research Buildings - North and East of Biomedical Building Plan

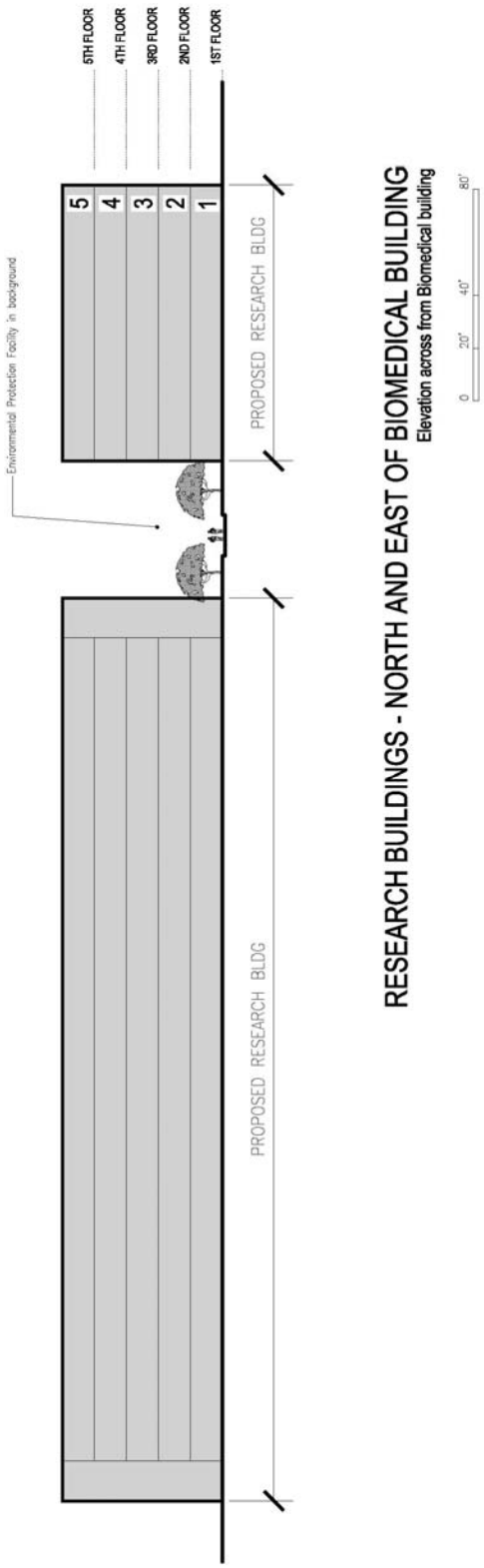


FIGURE 3-44: Research Buildings – North and East of Biomedical Building: Building Elevations

N. Research Buildings - Mauka Campus

Additional Research Buildings are proposed for the Mauka Campus. The proposed Research Buildings will complement the existing Institute of Astronomy. The architectural character of the buildings must be compatible with the scale and character of the surrounding residential neighborhood and University buildings. Refer to *Figures 3-45 and 3-46*.

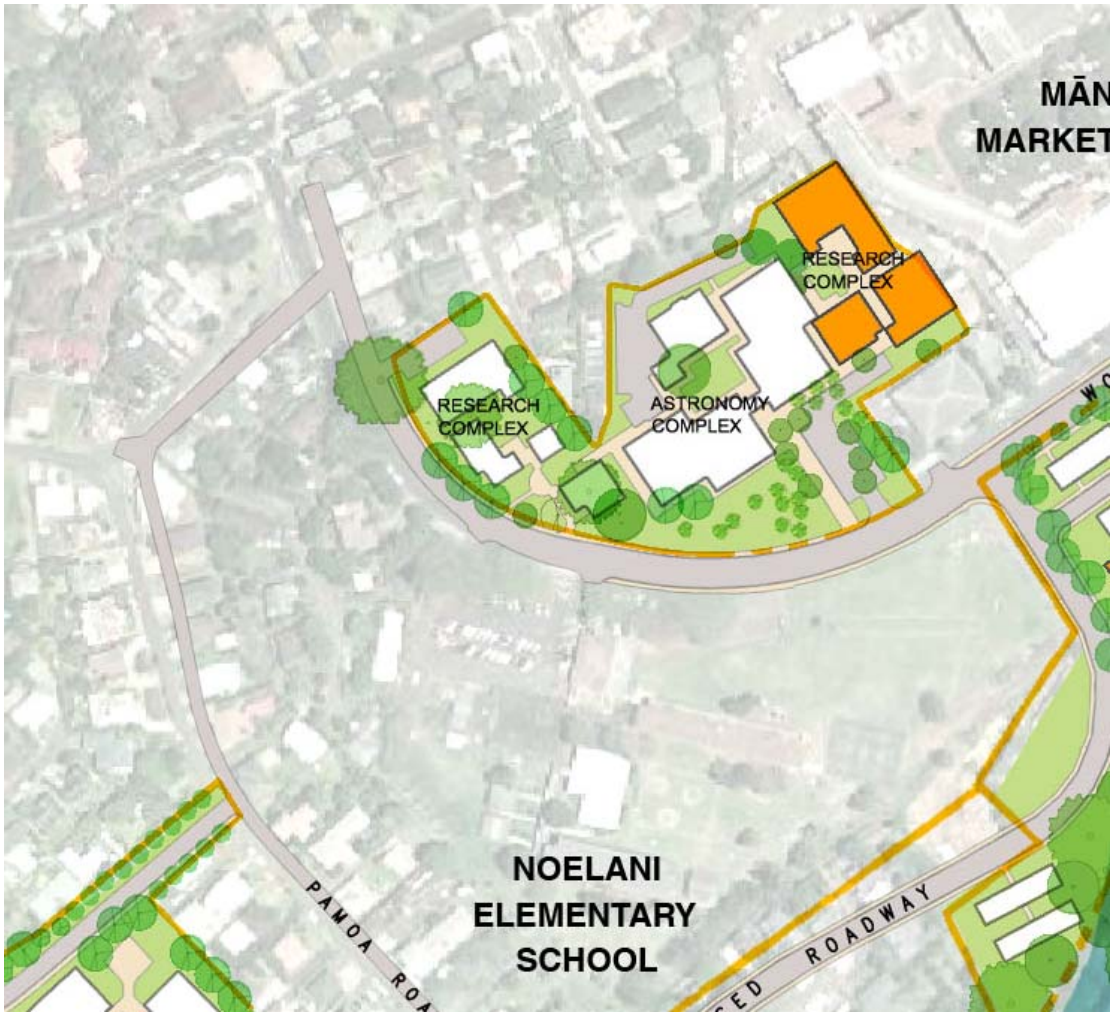


FIGURE 3-45: Research Buildings – Mauka Campus Plan

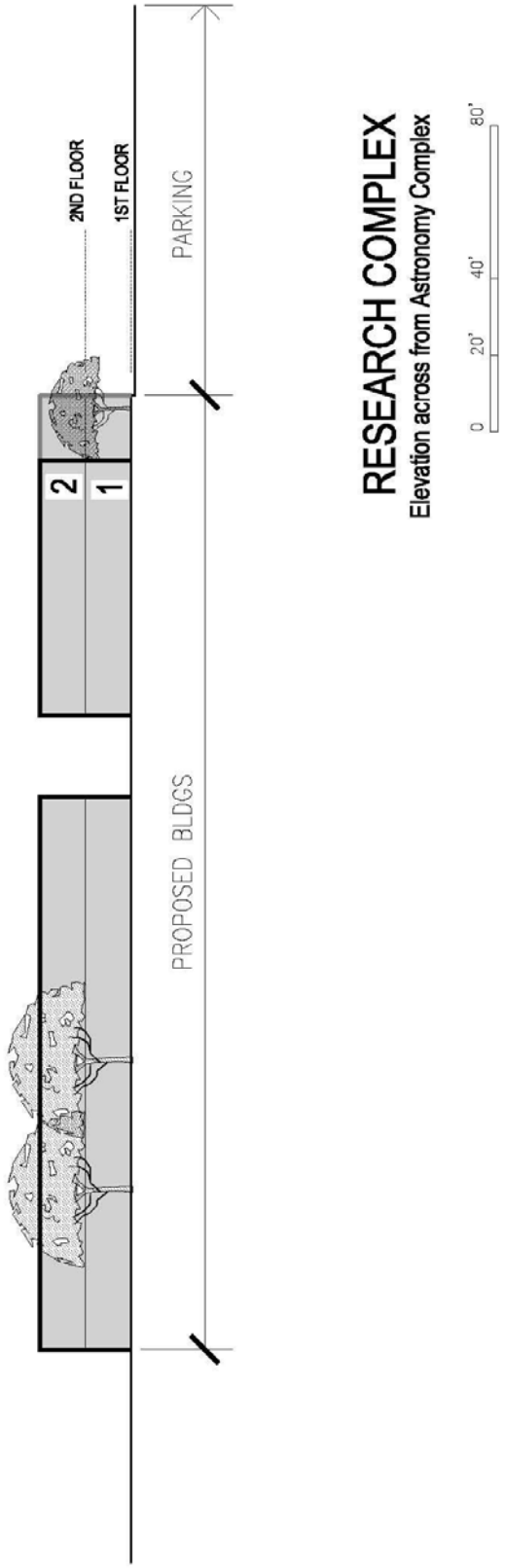


FIGURE 3-46: Research Buildings – Mauka Campus: Building Elevations

O. Johnson Hall - Replacement Dormitory

Existing dormitories Johnson Hall A (1958) and Johnson Hall B (1962) are over 30 years old and are badly in need of refurbishing to meet current student needs and building codes. The Student Housing Office has determined that it would be more practical to rebuild than to try to upgrade outdated facilities.

The existing Johnson Halls are to be replaced with modern higher density student housing facilities. The Johnson Halls now accommodate 195 students in a standard dormitory configuration. The new student housing, which will accommodate approximately 360 students, will be contained in four four- to five- story wings connected by a two-story building containing common facilities. The four- story wings will be along Dole Street, and the five-story wings will be on the quarry side. The existing pattern of monkey pod trees along Dole Street will be maintained, and a service drive will be provided from Dole Street for maintenance and supply vehicles. Refer to *Figures 3-47 and 3-48*.

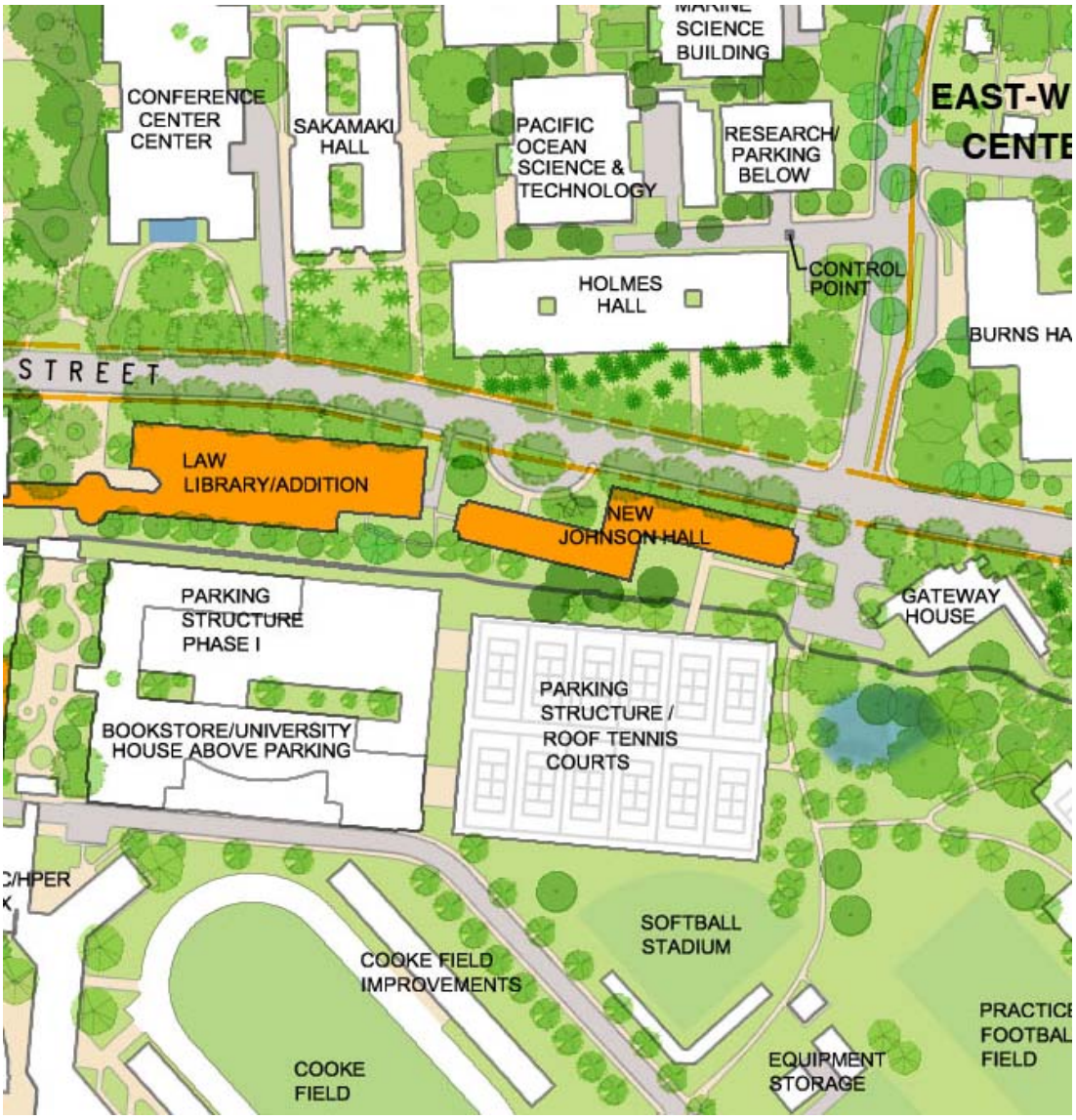


FIGURE 3-47: Johnson Hall - Replacement Dormitory Plan

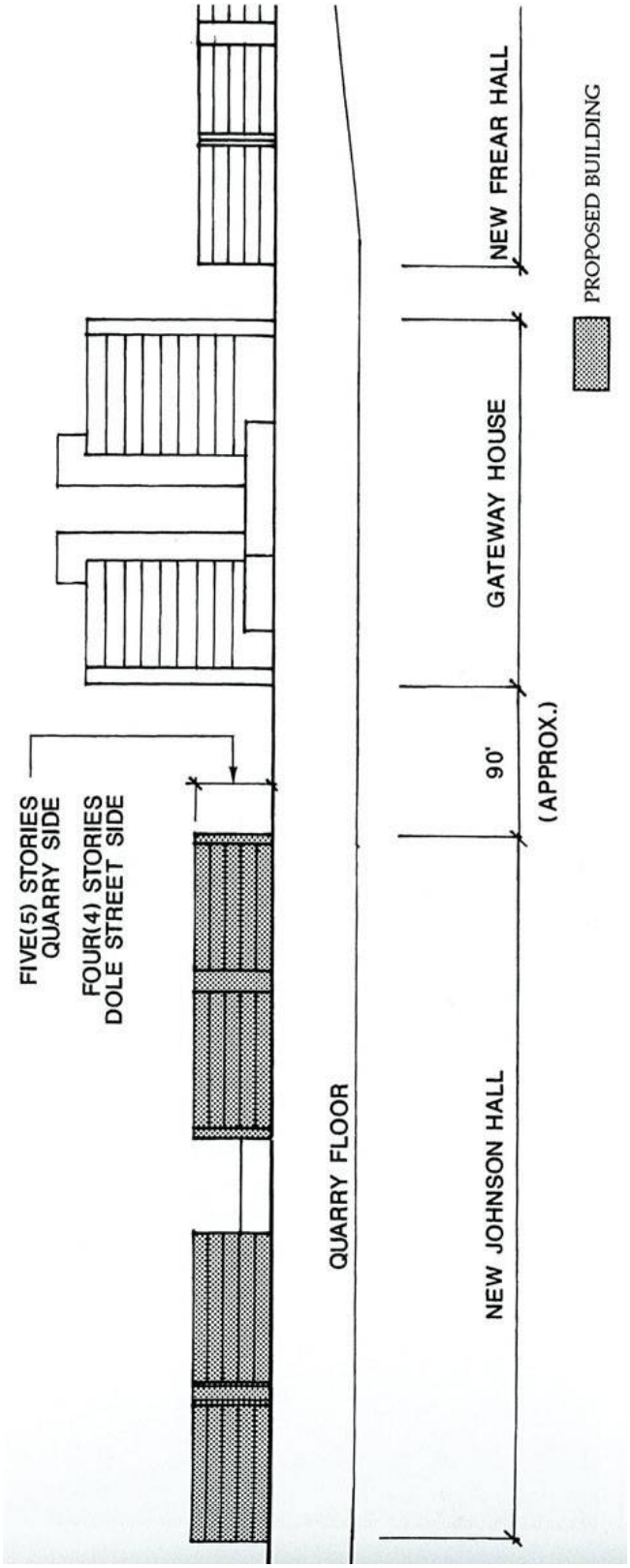


FIGURE 3-48: Johnson Hall – Replacement Dormitory: Section Plan

P. Hale Noelani - Replacement Dormitory

Existing dormitories Hale Noelani (1977) is over 28 years old and is also badly in need of renovation to meet current student needs and building codes. The existing Hale Noelani apartments currently accommodate 506 residents. A new student housing facility to replace aging Hale Noelani is proposed. New Hale Noelani will not only provide modern facilities but will also provide additional beds with a higher density design. Refer to *Figures 3-49 and 3-50*.

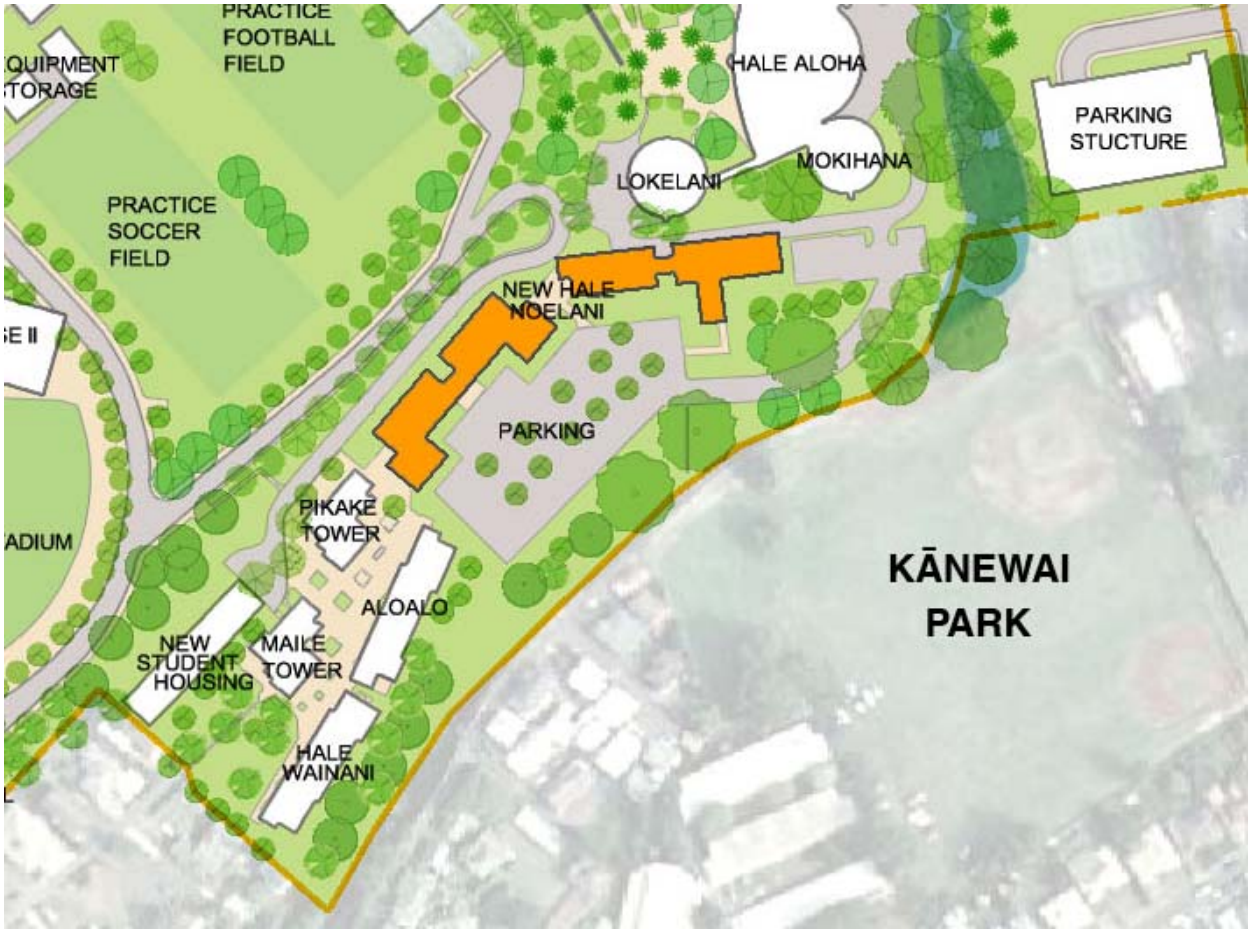


FIGURE 3-49: Hale Noelani – Replacement Dormitory Plan

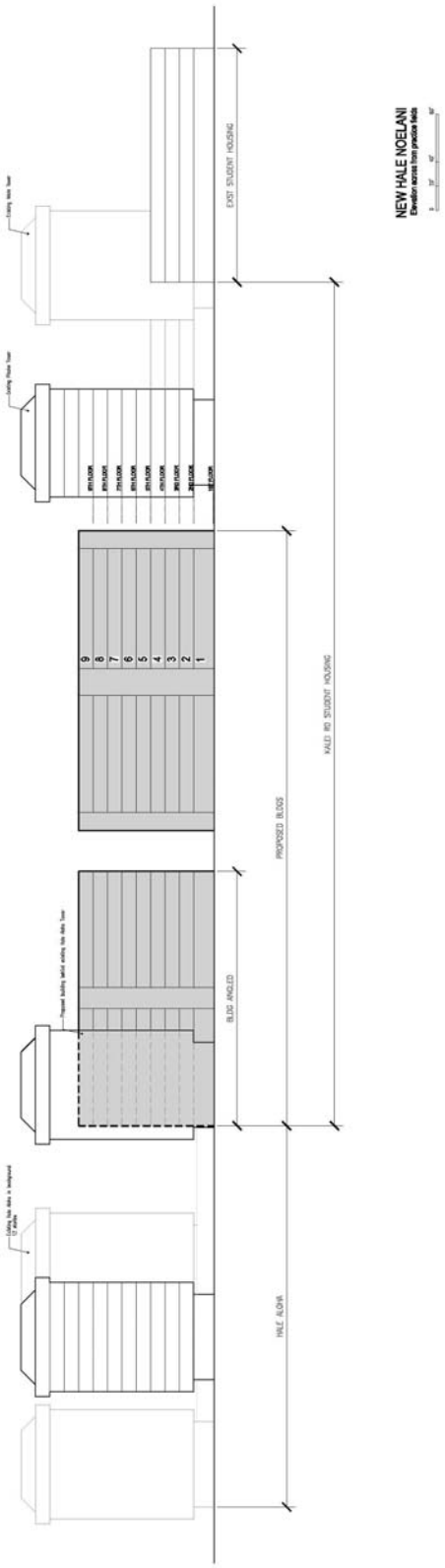


FIGURE 3-50: Hale Noelani – Replacement Dormitory: Building Elevations

Q. School of Hawaiian Knowledge

The School of Hawaiian Knowledge Addition is planned between the existing School of Hawaiian Knowledge and a parking structure makai of Dole Street. Design criteria defined by the LRDP states that proposed addition will recognize the need to protect views from St. Louis Heights and Wa'ahila Ridge Faculty Housing. The addition should continue to foster sensitive relationship to Mānoa Stream. In addition, design criteria states that the new addition should relate to the existing buildings at the School of Hawaiian Knowledge, reflect Hawaiian culture in its design, and embody Hawaiian respect for the environment and openness to the community. The School of Hawaiian Knowledge Building will be approximately 16 stories in height from the current level of the circulation lanai of Kamakakuokalani. The building footprint is approx 135 x 175 feet and includes the building envelope/frame behind which the building is sheltered. The project design will include energy saving features such as photovoltaic solar panels and wind turbines. Refer to *Figures 3-51 to 3-56.*



FIGURE 3-51: School of Hawaiian Knowledge Plan



FIGURE 3-52: School of Hawaiian Knowledge Existing Site

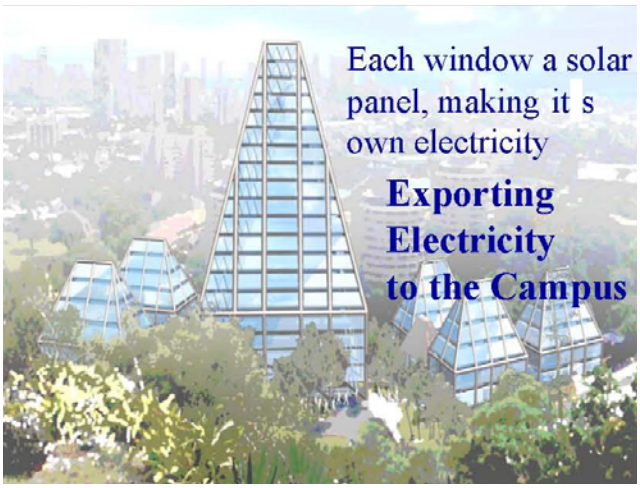




FIGURE 3-53 AND 3-54: School of Hawaiian Knowledge Renderings



FIGURE 3-55: School of Hawaiian Knowledge Site Plan

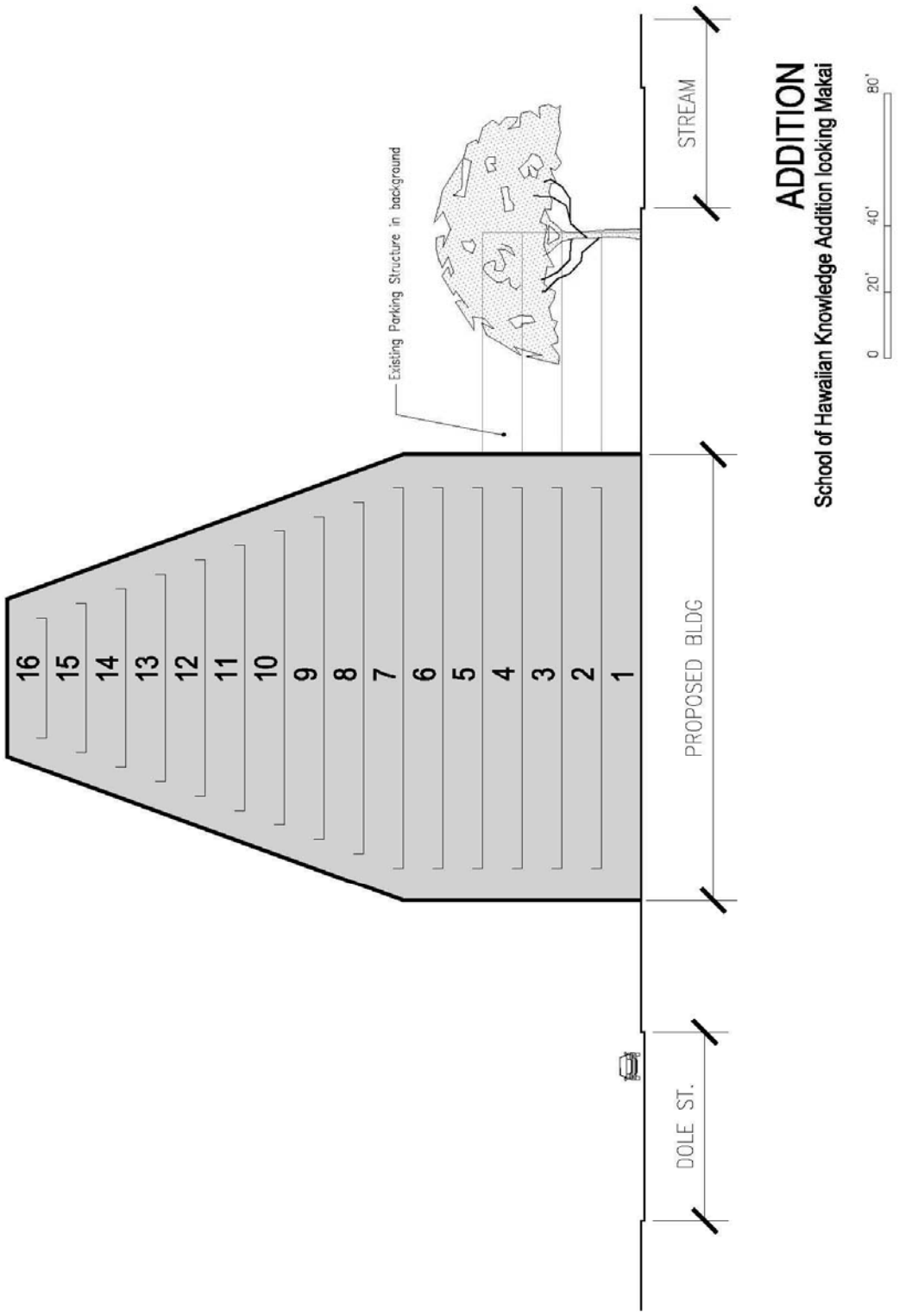


FIGURE 3-56: School of Hawaiian Knowledge: Building Elevations

R. Transitional Space Building

The Transitional Space Building is a two-story building located in the Upper Campus area. The building will function as an interim space to house departments while their "home space" undergoes renovations. Refer to *Figures 3-57 and 3-58*.

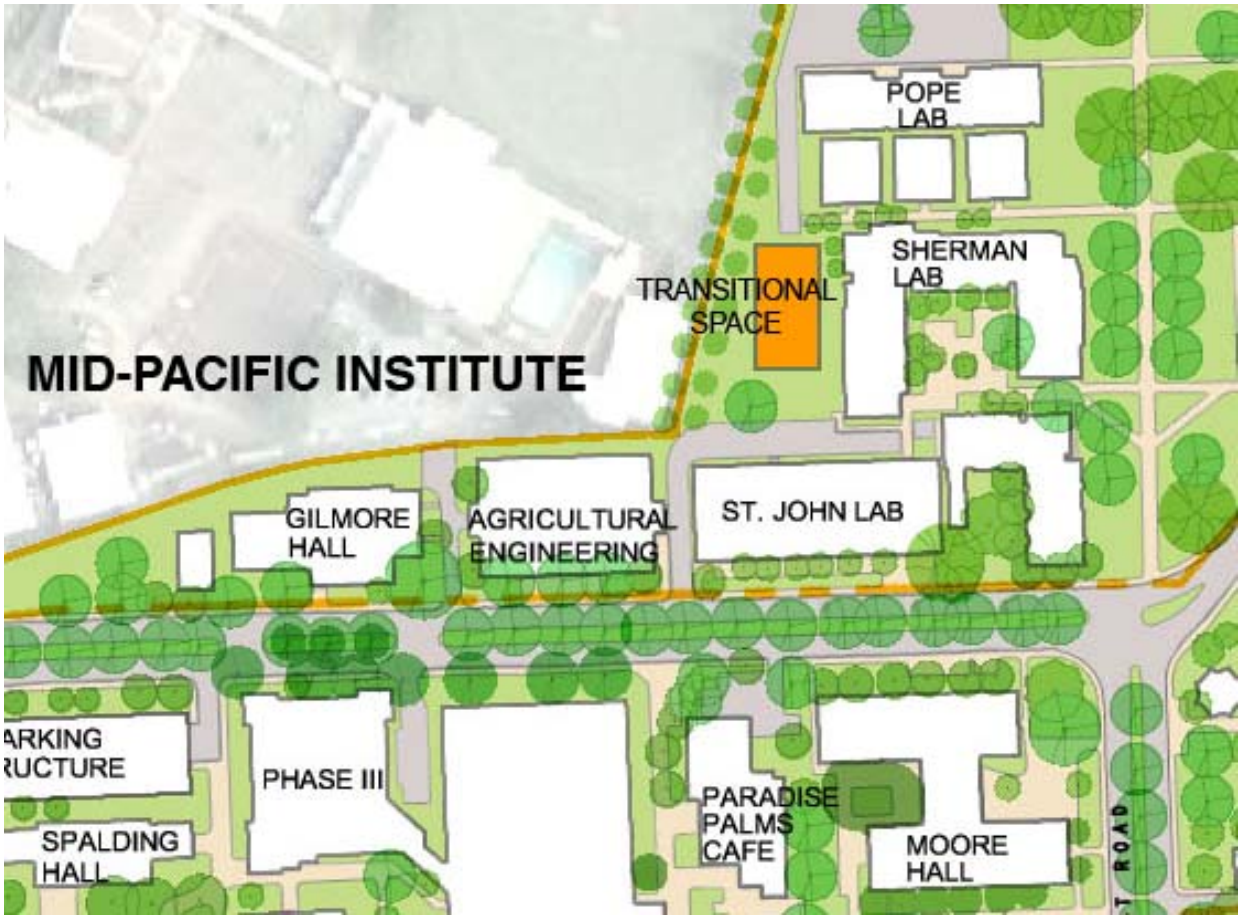


FIGURE 3-57: Transitional Space Building Plan

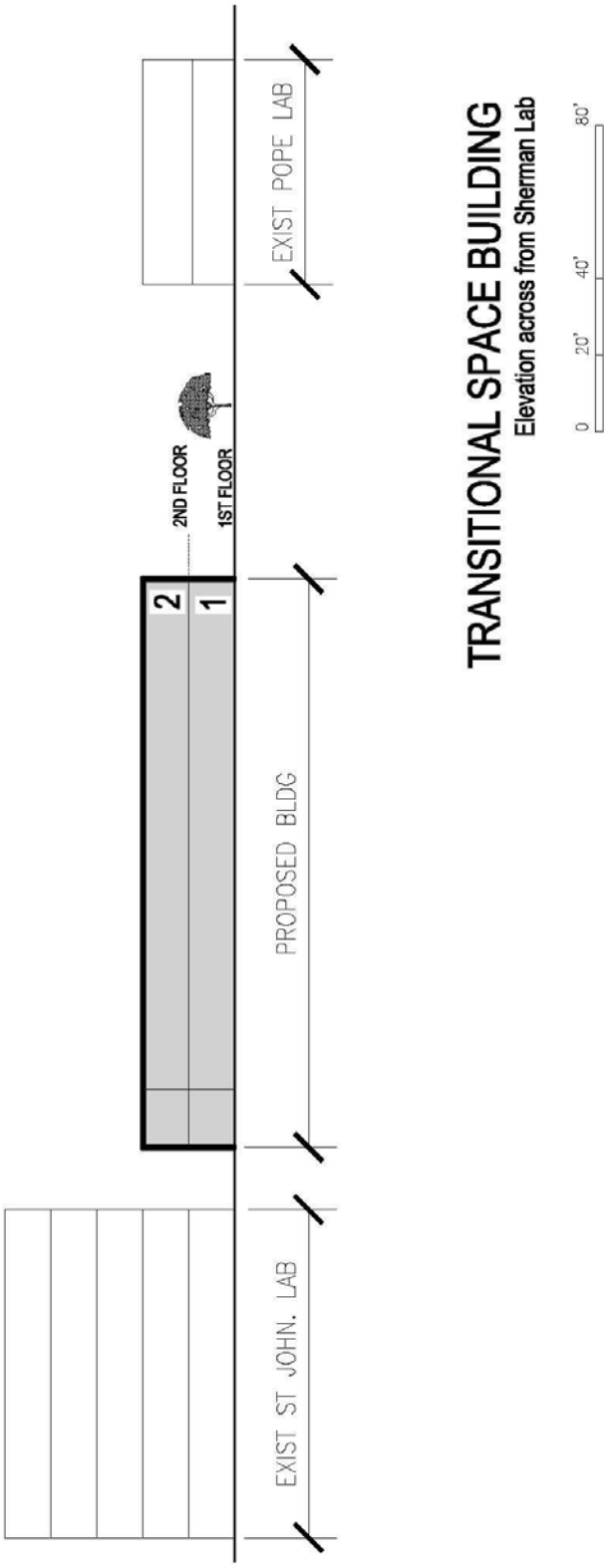


FIGURE 3-58: Transitional Space Building Site Plan

3.8 JUSTIFICATION AND OVERVIEW OF NEED

These projects address current and projected space and activity needs on campus. Enrollment is projected to remain relatively stable over the next planning period—through 2012-- as indicated by the University of Hawai'i's Institutional Research Office. Enrollment declined from an all-time high of 22,000 + students in 1972 to a low of approximately 18,000 in 1987. Since then, enrollment has slowly increased reaching 20,644 students in the fall of 2007. The anticipated opening of the new West O'ahu Campus is also expected to reduce the pressure on undergraduate enrollment.

Campus development at UHM is now stimulated by sometimes severe current facility program needs and the desire to provide a more complete campus community experience instead of enrollment growth. Universities across the country have focused on enhanced environments for learning, working, and living. Campuses of the future envision uses and activities not unlike that of any vibrant urban center.

Graduate and research space needs will continue to fuel growth on the Mānoa Campus. In a pattern typical of other major universities, research and administrative support facilities are related to the availability of research funding rather than enrollment. Overall, extramural funding at Mānoa has increased by 50% over the past ten years. In 2003, the Top American Research Universities ranked UHM among the top 50 public universities in federal research funding. New laboratories, offices and library resources will continue to be required to support evolving graduate work and research activities.

While not all research and graduate education will be campus-bound, as evidenced by the John Burns School of Medicine in Kaka'ako, telescopes atop Mauna Kea and research facilities on Coconut Island, the great majority of research and graduate student activities seek a direct relationship to the resources of the Mānoa Campus. While distance learning and virtual teaching methods also promise changes to higher education, their immediate impact appears to be at the lower division and undergraduate level. Institutions such as UHM with large upper-division and graduate programs, with successful professional schools and burgeoning research programs are anticipated to grow in-place. UHM's challenge is to use the opportunity afforded by this growth to achieve higher levels of quality in its physical and academic environment. The 2007 Update to the LRDP will serve as guidance towards this important goal.

3.9 MASTER PLAN CONCEPTS AND VISION

In 2001, the Mānoa Campus carried out a participatory visioning process, establishing several major themes as part of the UHM LRDP Update. These were as follows:

1. Globally Connected Hawaiian Place of Learning, Leadership and Service

This theme, which derives from the University of Hawai'i's Strategic Plan, has many implications. These include the reality of UHM's global reach and influence while being rooted in Hawai'i. This LRDP theme reflects an aspiration of the campus to be a physically appropriate Hawaiian place as it functions as a global center of learning, leadership and service.

Related supporting themes include the strengthening of the relationship of the campus to the ahupua'a of Waikīkī; the creation of a Hawaiian identity to the campus or to significant places of

the campus; the defining of entryways or "ahu" of welcome to the campus; making the campus a "people friendly" place; and the highlighting of places of international connections.

2. Livable Urban Campus

This theme recognizes the need to create and highlight a residential lifestyle for a campus that has traditionally been viewed as a commuter campus. This includes the development of significantly more housing for students and faculty on or adjacent to the campus (a departure from the 1994 UH LRDP Update) with supporting commercial, entertainment, and cultural amenities. The theme envisions a lifestyle for faculty, students, researchers, staff, and visitors which is available in urban communities, which attract young, intellectually, and physically active students and experienced faculty and research members who are seeking a good quality of life.

Supporting themes include a "24 hour – live, learn, work and play" environment; mixed use retail centers with nightlife; venues for cultural, social and artistic interaction, dining in multiple locations; places for fitness and wellness; and wireless access throughout.

3. Outdoor Spaces for Living and Learning

Much of the campus reflects and capitalizes upon the beauty of the surrounding Mānoa Valley. Nonetheless, there are many spaces which are merely remnant areas, which do not encourage functional use. A positive characteristic of many of the buildings, notably the Art Building, is that they are permeable buildings, allowing for shortened and shaded walks. This theme envisions the spaces between buildings as either "outdoor rooms" functioning in concert with indoor spaces as venues for education, social gathering, recreation, contemplation, unprogrammed uses, or as outdoor corridors.

Related supporting themes include the creation of places which are usable day and night with comfortable shade and appropriate lighting; places which have unique historic, cultural, visual and/or environmental characteristics; and the creation of a wide variety of places identified by special vegetation, function, and history.

4. UHM – Leader in Environmental Sustainability

UHM houses numerous experts in various fields who are working on issues and projects related to environmental sustainability. In addition to education and research, UHM has an institutional commitment to sustainability for social, cultural, and economic reasons. This theme envisions the campus as a laboratory, model, and institutional leader for sustainable practices.

Supporting themes include a goal of increasing the permeable surfaces from 40% to 60% of campus land area to allow more absorption of rainwater into the ground; protecting the existing trees of the campus' "urban park", and expanding its canopy from approximately 20% to 30%; the use of Leadership in Energy and Environmental Design (LEED) criteria and practices in the design of facilities and management; and programmed reduction of energy, water usage, and other resources.

3.10 ARRIVAL AREAS: AUTO, MOPED, BICYCLE PARKING &TRANSIT

The LRDP concept for the Central, Upper Central, Makai and Mauka Campus areas, continued in the 2007 LRDP Update, is to give priority to pedestrian circulation. Vehicular arrival points such as parking lots, bus stops and transit stations are, therefore, indicated on the periphery of the

campus; freeing the central areas for pedestrian use. In the Central Campus area, for example, valuable land is presently occupied by low efficiency on-grade parking lots and old roadways. The removal of the parking and roads will provide significant areas for pedestrian use such as the Varney Plaza, the Legacy Path and Correa Mall. The location of additional parking, in structures, on the periphery of the Central Campus is very feasible, as is the servicing of the Central Campus without such a large roadway system as existing today.

The Parking structures proposed during the near-term update period are as follows:

- Parking Structure at Kennedy Theatre
- Parking Structure IIB

Parking structures should be integrated into buildings whenever possible. As with downtown Honolulu, the integration of parking with buildings can serve to mitigate the visual impact of these structures. Parking structures are also prime candidates as sites for other buildings, thereby reducing the impermeable footprint of construction on campus. Finally, these structures are also candidates for "green" or landscaped roofs.

One of the alternative modes of transportation popular with students is the moped. Moped parking is allowed only in designated areas on the periphery of the campus areas. These moped parking areas are adjoining or in the proximity of pedestrian gateways and adjoining parking structures.

Bicycle parking is allowed at specific locations within the body of the campus and is related to buildings and destinations. To the extent possible, bicycle paths will be designated to minimize serious conflicts with pedestrians. A program to provide bicycle racks within parking structures will increase the comfort of bicyclists by placing more racks in covered locations.

Mass transit is projected as a future mode of transportation for Honolulu. Transit is envisioned to service the UHM Campus and neighboring communities. Future transit stations are recommended to be located in the surrounding commercial districts and not on campus in order to enhance campus security, while guaranteeing service to the public as well as University students and faculty.

3.11 LANDSCAPE

Guidelines for the enhancement and protection of the campus landscape are located in the Landscape Guideline section of the 2007 LRDP report. The existing landscape of the Mānoa Campus functions as a unifying element, as a green matrix in which buildings of various eras coexist congenially. The Campus Planning Office, Landscape Advisory Committee and landscape staff of the Mānoa Campus have made substantial strides in enhancing the unifying elements. With over 560 varieties of tropical and subtropical plants UHM takes landscaping very seriously and is committed to preserving and enhancing this resource which defines the natural environment of the Mānoa campus.

A principal goal of the Landscape Plan is to provide guidelines for the knitting together of the campus into a unified whole, which enhances the various sub-areas of the campus. In some cases, existing areas have not been completed. For example, Dole Street and University Avenue are partially landscaped with impressive monkey pod tress. If this landscape treatment is completed on both streets along the entire University frontage, the campus would immediately have a unified appearance along these major roadways. All campus roads should also be landscaped with continuous lines of street trees to achieve visual unity along vehicular corridors.

Campus landscaping has been developed on a project by project basis, primarily to frame individual buildings. General project landscaping guidelines are included with the design criteria for each building in the LRDP Update 2007. Through the development of Landscape Guidelines, each project's design will incorporate landscaping elements that help to support the University's desire for an integrated landscape while reducing the visual impact of the proposed facilities from adjoining uses and surrounding areas.

3.12 SUSTAINABILITY AND DESIGN GUIDELINES

Some guidelines proposed to assist administrators, design consultants, campus client groups and review committees are presented in the Sustainability Guidelines and Design Guidelines section of the 2007 LRDP report. The guidelines address building design, sustainability, and landscape. These guidelines incorporate "best practices", national standards as well as campus specific design criteria. They are not meant to be exhaustive and it is anticipated that in the planning period, standards (especially best practices and national standards) will continue to change and be updated. The guidelines are not intended to be prescriptive but are to assist project teams in their efforts to achieve the goals of the LRDP. The guidelines do not supersede County, State and national codes.

4.0 Affected Environment, Potential Impacts and Mitigation Measures

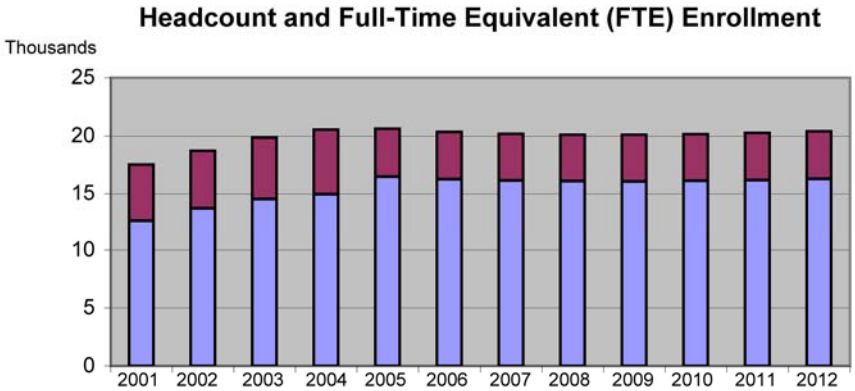
4.0 AFFECTED ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

4.1 UNIVERSITY OF HAWAI'I, MĀNOA CAMPUS ENROLLMENT

Existing Conditions – As previously mentioned in *Section 3.3,* enrollment at UHM was 20,644 students in the fall of 2007, and 18,818 in the spring 2008 semester. Enrollment is projected to remain relatively stable through 2012, as indicated by the University of Hawai'i's Institutional Research Office, 2007 (*Figure 4-1*). The anticipated opening of the new West O'ahu Campus is also anticipated to reduce the pressure on undergraduate enrollment.

Impacts – The projects in the 2007 LRDP Update address current space and activity needs on campus. They are not based on any anticipated increase in enrollment over the next planning period. Enrollment is not expected to fluctuate in any significant number during the planning period for the 2007 LRDP, or through 2012.

Mitigation - Graduate and research space needs will also continue to fuel growth on the Mānoa Campus. New laboratories, offices and library resources will continue to be required to support evolving graduate work and research activities, and mitigation measures to reduce impacts of construction and development will be followed as outlined in this chapter. No mitigation measures are necessary concerning enrollment since no significant increases or impacts are anticipated.



	2001*	2002*	2003*	2004*	2005*	2006	2007	2008	2009	2010	2011	2012
Headcount	17,532	18,706	19,863	20,549	20,644	20,350	20,186	20,109	20,102	20,158	20,268	20,424
FTE	12,624	13,720	14,517	14,925	16,452	16,243	16,126	16,070	16,057	16,088	16,160	16,264

* Actual

Source: Institutional Research Office, University of Hawai'i, February 2007

Figure 4-1: UH Mānoa Enrollment Projections

4.2 TOPOGRAPHY

Existing Conditions - In general, the UH Mānoa Campus is gently sloped mauka to makai at about 5% between the Mauka and Upper Central Campus areas and the Central and Makai Campus areas. However, in some locations abutting Mānoa Stream, on the lower slopes of Wa'ahila Ridge, and descending into the Quarry, slopes are much steeper *(Figure 4-2).*

Impacts – None of the construction projects considered in this 2007 LRDP Update will result in any significant changes to the existing topography of the UHM Campus. Minor grading may occur to prepare and finish the sites.

Mitigation – All necessary permits will be obtained, and all conditions to minimize any anticipated impacts will be followed.

4.3 GEOLOGY AND SOILS

Existing Conditions - The Island of O'ahu is comprised of two major extinct volcanoes, Wai'anae and Ko'olau Volcano. The UH Mānoa Campus is located at the mouth of Mānoa Valley situated on the southeastern slopes of the extinct Ko'olau Volcano. The valley was a result of a rejuvenated stage of eruptions, known as the Honolulu Volcanic series, over 100,000 years ago.

During the Honolulu series eruption period, many of the vents erupted through a coral reef that surrounded the island on the south side. The cinder cones of Mount Tantalus, Punchbowl (Puowaina), and Rocky Hill at Punahou were formed during this period. The other flows that erupted inland were funneled down valleys, such as Mānoa, thereby creating flatter valley floors and bluffs. The flows and ashes of the Honolulu Volcano series have high contents of sodium and potassium and low contents of silica.

Soil types in the project area have been identified by the U.S. Department of Agriculture's 1972 Soil Conservation Service Soil Survey. As shown by *Figure 4-3*, soil types in the project area consist largely of "alluvium mixed with volcanic ash and cinders." The predominant soil type is Makiki Stony Clay Loam (M1A), which is characterized by stony soils.

Other soil types include Rock Land (rRK), which is made up of exposed rock, rock outcrops and very shallow soils; Kaena Very Sony Clay (KanE), which is characterized by talus slopes and alluvial fans; and Kawaihapai Clay Loam (K1A), which is found along drainageways and alluvial fans and is further distinguished by dark clay loam.

Impacts – None of the construction projects considered in this 2007 LRDP Update will result in any significant change to the existing soils of the UHM Campus. As noted above, since minor grading may occur to prepare and finish the sites; all necessary permits will be obtained and all conditions will be followed.

Mitigation – Strict adherence to Best Management Practices and erosion control measures will minimize the potential impact of silt runoff from construction areas during a major storm.

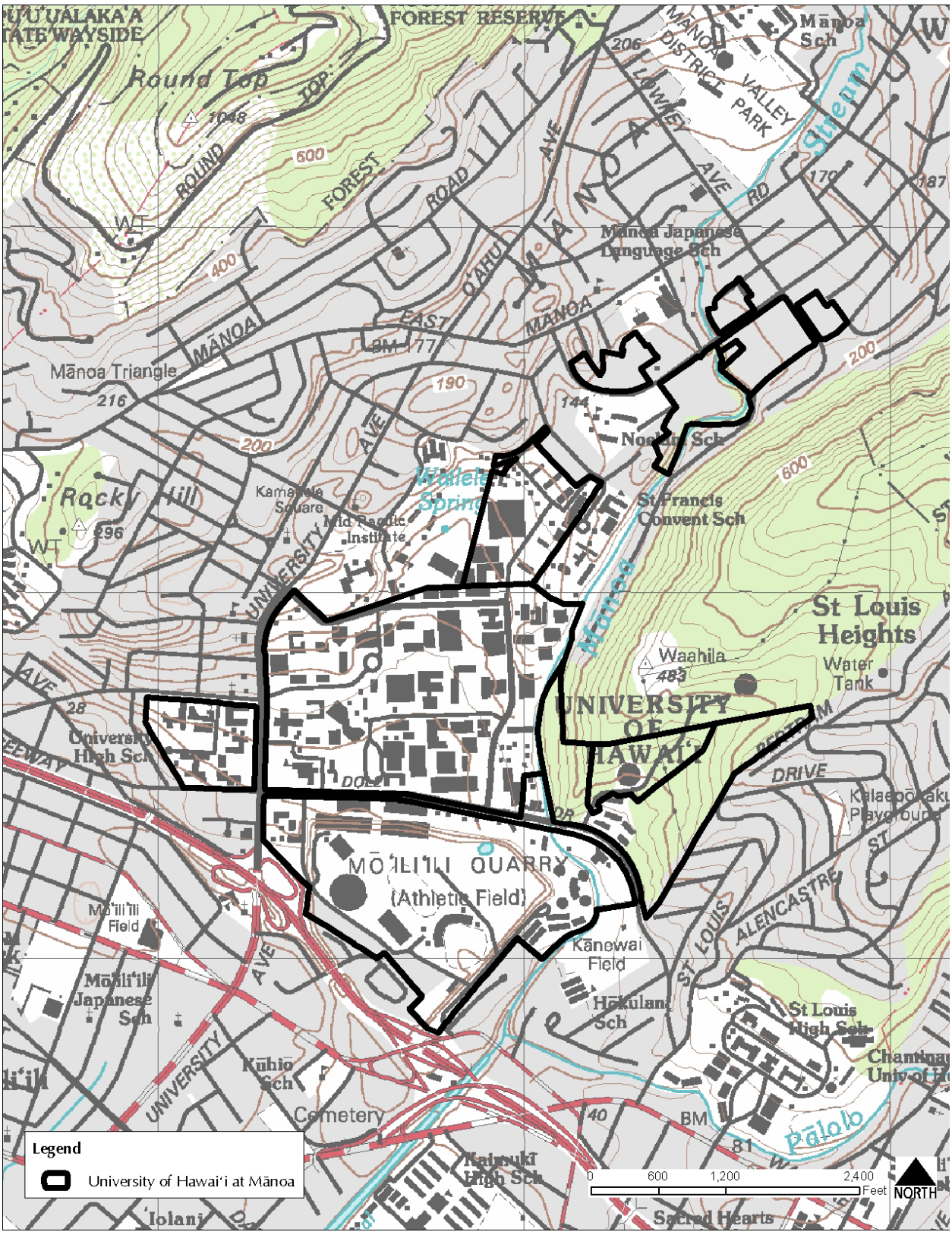


Figure 4-2: USGS Topography Map

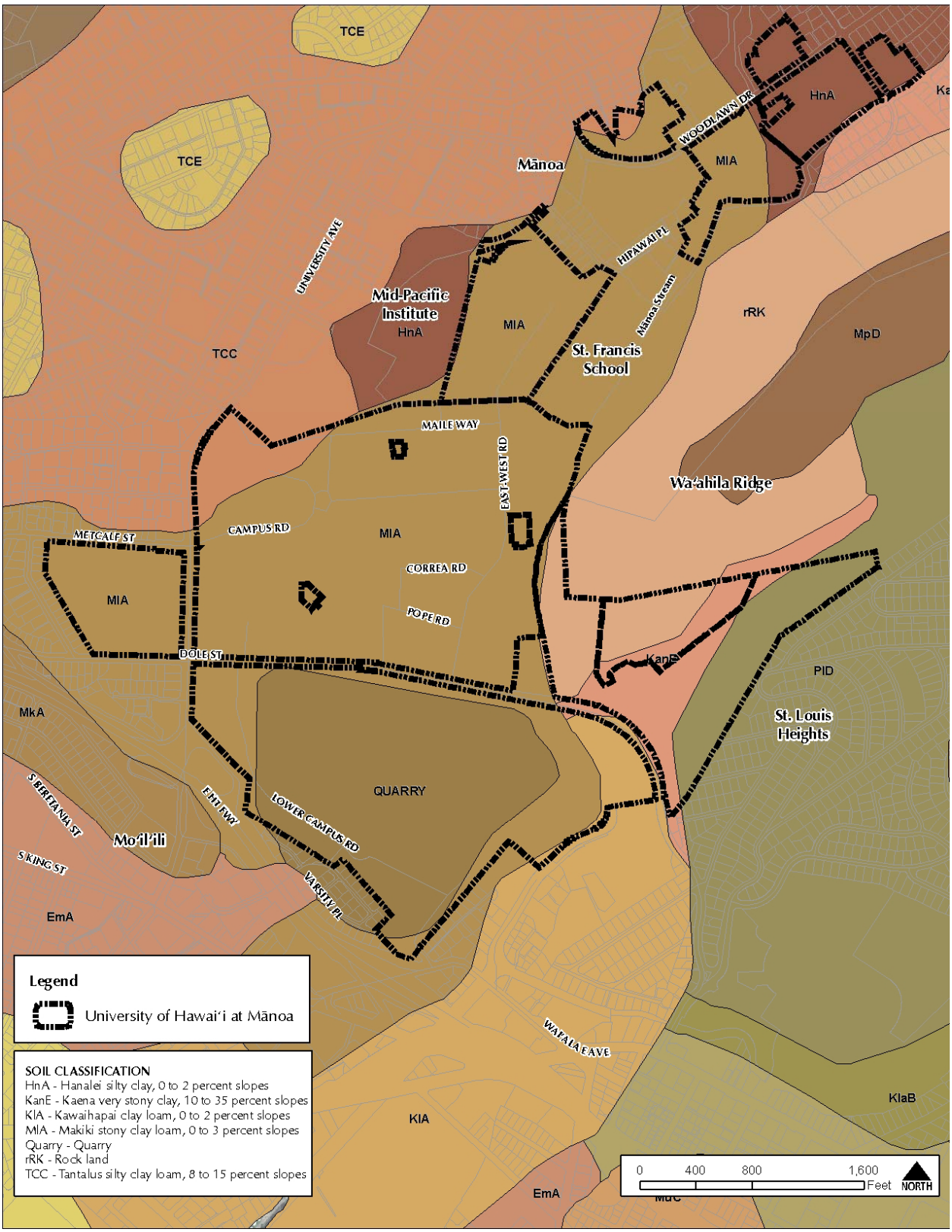


Figure 4-3: Soil Classifications

4.4 CLIMATE AND RAINFALL

Existing Conditions - The UHM Campus is located in the middle and lower regions of Mānoa Valley of Honolulu. Nestled within the flanks of the Koʻolau Mountains, Mānoa Valley is exposed to lower temperatures than the downtown area of Honolulu. Average daily minimum and maximum temperatures typically range from the low 60s (degree Fahrenheit) to the low 90s, depending on the time of the day and the season. Daily temperatures vary by about 7 degrees between winter and summer seasons, and 15 to 20 degrees between day and night.

Northeasterly trade winds prevail much of the time throughout the island of O'ahu. These trade winds vary in frequency. Often times they last for weeks on end. Other times they are virtually absent. This is the general result of the location of the North Pacific high pressure system. During the spring and summer months, this system is larger, stronger and shifts farther to the north and produces stronger, more persistent trade winds. In the fall and winter months, this high pressure system degrades and shifts to the southeast, at which time the general wind patterns become weaker and more variable. Typical wind velocities range between 8 and 15 miles per hour.

Rainfall in Mānoa Valley varies considerably between the upper and lower areas; therefore the upper-most and lower-most districts of the UHM Campus receive different amounts of rainfall. On average, annual precipitation values of approximately 30 inches can be expected, with most rainfall occurring in conjunction with discrete winter storms between December and April. However, during the spring and summer months, moisture-laden trade winds regularly produce passing showers that contribute significantly to the annual rainfall total.

Impacts - None of the construction projects considered in this 2007 LRDP Update are anticipated to have a significant adverse impact on climate and rainfall in Hawai'i. The LRDP Update Design and Sustainability Guidelines anticipate that future buildings will be as distinguished for their responses to sustainability objectives as much as their aesthetic expressions.

Mitigation – At a time when buildings globally are incorporating landscaping on roofs and within their building envelopes, it is envisioned that the buildings on campus will contribute to UHM becoming an "urban park" reducing the heat island effect. Additionally, existing and future buildings will reduce energy consumption through audit/management programs, active and passive energy conservation design and advancing technologies. Natural day-lighting techniques, including operable windows and shading devices to reduce cooling load and dependence on air-conditioning and electric lighting, using natural lighting, and employing "smart" energy control systems and other strategies discussed in the Guidelines will allow the reduction of energy in all buildings. Existing and future buildings will also employ systems of energy generation through strategies such as heat transfer, photovoltaic solar cells and solar electric systems. A new legislation mandate requires new public buildings to achieve Leadership in Energy and Environmental Design (LEED) silver ratings and this will redeem impacts to global climate change.

4.5 FLOOD AND NATURAL HAZARDS

Existing Conditions - The Mānoa Campus has a storm drain system which is connected to the City's drainage system on University Avenue and Dole Street. The Makai Campus has several existing outlets to Mānoa Stream as well as a storm drain system that is connected to the City's drainage system on Varsity Place.

According to FEMA's Flood Insurance Rate Map (FIRM) dated September 30, 2004, the entire Mānoa Campus, other than the banks along Mānoa Stream and two adjacent areas to the stream are located in Zone X (500 year flood), as shown in *Figure 1-6*. The two areas adjacent to the stream are at the Mauka Campus where Woodlawn Drive crosses Mānoa Stream and at the Makai Campus below Dole Street where Mānoa Stream passes the Taro Patch area adjacent to the Center for Hawaiian Studies. These two areas are in Zone AE (100 year flood), and their Base Flood Elevations are specified on the FIRM.

In October 2004, there was a 25-year storm event that flooded parts of Mānoa, including a portion of the UHM Campus. According to the U.S. Army Corps of Engineers "Hydrology and Hydraulics Study, Flood of October 30, 2004, Mānoa Stream" dated November 15, 2006, the flooding was caused by blockages in Mānoa Stream and an inadequate channel capacity between Kahaloa Drive and Woodlawn Drive. The main buildings affected by the flooding were Hamilton Library and the Biomedical Science Building.

The impacts of natural hazards such as earthquakes, high winds and hurricanes are addressed in the design and construction of the campus' facilities, all of which are in compliance with relevant building codes in force at the time of design and construction. The University has adopted a System-wide Emergency Operations Plan to be implemented whenever a disaster strikes; the UH Civil Defense Coordinator is responsible for the implementation of this Plan.

Impacts – No development in the Zone AE areas is planned for this LRDP.

Mitigation – Risk from earthquakes and hurricanes will be mitigated through continued adherence to local building codes when designing and constructing buildings. Additionally, with the Mānoa Watershed Project, the U.S. Natural Resources Conservation Service (NRCS) is investigating flood mitigation and stream restoration issues. A Final Environmental Impact Statement on the project is expected shortly, with design and implementation to follow thereafter. The University's involvement with this project is to develop and review recommendations and to monitor implementation, which will help coordinate improvements that would affect the UHM Campus.

4.6 AIR QUALITY

Existing Conditions - The consistent tradewinds that regularly blow from a northeasterly direction generally create conditions for excellent air quality over the islands because the winds blow pollutants out to sea. Present air quality in the Mānoa Campus area is mostly affected by air pollutants exhausted from motor vehicles, with carbon monoxide being the most abundant of the pollutants emitted. The State of Hawai'i Department of Health, Clean Air Branch monitors are quality at the University, as indicated by their *Annual Summary 2006 Hawai'i Air Quality Data Report*. The University monitor site is located on the second floor of the University Square building at 2617 South King Street, near the University of Hawai'i. This is a mostly commercial and residential area with apartments, restaurants and shops. Bordered by three busy streets: South King Street, South Beretania Street and University Avenue. The pollutants monitored are Carbon Monoxide (CO) levels at 1-Hour and 8-Hour intervals. The CO levels collected in the 2006 report were well below Hawai'i State and Federal Ambient Air Quality Standards.

Exhaust from laboratories, mechanical rooms, etc., are isolated and dispersed through systems that meet air quality standards.

Impacts – The improvements proposed in the planning period will add more parking facilities on the UHM Campus, and the additional traffic to these facilities will result in increased emission of carbon monoxide and other pollutants along certain routes. The availability of more parking facilities, however, is expected to reduce traffic congestion and thus reduce the overall concentration of pollutants around the campus since the vehicles will be able to find parking more readily.

There will be two types of short-term air quality impacts that will result from the proposed construction projects, 1) fugitive dust generation and 2) on-site emissions from construction equipment and off-site emissions from moving construction equipment and commuting construction workers.

Mitigation – Traffic and air quality monitoring can be implemented if needed by the University, County or State to ensure compliance with State Ambient Air Quality Standards. Strict compliance with State and County pollution control requirements, such as dust-watering programs and covering dirt-hauling trucks will mitigate fugitive dust from construction activities. On- and off-site emissions from construction equipment and workers can be controlled, as appropriate, by the use of proper equipment and restricting working hours.

4.7 NOISE

Existing Conditions - The ambient noise levels around the Mānoa Campus are typically consistent with noise levels found in urbanized residential areas. A 1989 Noise Impact Study (Y. Ebisu & Associates, 1989) discussed existing and anticipated noise issues on the Mānoa Campus. While this study focused particularly on the Special Events Center in the Makai Campus, it also considered the worst case scenario, since the Makai Campus is the most noise-prone location on the Mānoa Campus due to its proximity to the H-1 Freeway, Dole Street and University Avenue, the parking structures and athletic facilities. Ambient noise levels measured at that time were 55dBA or less, which does not exceed the Department of Health Guidelines.

Impacts – The improvements proposed in the planning period are not likely to result in an increase in ambient noise levels on the UHM Campus. However, significant amounts of noise will be generated during the construction period.

Mitigation – No extraordinary mitigation measures are proposed at this time since the noise generated by current and proposed activities is not expected to exceed allowable levels. Construction activities will be monitored by the University and State to comply with the provisions of the regulations for community noise control. The contractor will be required to obtain a noise permit if the noise levels from construction activities are expected to exceed the allowable levels. Heavy vehicles traveling to and from project sites will comply with the State's administrative rules for vehicular noise control.

4.8 FLORA AND FAUNA

Existing Conditions - The vegetation on the Mānoa Campus is almost entirely urban in character. There are, however, many rare trees, including threatened and endangered species, located around the campus; in fact, one of the greatest assets of the UHM Campus is its collection of

special trees and its mature tree canopy. The existing landscape functions as a unifying element in which buildings of various eras coexist congenially. According to a recent landscape study conducted for the current update to the UHM LRDP (Walters, Kimura, Motoda, Inc, 2007), substantial strides have been made in improving the campus' landscaping since 1994. There are, however, still many areas on the UHM Campus that are unattractive.

The urban character of the campus provides poor habitat for wildlife. The predominant fauna are introduced species, including rats, mice and feral cats. Typical avifauna includes Common Indian Mynah, doves and sparrows. No rare, threatened or endangered species are known to exist on the project grounds.

Impacts – There are no anticipated significant negative impacts to flora and fauna from development—in fact, the development plan calls for a Landscape Master Plan to improve the vegetated landscape at the University. Efforts will be made to preserve mature trees in construction areas.

Mitigation – One of the key elements of the 2007 LRDP Update is the development of a Landscape Master Plan to provide guidelines for knitting together the campus into a unified whole. Accordingly, the vision of the Mānoa Campus is that of a tropical interpretive garden, which in addition to being educational:

- supports a Hawaiian sense of place, including views of the mountains as well as botanic and cultural native plants,
- provides a visually attractive, comfortable and functional environment for people walking and driving through the campus
- includes a great collection of plants that utilizes the good soil and range of micro-climatic conditions at Mānoa, and
- makes a substantial contribution to environmental sustainability concerns, such as improving storm water management, reducing water demand and heat island effects, avoiding invasive species and utilizing integrated pest management techniques.

To implement this vision, the Landscape Master Plan establishes a variety of important principles, organizes the existing campus into a range of landscape "use" zones, and recommends a number of design guidelines such as plant selection, size of plant material, general location (through landscape zones), and overall tree care. Through this Master Plan, the enhanced landscape will help support the University's desired development of the UHM Campus as a leading higher education and research institution. Additionally, a green roof program as proposed by the LRDP would also increase the area of vegetated landscaping on the campus.

Proposed projects in the UHM LRDP Update 2007 will individually supply more detailed landscaping plans, which include specific information on plant types, species names, estimated size and general location, quantity of plant materials to be installed and other planned screening and/or buffering components. This information will identify the specific landscaping elements and proposed plans that best fit with each project and its surrounding areas. Additionally, a landscape remediation plan and specific mitigation measures will be provided. Project specific landscape master plans will be developed in coordination with the Facilities Management Office and University landscape architects and provided with each building permit submittal.

4.9 ARCHAEOLOGICAL RESOURCES

Existing Conditions - The *Archaeological Literature Review and Field Inspection Report for the University of Hawai'i at Mānoa Long Range Development Plan*, by Cultural Surveys Hawai'i, Inc. (CSH) is intended as a planning document to facilitate good stewardship of historic properties, and to streamline compliance with SHPD requirements as may attend future development. CSH archaeologists Chris Monahan, Ph.D. and Jon Tulchin, B.A. conducted the fieldwork on May 14, 2008 in a total of 10 person hours. The full report is appended to this report in *Appendix E*.

The 2007 Long Range Development Plan (LRDP) focuses on projects that are on the Capital Improvement Program and/or are anticipated for development within the next 5-10 years. At this time, a total of at least seventeen (17) new buildings and/or building expansions are included in the LRDP. The Area of Potential Effect (APE) consists of the entire approximately 304-acre campus. The following historic properties located within the boundaries of the UHM Campus have previously been assessed as eligible for the Hawai'i Register of Historic Places (HRHP):

1. The historic core of the campus (State Inventory of Historic Properties [SIHP] No. 50-80-14-1352), consisting of Hawai'i Hall, George Hall, Dean Hall, Gartley Hall, Crawford Hall, Varney Circle, Founder's Gate, Andrew's Outdoor Amphitheater, Wist Hall and the Pineapple Research Center. These historic structures were added to the HRHP in 1984 (*Figure 4-4*).

2. Kānewai Cultural Garden (SIHP No. 50-80-14-4498), consisting of modern surface features (irrigation ditches feeding into taro pondfields) overlying centuries-old deposits consistent with a long history of cultivation. It is also important to state the nearby "Dole Street burials" documented by CSH (Hammatt and Shideler 1991) are reburied on the grounds of the Center for Hawaiian Studies (*Figure 4-5*).

3. SIHP No. 50-80-14-4191, a traditional-style presumably pre- Contact-era burial discovered during construction activities at Keller Hall (Smith and Kawachi 1991). The following historic properties located within the boundaries of the UHM Campus have not been previously assessed for eligibility for the HRHP:

    a. Koana Cave, which has never received a site number designation, has previously yielded human skeletal remains (accessioned by the Bishop Museum in the 1960s), and probably contains as yet undiscovered historically-significant cultural materials consistent with habitation and / or gardening (*Figure 4-6*).

    b. Hipawai Heiau, designated by McAllister (1933) as "Site 63," reported as "torn down" earlier by Thrum; CSH archaeologists may have identified a remnant section of stone wall associated with this *heiau* located just outside the boundaries of the UHM property (*Figure 4-7*).

In addition to the aforementioned historic properties located on the UHM Campus, two areas containing possible rockshelters were identified during the course of the subject field inspection. As explained in detail above, additional testing (controlled archaeological excavations) would be needed to more accurately determine whether these possible rockshelters contain any historically-significant cultural materials.

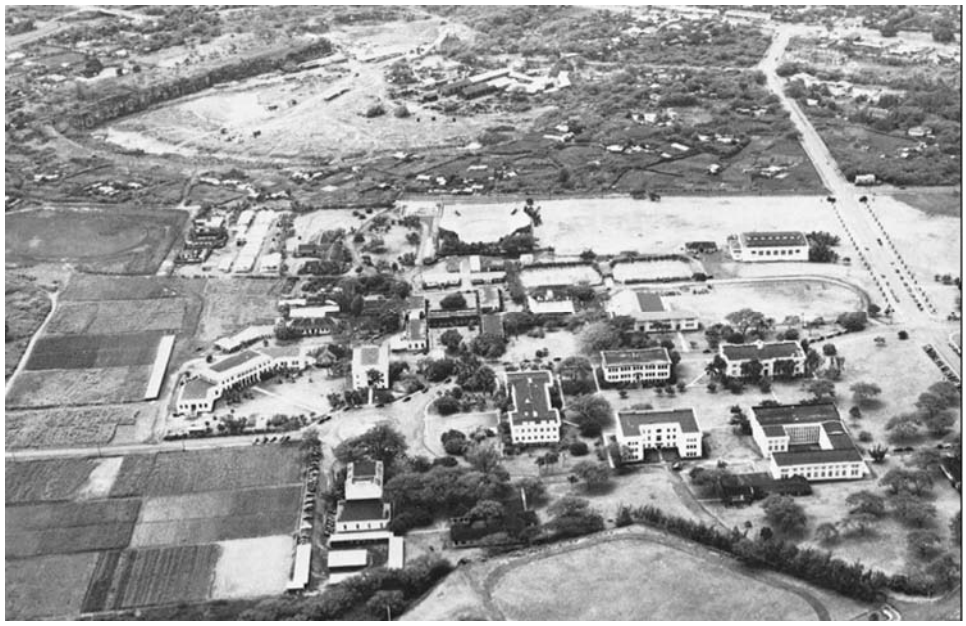


Figure 4-4: 1939 Aerial photograph showing the campus dominated by the old quad (lower right) of Hawaiʻi Hall (1912), Gartley (1922), George (1925), and Dean (1929) and the new Crawford Hall (1938). The brand new Hemmingway Hall (1939) is just seaward and old Gilmore Hall (1935-1973) with its two wings anchors the east end of campus at left. (Cultural Surveys Hawaiʻi, Inc., 2008)



Figure 4-5: Overview of the central portion of the Kānewai Cultural Garden (Cultural Surveys Hawaiʻi, Inc., 2008)

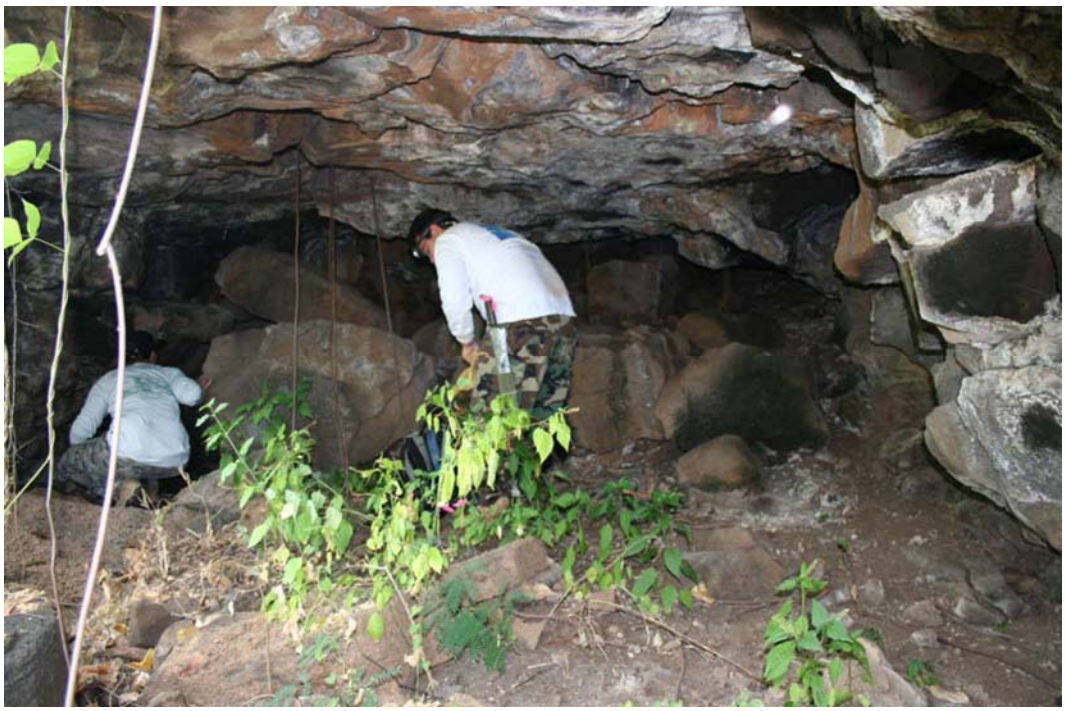


Figure 4-6: Main chamber of Koana Cave (Cultural Surveys Hawai'i, Inc., 2008)



Figure 4-7: Stone wall remnant at the location of Hipawai Heiau, facing north-northwest (Cultural Surveys Hawai'i, Inc., 2008)

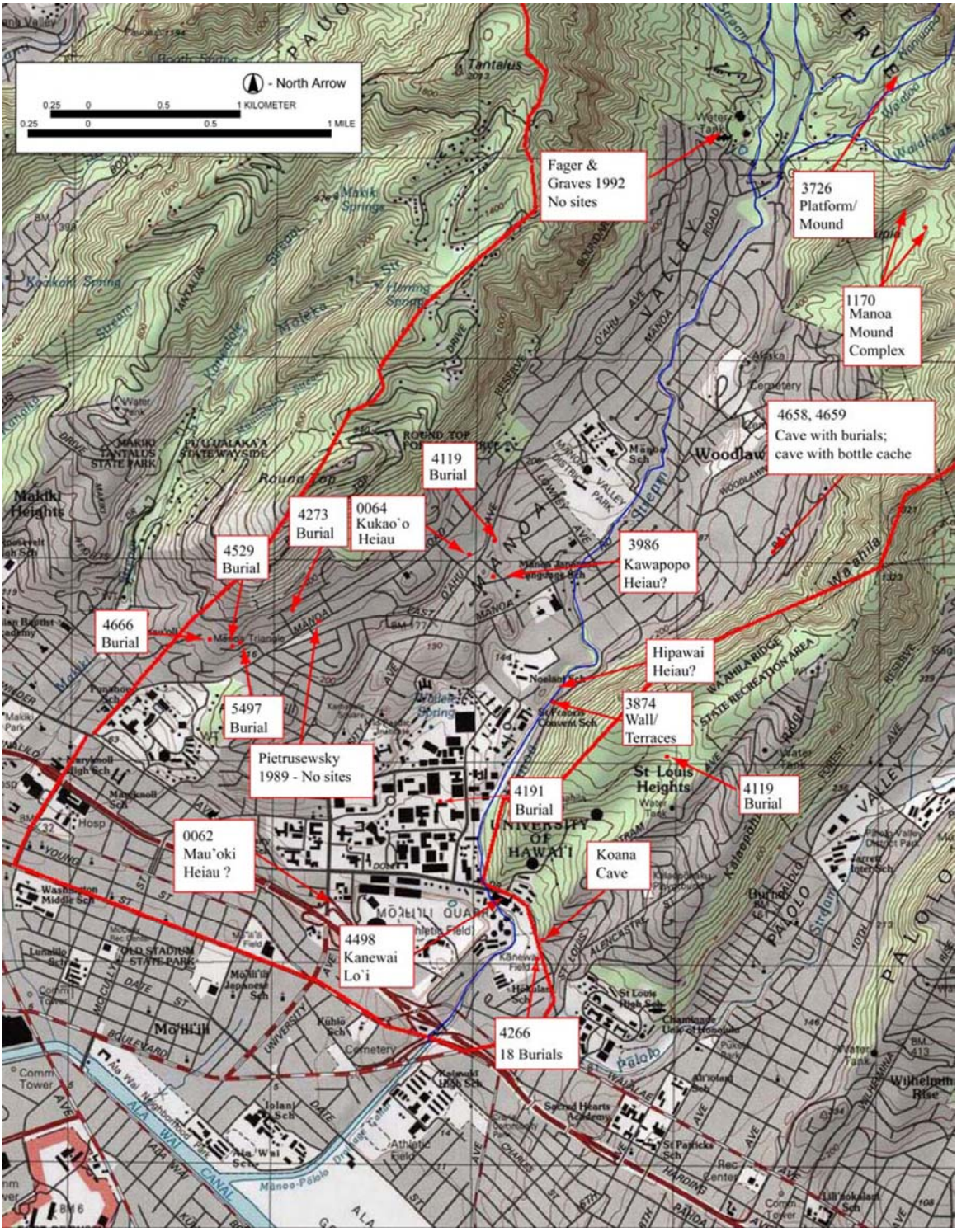


Figure 4-8: Previously identified archaeological sites in Mānoa Ahupuaʻa (project areas with no identified sites are denoted by author and year of the report) (Cultural Surveys Hawaiʻi, Inc., 2008)

Impacts – Impacts may result from development activities to sub-surface burial sites that are as yet unknown. Impacts may also result from renovation and/ or demolition of buildings of potential historic significance, as outlined in *Section 4.10*.

Mitigation – CSH offers the following specific recommendations:

1. Alterations to, or near, the historic structures included in SIHP No. 50-80-14-1352 should be assessed by a qualified Architectural Historian.

2. Any major ground disturbance at Kānewai Loʻi should be preceded by additional archaeological testing and / or should be conducted in association with monitoring by a qualified Archaeologist, in consultation with the Center for Hawaiian Studies.

3. Given the Keller Hall burial discovery (SIHP No. 50-80-14-4191), in particular, it is possible that as yet undiscovered burials may still be present at some locations on the UHM Campus; however, it is fairly difficult to predict with any specific certainty where burials might occur. CSH recommends consultation with the SHPD on future excavation projects on the UHM Campus.

4. Koana Cave should be formally assessed by a qualified Archaeologist and assigned a State Site number. Given reports of human skeletal remains from this cave, it should also be preserved and protected from those who might disturb or desecrate its contents. Archaeological testing (excavation) of the cave would have to be balanced against the possibility of encountering / discovering additional human skeletal remains.

5. No further work is recommended for the rock wall remnant that may be a portion of the Hipawai Heiau; however, should deep excavation or major development be planned for the adjacent Magoon Property, against which the wall remnant rests, archaeological monitoring or preliminary subsurface testing (excavation) might be warranted in order to ensure that no historically-significant cultural resources associated with the old *heiau* are damaged. Thrum's comments in reference to Hipawai Heiau, made approximately 100 years ago (see Sterling and Summers 1978:286), are instructive: "…partly destroyed many years ago, then used as a place of burial."

6. Finally, if the Waʻahila Ridge area is slated for major development, the two possible rockshelter areas should be subject to formal archaeological inventory, including subsurface testing (excavation), prior to any substantial ground disturbance.

4.10 HISTORIC RESOURCES

Existing Conditions - The following places on the Mānoa Campus have been listed on the State Historical Register to date:

Hawaiʻi Hall
Gartley Hall
Dean Hall
George Hall
Founders' Gates
Wist Hall
Castle Memorial Hall
Crawford Hall
Andrews Amphitheater
Varney Circle Fountain

One of numerous criteria to qualify for placement on the Historical Register is that a building must be at least 50 years old (*Figure 4-4*). The process of being listed on the Historical Register is voluntary and discretionary, and once listed, additional review is necessary prior to certain alterations or demolition. UMH buildings that were built before 1968 (and thus may qualify for listing) and are proposed for alteration/demolition in the 2007 LRDP Update include:

Music Complex and Orvis Auditorium
Klum Gym
Engineering Quad Health Services
Old Bookstore
Health Services
Henke Hall
Wist Annex 1 and University Laboratory School
Krauss Hall and Annex

Impacts – Pursuant to State Historic Preservation laws and guidelines for placement on the Historic Register, fifty years is a standard qualifying threshold for consideration as a historic property. The consideration of a building for placement on the register does not automatically qualify it for placement. Potentially, the review by the State Historic Preservation Division may result only in a recommendation for completion of a HABS (Historic American Building Survey), after which it is permissible to alter or demolish the building. Even after a building has been registered as a historic building, which can take a number of years, it can legally be altered or demolished once formal procedures have been followed.

Mitigation – Given the number of campus buildings approaching the fifty year threshold, the separate UHM Master Planning process scheduled to begin soon should include the identification and consideration of these buildings' historic value, as the University should have a clear sense of its past, of its roots and traditions, as it moves into the future. Some structures, such as Henke Hall are not very efficient or suited for modern labs and academic uses. However, they should be reviewed for historic values and qualities. The University can retain the decision to proceed with listing on the Register or to alter or demolish such structures after the assessment has been completed.

4.11 CULTURAL RESOURCES

Existing Conditions – The *Cultural Impact Assessment for the University of Hawai'i at Mānoa Long Range Development Plan*, by Cultural Surveys Hawai'i, Inc. (CSH) is intended as a planning document to facilitate good stewardship of cultural resources, and to streamline compliance with the State of Hawai'i environmental review process, which requires consideration of a proposed project's effect on cultural practices and resources. Through document research and (ongoing) cultural consultation efforts, the report provides preliminary information pertinent to the assessment of the proposed project's impacts to cultural practices. The study is intended to support the project's review and may also serve to support the project's historic preservation review under HRS Chapter 6E-8 and Hawai'i Administration Rules Chapter 13-275. The full report is appended to this report in *Appendix F*.

The 2007 Long Range Development Plan (LRDP) focuses on projects that are on the Capital Improvement Program and/or are anticipated for development within the next 5-10 years. At this

time, a total of at least seventeen (17) new buildings and/or building expansions are included in the LRDP. The Area of Potential Effect (APE) consists of the entire approximately 304-acre campus.

Hawaiian organizations, agencies and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the project area and the vicinity. Organizations and members / representatives of these organizations consulted included the SHPD, the Office of Hawaiian Affairs (OHA), Hui Mālama I Nā Kūpuna o Hawaiʻi Nei, faculty members of the Kamakakūokalani Center for Hawaiian Studies, the Mānoa Heritage Center, the Mānoa Neighborhood Board, Hoʻokahe Wai Hoʻoulu ʻĀina, and Mālama o Mānoa.

Background research conducted for this project yields the following results:

1. Given its abundant natural resources—including several tributary streams that feed into the main stream and several *pūnāwai* (fresh-water springs)— Mānoa Valley has been an attractive place to settle and garden for as long as people have lived on Oʻahu (i.e., well over a millennium). Lower Mānoa Valley, within which the campus is located, represents the prime wet-taro-growing area and agricultural heartland of the entire valley.

2. Mānoa is exceedingly rich in places names, *wahipana* (legendary or storied places) and associated *moʻolelo* (oral histories), reflecting the valley's elevated cultural and historical significance to Hawaiians, in particular. Important *moʻolelo* focus on Mānoa's many *pūnāwai*, which are directly associated with the exploits of two primary Hawaiian gods, Kāne and Kanaloa. These springs include Kānewai (location of the current Kānewai Cultural Garden), Hualani, Wailele— located near the present day athletic field of the Mid-Pacific Institute and associated with Kūkaʻōʻō Heiau, Punahou (a.k.a. Kapunahou), Kaʻaipū, Waʻaloa and Waiakeakua. The valley is also home to many *puʻu* (hills, mountains), peaks, ridges and caves—all with associated *moʻolelo*; these include Waʻahila Ridge (which defines the eastern border of the valley) and its numerous peaks. Finally, Mānoa is also associated with a variety of other *moʻolelo*, including "Pīkoi the Rat Killer," "Maluae and the Underworld," and "The Woman Who Died and Came Back to Life;" as well as famous events and people of the early historic era, including Kamehameha I, Kaʻahumanu and Boki.

3. The archaeology of lower Mānoa is somewhat problematic in that most of the campus was developed before historic preservation awareness and laws were in place; thus many or most surface level sites and features once present in the project area have been destroyed and / or damaged by being covered with sediments and structures. Before these historic impacts, however, the campus undoubtedly contained a patchwork of gardens, including many *loʻi* (stone terraces) and *ʻauwai* (irrigation ditches), and house sites, including many small stone enclosures, terraces and platforms. Undoubtedly, there are still subsurface cultural deposits within the campus containing significant historic and cultural resources.

4. Burials have been documented near Keller Hall and along Dole Street, immediately adjacent to the Kānewai Cultural Garden and Kamakūokalani Center for Hawaiian Studies. The latter burials, representing the remains of at least 18 individuals, have been interpreted as a traditional Hawaiian cemetery. It is possible that more burials are located in subsurface deposits within the project area.

5. A recent field inspection of the campus by CSH found a number of possible rock shelters and overhangs in the Wa'ahila Ridge area. Additional study of these possible archaeological sites would have to be conducted in order to more fully understand their function, chronological age and archaeological significance. Community consultation conducted for this project yields the following main concerns:

    a. Many participants voiced concern about the possibility of encountering as-yet undiscovered cultural and historic sites, including most importantly, human skeletal remains and burials in subsurface deposits. One participant (Dr. Davianna McGregor) also pointed out that the burial site preserve near Keller Hall, which used to be marked by a ginger plant, is no longer being maintained (i.e., the ginger plant is not there anymore).

    b. A few participants stated that existing undeveloped areas, including ridges and valley slopes, should not be developed or impacted in any way, given the already significant loss of such natural portions of the campus and given the importance of retaining a Hawaiian sense of place and landscape integrity. This concern about preserving the last undeveloped portions of the campus extends specifically to the Wa'ahila Ridge area.

    c. Many participants voiced concerns about future buildings and projects being more harmoniously designed and integrated into the natural surrounding and themes inherent to the valley. It is important to note that this type of concern is fundamentally a cultural one for Hawaiians, in particular, whose 'world view' and deeper philosophical / spiritual beliefs are based on such concepts as *pono* (in this case, "right ways" of doing things) and *lōkahi* ("harmony"), among other related concepts (e.g., *mālama 'āina,* or "taking care of the land").

    d. A few participants talked about the importance of understanding and incorporating Hawaiian language words, phrases and concepts that extends beyond the superficial (e.g., naming buildings).

    e. The current Director of Ka Papa Lo'i o Kānewai (a.k.a. Kānewai Cultural Garden) shared his personal knowledge of a well-known master navigator and teacher who previously indicated the large albizia tree at Kānewai Lo'i (which is scheduled to be removed in association with a stream erosion-prevention project funded by the Federal Emergency Management Agency) could be used to construct a large traditional *wa'a* (canoe).

    f. Many participants talked about the importance of using native plants in future projects.

    g. The Wa'ahila Ridge area is an important natural and cultural resource, containing trails, native plants and other significant sites and features (e.g., possible rockshelter and overhangs).

h. A few participants provided detailed accounts of well-documented *moʻolelo, wahi pana* and other cultural sites in Mānoa; in one case, one participant (Palani Vaughn) suggested there is another, alternate legend associated with the origins of the well-known spring (Ka Punahou, widely attributed to Kāne), but he did not elaborate further on this point.

i. A couple participants called into question the State's (i.e., Department of Land and Natural Resources, Historic Preservation Division) poor record of protecting and preserving important cultural sites in Mānoa, including *heiau* that have been damaged or compromised by recent construction projects.

j. One participant (Palani Vaughn) suggested the university has not done enough to promote education about the traditions of old Hawaiʻi in Mānoa; and that it should build a "learning center" (perhaps located at the Center for Hawaiian Studies) that would integrate *moʻolelo, wahi pana,* the landscape and other cultural and historical information about Mānoa.

k. One participant (Dr. Davianna McGregor) pointed out that the Long Range Development Plan (LRDP) is not detailed enough for meaningful review and comment, and that descriptions such as building "expansion" or "replacement" are too vague. There is concern that the LRDP will be used to guide development 20 years from now, which, given the lack of detail, is problematic.

l. Dr. McGregor also pointed out that there are many significant and commemorative trees on campus that should be systematically catalogued in order to ensure their protection during future development of the campus.

Impacts – Impacts may result from development activities to significant cultural resources and practices. Impacts may also result from renovation and/ or demolition of buildings of potential historic significance, as outlined in Section 4.10.

Mitigation – CSH recommends the following measures, which, if addressed in a good faith manner, will help mitigate potentially adverse effects of the proposed project:

1. Community consultation participants and the wider Mānoa community should be afforded the opportunity to review the subject draft CIA and offer their input for the final verision of this report.

2. Given that the LRDP includes seventeen new buildings, building expansions and other infrastructure improvements, and given the lack of specific plans for these projects, the community should be afforded the opportunity to review and comment on each individual project as details become finalized and as more specific potential impacts (both positive and negative) can be assessed.

3. The University should proactively develop a plan to avoid disturbing burials and historic and cultural sites located in subsurface contexts. Such a plan may include archaeological inventory surveys prior to ground disturbance and / or archaeological monitoring of excavations during construction; specific decisions should be made on a case-bycase

basis, in consultation with appropriate government agencies (e.g., SHPD, OHA) and Native Hawaiian organizations and individuals. In particular, every effort should be made to proactively avoid inadvertent finds of human skeletal remains and burials.

4. Planning and design of proposed projects included under the LRDP should incorporate Hawaiian cultural and historical themes and concepts in order to restore and accentuate an authentic Hawaiian sense of place. This should include (a) use of native and Polynesian-introduced plants, (b) integration of *mo'olelo*, Hawaiian language and other Hawaiian concepts and ideas beyond superficial applications of such information (e.g., building names) and (c) preservation and protection of undeveloped spaces and natural resources.

5. The Wa'ahila Ridge area, one of the only undeveloped places in lower Mānoa Valley, should be carefully preserved and protected from future development, and from modern abuses and damage that have already taken their toll (e.g., soil erosion from "off-road" activities).

6. Ka Papa Lo'i o Kānewai, also known as Kānewai Cultural Garden, should be treated with the utmost care and respect; any plans for future improvements, alterations or development in or adjacent to Kānewai Lo'i should include comprehensive consultation with its director and with the Hawai'inuiākea School of Hawaiian Knowledge.

7. The issue of removing the large albizia tree scheduled for removal in association with the stream-erosion-prevention project should be discussed with the Director of Ka Papa Lo'i o Kānewai, who has indicated the tree may be used to make a large traditional *wa'a* (canoe).

4.12 AESTHETIC RESOURCES

Existing Conditions - The 304 acre UHM Campus, strategically located at the mouth of Mānoa Valley, is a significant part of the ahupua'a of Mānoa and Waikīkī, as displayed by *Figure 4-9*. Mānoa Stream, which runs along the Diamond Head side of the campus, is the natural feature connecting the mauka and makai portions of the ahupua'a and is the source of the waters that feed the makai lands with their "waikīkī" (spouting waters). Wa'ahila Ridge, which with Mount Tantalus frames the mouth of the Valley, is the Diamond Head boundary of the campus.

The campus has been noted for its lack of consistency, continuity and cohesiveness in architectural character; landscaping in some areas; and effective relationships between buildings and space. These shortcomings have been a major cause of criticism of the physical appearance of the Mānoa Campus. The 2007 LRDP Update illustrates the design considerations for the projects on specific sites, incorporating information from the various analyses conducted in preparing the LRDP. The end result is not a final project design but a set of design criteria. These criteria are not meant to be rigid standards; rather flexible statements to guide the design of future projects. They may include the establishment of maximum heights, maximum widths, as well as guidelines for architectural and landscape design.

In the Hawaiian tradition, geographic orientation is often based on being able to see mountains, the sea and prominent land forms. Thus views of the mountains and sea are visual assets of the campus.

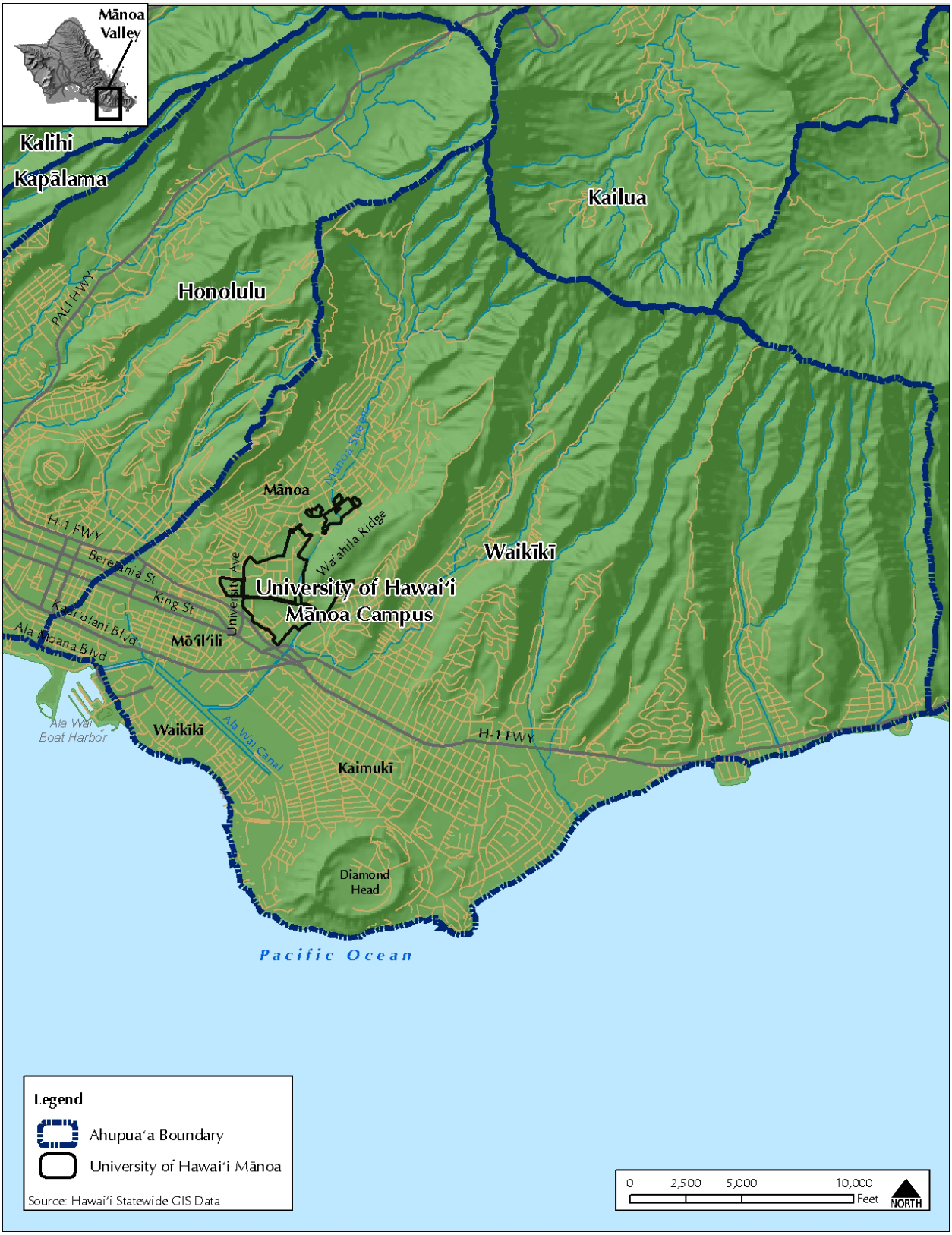


Figure 4-9: Ahupua'a Map

Given its significance within the ahupuaʻa, the campus inherits a major kuleana responsibility as a steward of the lands of Waikīkī (*Figure 4-9*). This kuleana responsibility may take many forms; its most obvious responsibility related to the land is to preserve and enhance the natural systems of the ahupuaʻa to the extent possible. The land has functioned with certain patterns since time immemorial and while these patterns have been modified over time, it can be reasoned that unless these patterns perpetuate, the very nature of the land and its ecological values will be lost.

The LRDP Update recommends that in the future, vegetation will not be limited to landscaped open spaces but will extend to buildings. Throughout the world, building roofs are being landscaped, natural areas are being introduced into the body of structures, natural light and air are permeating previously sealed spaces and paved surfaces are absorbing water into the ground. Buildings on campus will generate power to satisfy their own needs. Waste will be recycled. UHM will become a laboratory, model and leader of sustainable practices, which relate to the Hawaiian environment and culture and to the world.

The neighborhoods of Mānoa, McCully, and Mōʻiliʻili are also major communities in the ahupuaʻa of Waikīkī. Over time, these areas have seen UHM grow from a small pastoral campus to one of the largest urban centers in Hawaiʻi, with a daytime population of over 30,000 persons. Past LRDP's have emphasized the importance of integrated planning, recognizing both the positive and adverse impacts these communities experience because of their adjacency to the campus.

The 2007 Update continues to see Mānoa, McCully, and Mōʻiliʻili relating to the campus in a positive and direct manner. It is predicted that these communities will be vital commercial centers supported by the University community. These areas are also potential venues for educational and cultural activities shared by the campus and larger community. They currently serve as residential neighborhoods for students and faculty.

Impacts- With the UHM LRDP Update an opportunity exists for the Mānoa Campus to become a more cohesive campus during the planning period. Key sites are identified for development during this time. The challenge in the design of the new buildings on these sites, as well as the expansion of existing facilities, is to maximize the contribution of each project towards providing a greater aesthetic and functional wholeness to the campus.

Mitigation - In exercising its kuleana, responsibility and authority, UHM, through its LRDP, will seek to maintain and enhance the natural patterns and concepts of the ahupuaʻa (*Figure 4-9*). The campus, even with its extensive development, is envisioned to be an entity that makes positive ecological contributions to its ahupuaʻa and the City of Honolulu. Its tree canopy is the basis of an "urban park." Already, the campus possesses a significant amount of open space (though many parts of it are roadways and remnant areas), which, if well landscaped and maintained, would represent a positive increase in the developed open space of the campus. Many university campuses, are oases in the midst of urban development. In this sense, they remain green "urban parks" which serve to cool ambient temperatures, provide ecological functions, increase permeability for ground water, and offer visual beauty and respite.

As a responsible party within the ahupuaʻa, UHM is guided by the LRDP to minimize its negative impact on its neighbors while increasing its accessibility to the larger community. The Update establishes increased parking on campus and encourages pedestrian, bicycle and moped access. With the objective of sustainability adding to the beauty of the valley with large and small usable,

landscaped, open spaces and with environmentally responsible buildings and facilities, the LRDP envisions the campus seamlessly transitioning from the mauka residential valley into the more urban and commercial districts of Mō'ili'ili and McCully. Where practicable views of the mountains and sea should be preserved and others recaptured.

4.13 INFRASTRUCTURE

The following paragraphs discuss three important infrastructure systems in and around the UHM campus that may be affected by elements of this LRDP Update, namely the drainage system, the wastewater system and the potable water system. A *Utility Systems Report* (October 2007) was prepared by Austin, Tsunami & Associates, Inc. for the UHM LRDP 2007 Update and is included in *Appendix G*.

4.13.1 Drainage System

Existing Conditions **–** The UHM Campus is part of the Mānoa watershed. A large amount of off-site drainage from portions of Mānoa Valley and Mid-Pacific Institute is conveyed through the City's drainage system through and around the UHM Campus. As depicted in *Figure 4-10*, UHM's storm drain system connects to the City's drainage system on University Avenue and Dole Street. The Makai Campus has several existing outlets to Mānoa Stream as well as a storm drain system that is connected to the City's drainage system on Varsity Place.

There are two concrete interceptor ditches outside of and along the University's common boundary with the Mid-Pacific Institute that converge just above the Agricultural Engineering Building. One of these ditches runs along the UHM property line just mauka of Maile Way, while the other runs along the property line beginning near the Biomedical Science Building and ending near the Agricultural Engineering Building. A portion of UHM's drainage system ties into the ditch near the Biomedical Building. The capacity of this ditch is questionable, as it was overwhelmed in the October 2004 flood.

Impacts– Generally, the improvements proposed in the 2007 LRDP Update are not anticipated to have significant long-term impacts on campus drainage. The majority of the new buildings and parking structures will be in areas that are already paved; therefore the increase in impervious area should be minimal. In addition, building slabs and paved areas will be set close to existing grades to minimize excavation and embankment, thus retaining the campus' existing drainage patterns.

Letters from the Department of Environmental Services (DES) and Department of Design and Construction on the proposed project provided no comments in regards to adequacy. The University has been conducting ongoing discussions with the City in regards to future long range drainage plans for the area.

Mitigation - As noted above in *Section 4.5*, the Mānoa Watershed Project is investigating flood mitigation and stream restoration issues related to the October 2004 flooding. The University's involvement with this project to develop and review recommendations and to monitor implementation will help to coordinate improvements that may affect the UHM Campus.

There are two major drainage improvements in the Central Campus that will be constructed in the near future; these improvements are being made to help protect UHM from future flood damage as sustained in the October 2004 event:

1. Hamilton Ground Floor Renovation – After considering a number of alternatives to protect Hamilton Library from another similar sized flood of approximately 2,000 cubic feet per second (cfs), construction plans are being finalized to install a relatively small drainage system and a 2.5 foot high wall around the front and side of the library, to repair the existing drainage improvements upstream at the entrance to a box drain, to lower a portion of the driveway at the 'Ewa end of the building, and to cover the existing "moat" at the north, east and west sides of the Library with a concrete roof to prevent flood water from filling up the moat and then entering the ground floor. This alternative is expected to mitigate about 500 cfs, while allowing approximately 1,500 cfs to pass through the McCarthy Mall to downstream areas. The alternative of building a larger box drain approximately 10 ft. by 8 ft. with a new inlet structure by the Agriculture Engineering Building and a new outlet at Mānoa Stream, which would accommodate the full 2,000 cfs, was recommended for further consideration.

2. Biomedical Science Building – To prevent future flooding of this building, several floodwalls on the northern and eastern sides of the building are being designed. A concrete channel is also being considered adjacent to the northern wall to direct the flow to the existing ditch along the property boundary with Mid-Pacific Institute. This flood-response project has direct connections with another planned LRDP mitigation project as detailed below.

To improve the overall drainage on campus, there are three drainlines that need to be designed and constructed as part of the LRDP building and roadway improvements:

1. Parking Structure Phase IIB – As noted on *Figure 4-10* and the 1990 Drainage Master Plan, "Project B" will extend the drainlines on the makai side of the parking structure to connect to the existing drainage system.

2. Project "E" – As noted on *Figure 4-10* and the 1990 Drainage Master Plan, "Project E" will extend the Drain "C" to St. Francis School to convey storm water through an underground drainage system.

3. Research Buildings North and East of Biomedical Science Building – An existing 54" pipe currently outlets at an energy dissipater into a small swale on the north side of the Biomedical Science Building. The swale runs to an existing 18" pipe that outlets to the concrete ditch on Mid-Pacific Institute's property; both the swale and the 18": pipe will need to be re-routed around the new research buildings. The existing 54" pipe should be extended to the existing concrete ditch to improve the conveyance of stormwater in this area. As noted above, the capacity of this ditch needs to be examined; additionally, this project will need to be coordinated with Mid-Pacific Institute since they own the ditch.

In addition to these three improvements, consideration of the large box drain noted above in the Hamilton flood-response project will be studied to help mitigate the amount of surface drainage coming through the UHM campus. The alignment of this box drain will be challenging because of

the existing infrastructure and new underground electrical lines being installed on Maile Way and East West Road. Since this box culvert would also convey stormwater from Mid-Pacific Institute and other parts of Mānoa Valley, this project requires close coordination with the Mānoa Watershed Project.

Site erosion control measures and Best Management Practices will be implemented to reduce pollution from construction activities prior to entering the City's drainage system. Other permanent mitigation measures, such as vegetated roofs, porous paving and stormwater separators with media filters, are discussed in the LRDP's Sustainability Guidelines and may be used to reduce the amount of runoff and to improve stormwater quality.

A new Drainage Master Plan will be considered in the full scale master planning for the campus scheduled for commencement in 2009, in conjunction with the Mānoa Watershed Project and the City's future drainage improvements, since off-site improvements from these projects can greatly affect UHM's drainage infrastructure.

The 2007 UHM LRDP Update includes a goal of increasing permeable surfaces from 40% to 60% of the campus land area to allow more absorption of rainwater into the ground. It also sets a goal of increasing canopy cover from 20 to 30%. Also being planned is the addition of green roofs and rainwater harvesting to further reduce runoff.

4.13.2 Wastewater System

Existing Conditions **–** The UHM Campus Wastewater is disposed through the City's wastewater system that runs through the campus. According to UHM Facilities Management, the existing sewer lines owned and maintained by UHM have no known problems. Pursuant to discussions with the City's DES Wastewater Management Branch (WMB), there are three areas with potential capacity problems on or near campus (*Figure 4-11*):

- Dual sewer lines mauka of the Agricultural Engineering Building
- Metcalf Street
- University Avenue near King Street

Impacts– Only the first of these three areas would be potentially affected by the 2007 LRDP Update. The dual 24 inch sewer lines may be near capacity. These lines, owned by the City, serve the Mānoa area and the UH Mānoa Campus, refer to *Figure 4-11*. A letter from DES on the proposed project provided no comments in regards to adequacy. The WMB will not be able to determine specific restrictions until they can assess future flows from UHM and other upstream users. In addition to potential flow restrictions if hooked up to this line, the Research Building north of the Biomedical Sciences Building is planned to be located in close proximity to the alignment of the line.

Mitigation- UHM will work with WMB to either avoid or relocate the two 24 inch lines. As an alternative, the Sewer Master Plan should evaluate whether this building, along with other future buildings in this area, can be connected to the existing sewer line on East West Road or any other location to provide relief for the City's dual sewer lines.

Prior to finalization of development plans, WMB will be contacted to ensure that the sewer system has available capacity to handle the planned campus improvements. If capacity is unavailable

other system wide mitigation options will be evaluated. Sustainability projects and designs may reduce overall flows, such as LEED measures to mitigate generation such as low flow toilets and water use fixtures.

4.13.3 Potable Water System

Existing Conditions **–** The UHM Campus is served by the City's Board of Water Supply (BWS) system. There are several water meters on campus that connect to the BWS system. The two main meters on the central campus are located near Burns Hall on Dole Street and just north of Kennedy Theatre on East West Road (*Figure 4-12*).

Since the 1994 LRDP Update, some of the water lines that were inadequate for fire flow have been improved. These areas include the site of the Teachers College/Lab School and Hemenway Hall. In addition, there were several fire hydrants added to the Central Campus. A significant amount of water lines were installed in the Makai Campus to provide adequate fire flow and water service to this area.

Impacts– Although the additional buildings in this 2007 LRDP Update will be increasing the water demand for UHM, the BWS has confirmed that the existing water system is presently adequate to accommodate the proposed facility upgrades. Additionally, water conservation efforts detailed below are expected to actually decrease the total water demand on campus. With this in mind, the main focus of this LRDP is to improve fire flow and provide redundancy for the existing water system.

Mitigation - Improvements to be constructed in the next 5 to 10 years are as follows, *Figure 4-12*:

- Parking Structure Phase IIB/ Bookstore – Construct 12" water line to complete the loop on the Makai Campus;
- Research Buildings North and East of Biomedical Science Building – Construct 8" water line with fire hydrants to provide adequate fire protection;
- Upper Central Campus Roadway – Construct 8" water line and connect to the existing "high service" BWS main on Pamoa Road. This will provide fire protection for St. Francis Convent.

In addition to these three projects, the Utility Systems Report suggested the consideration of making a new connection to the existing 20" transmission main near the Student Services Center and looping the system back to the existing 8" water line near Sakamaki Hall. This would improve water pressure and provide redundancy for the water system.

Additionally, as there have been a significant amount of changes to the UHM water system since the last Master Plan in 1990, an updated Water Master Plan will be completed with the next comprehensive LRDP update to reevaluate the existing water system.

Since 2002, the guiding principle of the University of Hawai'i has been "sustainability." In this light, UH and BWS signed a memorandum of understanding in 2003 to establish a program for reducing water and wastewater use at the Mānoa Campus. The goal of the program is to reduce water consumption by 10% annually through the development of a Water Management Plan that will include analyzing the campus' existing water system, identifying mitigation measures to reduce water use and monitoring water consumption. The new legislation mandate requiring new

public buildings to achieve LEED silver ratings will work to reduce water and wastewater use at the Mānoa Campus and to meet sustainability goals and principles.

All proposed provides are required to provide a water supply approved by the county, capable of supplying the required fire flow for fire protection to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed or moved into or within the county. On-site fire hydrants and mains capable of supplying the required fire flow shall be provided when any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building (1997 Uniform Fire Code, Section 903.2, as amended).

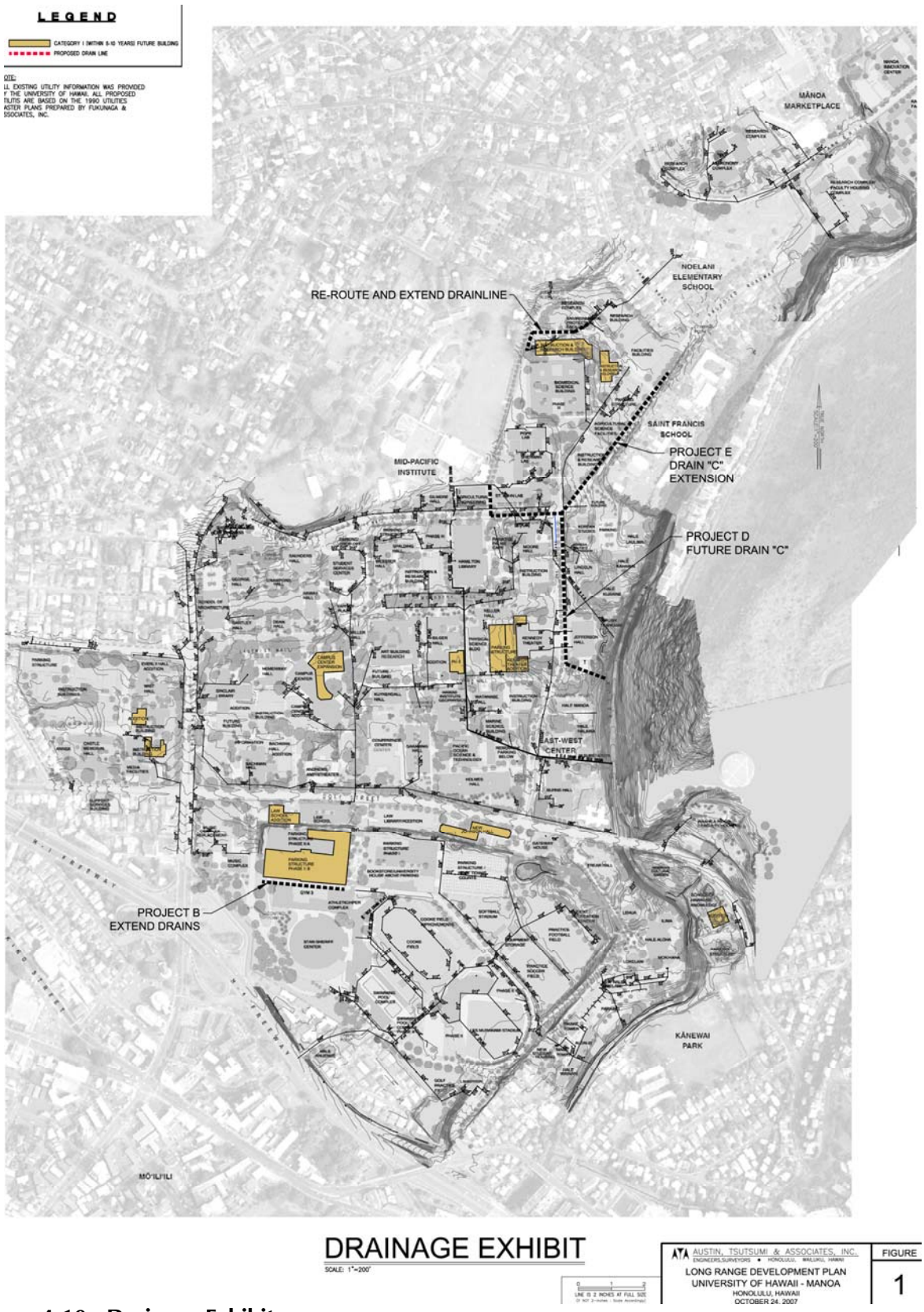


Figure 4-10: Drainage Exhibit

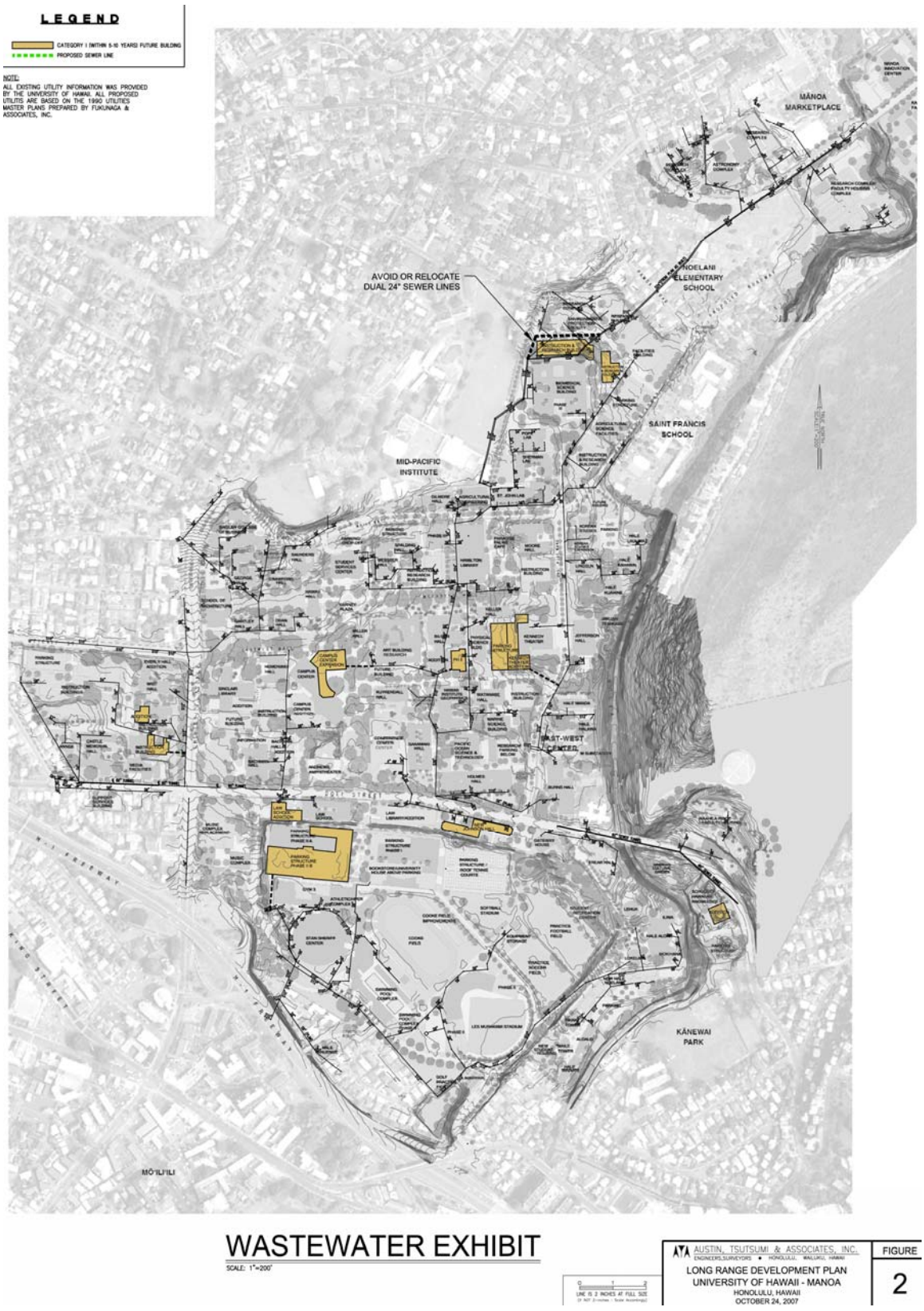


Figure 4-11: Wastewater Exhibit

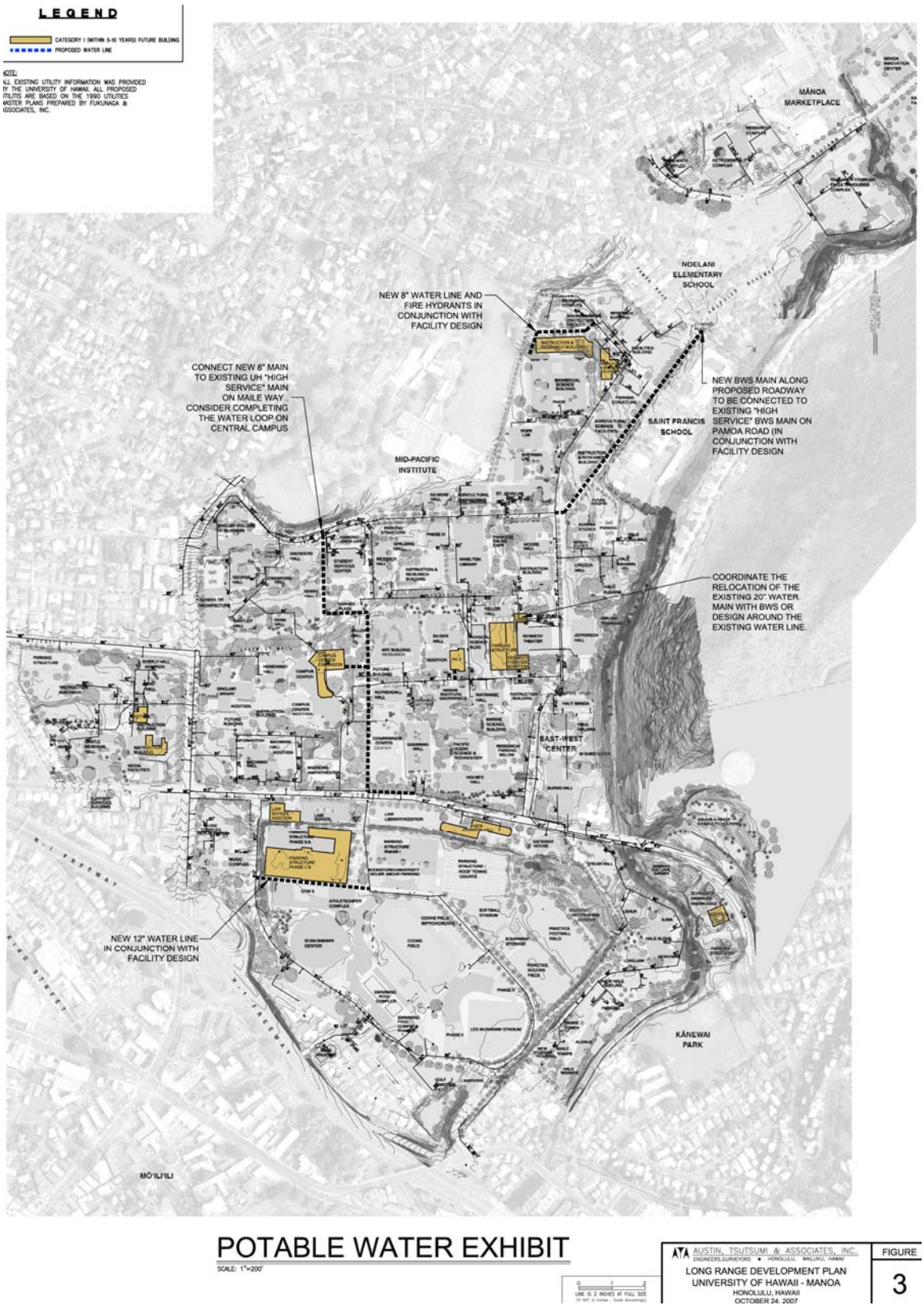


Figure 4-12: Potable Water Exhibit

4.14 TRAFFIC

Existing Conditions – The UHM Campus, as a result of being situated at the gateway to the mature residential community of Mānoa, near the H-1 Freeway, and Major Arterials South King Street, Beretania Street, and Wai'alae Avenue, experiences its fair share of traffic (both regional and local in origin). With Level-of-Service (LOS) used as the Measure of Effectiveness at intersections of interest within the vicinity of UHM, the following key study intersections were identified as problematic:

- South King Street/ Beretania Street/University Avenue – King Street and Beretania Street belong to a greater east-west corridor, which also includes the H-1 Freeway, Kapiolani Boulevard, and Ala Moana Boulevard. Therefore, these major arterials experience a significant regional traffic component. Furthermore, this intersections' adjacency to numerous H-1 Freeway On-ramps and Off-ramps, UHM traffic, and Mānoa traffic, generates a significant turning movement demand in a location that is not capable of further roadway widening. The efficiency and capacity of this intersection is also negatively impacted by the permitted left-turn movements into driveways, despite the absence of dedicated left-turn lanes.

- University Avenue/ Dole Street – the busiest intersection along UHM's perimeter, vehicular queues in the northbound (mauka) direction extend southward towards South King Street and onto the H-1 Freeway Off-ramps, during the AM peak hour of traffic. During the PM peak hour of traffic, vehicular queues in the westbound direction queues beyond the Lower Campus Road intersection, and into Lower Campus Road itself.

- University Avenue/ Sinclair Parking Lot – While the Highway Capacity Manual – Special Report 209 (HCM) analysis indicates that this intersection currently operates smoothly, the express bus traffic that utilizes this exit often have difficulty making the westbound left-turn out of the driveway. This is in part due to the wide turning angles required and the prevailing queue in the southbound direction at the University Avenue/Dole Street intersection which should be improved as a result of the mitigative measures at that intersection.

- University Avenue/ Maile Way – According to our analysis, this intersection operates smoothly at an overall LOS C or better during the AM and PM peak hours of traffic for both existing and future conditions. However, the HCM analysis does not account for the congestion downstream in the northbound direction along University Avenue. During the AM peak hour of traffic especially, conditions at the signalized intersection of Ka'ala Street, which provides access to the Mid Pacific Institute are extremely congested during the AM peak hour of traffic. To exacerbate problems, immediately north of the University Avenue/ Maile Way intersection, the two (2) northbound lanes merge into one (1). Therefore, this intersection likely operates at LOS E or F during its worst peak periods.

- Wilder Avenue/ Dole Street – The northbound approach to this intersection is formed by the H-1 Freeway Wilder Street Off-Ramp, which provides access to the Makiki Area, which includes residential land uses, Punahou School, and Maryknoll Schools. This off-ramp is given the right of way, in order to maintain conditions along the H-1 Freeway. However, this is done at the expense of Dole Street traffic, which has a relatively low demand.

- Dole Street/ Lower Campus Road – The majority of the vehicles entering/exiting the Makai Campus utilizes this vehicular gateway, due to the fact that it offers the greatest accessibility. During the PM peak hour of traffic, many of the commuters, dorm residents and faculty that utilize the existing 3509 Makai Campus parking stalls exit through Lower Campus Road and turn Left onto Dole Street, where they immediately encounter the queue generated by the University Avenue/Dole Street intersection. This causes vehicles to queue back to the parking guard shack and beyond at times.

- Dole Street/ Saint Louis Heights Drive – This intersection operates relatively well during the peak hours of traffic. Although HCM analysis indicates that the southeast-bound left-turn operates at LOS F during the AM and PM peak hours of traffic, this turning movement volume is relatively low and would therefore not warrant a traffic signal.

- Wai'alae Avenue/ Saint Louis Heights Drive – During the AM peak hour of traffic, congestion was observed to occur in the westbound direction, where queues were observed to extend as far as 10th Avenue during the AM peak hour of traffic, primarily in the right and center lanes. During the PM peak hour of traffic, similar congestion occurs in the westbound direction along Wai'alae Avenue. Although there is a brief reprieve west of Saint Louis Drive, congested conditions resume along Old Wai'alae Road, the H-1 Freeway and King Street further westward.

Details pertaining to the roadway system and to traffic volumes and conditions in the subject area can be found in the Traffic Impact Analysis Report, which is included as *Appendix H*.

Impacts- Relative to traffic analysis, the two proposed parking structures described below in *Section 4.15* will be the only part of the LRDP that will significantly affect traffic operations along the roadways within the area. This is due to the fact that traffic projections for universities are generally based upon student enrollment, which is not projected to increase at UHM within the next 5 to 10 years.

Besides analyzing existing traffic operating conditions at key locations as noted above, the LRDP traffic report also addressed the following:

- Base Year 2017 (buildout year for LRDP) traffic projections - without LRDP
- Base Year 2017 Mitigation Measures
- Year 2017 with LRDP
- Year 2017 with LRDP Recommended Improvements.

The following sections summarize these topics, while specific details of the traffic analysis can be found in the body of that report.

Base Year 2017
Based on data obtained from the State DOT, regional traffic is projected to increase by approximately 1% annually along the Regional Arterials. Traffic growth within the vicinity of UHM is not projected to occur, due to the fact that most of the area has already been built out, and that the UHM student population is not projected to increase. Furthermore, vehicular traffic decreased during the PM peak hour of traffic and remained constant during the AM peak hour of

traffic between 2004 and 2007 at the University/Dole Street intersection based on field counts conducted by the traffic consultants.

LOS F conditions will continue to occur during Base Year 2017 at the following locations:

- University Avenue /South King Street/ Beretania Street*
- University Avenue/ Varsity Place*
- University Avenue/ Dole Street*
- University Avenue/ Sinclair Parking Lot*
- Dole Street/Wilder Avenue – Mitigation would result in the reduction of traffic flowing from the H-1 Freeway On-Ramp, which is not recommended. Furthermore, the Dole Street traffic that experiences LOS F exhibits a relatively low demand due to further downstream obstructions and better alternative routes. Therefore, mitigation is not recommended.
- Dole Street/Lower Campus Road*
- Dole Street/Saint Louis Heights Drive – While the southeast-bound left-turn currently experiences and will continue to experience LOS F during the AM and PM peak hours of traffic, the demand for this movement is relatively low, and would not warrant a Traffic Signal. Mitigation is not recommended.
- Wai'alae Avenue/Saint Louis Heights Drive – Due to limited right-of-way, no geometric improvements can be made at this intersection.

* Indicates that mitigative measures are recommended and discussed in the next section.

Year 2017 with LRDP
While the LRDP includes two new parking structures, the number of students is not projected to increase as a result of these additions. Ultimately, as based on standard methods for generating trips for Universities, this would mean that the number of vehicular trips generated by the LRDP will remain the same. However, a redistribution of the existing trips will occur, in this case more heavily concentrating traffic at the University Avenue/Dole Street, Dole Street/Lower Campus Road, and Dole Street/East-West Road intersections. Given the improvements recommended in Base Year 2017 Mitigation Measures, these intersections will continue to operate at LOS E or better and under capacity.

As stated earlier, one caveat to this statement is that downstream conditions along University Avenue and subsequently the H-1 Freeway, Beretania Street, and South King Street will continue to experience congestion, and may therefore limit the incoming/outgoing capacity in the area.

Mitigation –

Base Year 2017 Mitigative Measures
University Avenue/Dole Street Intersection
Phase I
Reconfigure the westbound approach to the University Avenue/Dole Street intersection to incorporate an exclusive left-turn lane, a shared left-turn/through lane, and an exclusive right-turn lane, with storage extending approximately 100 feet east of the University Avenue/Lower Campus Road intersection. This mitigative measure may necessitate the relocation of the historic Gateway structures located along University Avenue, although every effort will be made to avoid this need.

The effect of Phase I would be to eliminate over-capacity conditions. However, the southbound left-turn movement would still experience LOS F during the PM peak hour of traffic. Also recommended would be parking restrictions along University Avenue between Metcalf and Maile Way during the morning peak periods. This will require coordination and approval from the City and County of Honolulu.

Phase II
Reconfigure the northbound approach to the University Avenue/Dole Street intersection to incorporate three (3) exclusive through lanes and two exclusive right-turn lanes, the rightmost of which would directly connect with the H-1 Freeway Westbound Off-Ramp. In conjunction with this, modify the Dole Street/Lower Campus Road intersection to incorporate one (1) Eastbound through lane, an eastbound shared through/right-turn lane, and an exclusive right-turn lane. Note that these modifications could potentially necessitate the relocation of the existing monkeypod trees along University Avenue, and reduce the available parking within the Music Building Complex. Phase II, when implemented without Phase I, would produce a similar result as Phase I, in that over-capacity conditions would be eliminated, and that the southbound left-turn movement would continue to experience LOS F, while the eastbound and westbound approaches would experience LOS E during the PM peak hour of traffic.

Phase I & II
Analysis indicates that the effect of implementing Phases I and II in combination would improve the overall delay of the intersection from 73.1 (56.6) seconds during the AM (PM) peak hours of traffic to 38.8 (39.9) seconds, with all movements at the intersection operating at LOS E or better during both periods. It should be noted that at the Dole Street/Lower Campus Road intersection, the lane modification will reduce the number of lanes that drivers need to cross to enter the Lower Campus Road, thereby reducing capacity reductions caused by weaving movements.

It is recommended that Phases I and II be implemented as a mitigative measure, while recognizing that the intent of this geometric augmentation would be to improve conditions for vehicles traveling northbound along University Avenue. Although vehicular flow will also improve in the westbound direction during the PM peak hour of traffic, such benefits would generally be realized locally, given that existing bottlenecks occur downstream at the following locations:

- University Avenue/H-1 Freeway Eastbound On-ramp
- University Avenue/H-1 Freeway Westbound On-ramp
- South King Street/Beretania Street/University Avenue
- Dole Street/Wilder Street
- University Avenue, south of Maile Way

Mitigation of these problems would require costly modifications, including improving congestion along the entire corridor. The H-1 Freeway, Beretania Street, and South King Street would all have to be widened to accomplish this. However, the implementation of the Rapid Transit System will ultimately reduce future vehicular traffic demand.

<u>Turning Movement Restriction</u>
During field observations, it was noted that along South King Street, east of University Avenue, and University Avenue in the Varsity Area, vehicular flow was hampered by the allowing of left-turns into driveways and small side streets.

Varsity Area
Vehicles turning left from the southbound direction cause other vehicles to switch lanes to maneuver around them. Due to the lack of an acceptable gap in northbound traffic, these vehicles often cause those behind them to arrive at the South King Street/Beretania Street/University Avenue intersection after the signal indication has turned red. The resulting flow interruptions have major implications along University Avenue in this area due to the fact that the current cycle length at that intersection is 170 seconds. Effectively, all of the vehicles impacted by this problem will be delayed by a additional two minutes and fifty seconds as the traffic signal cycles through all of its phases again. Operations at the University Avenue/Varsity Place intersection are also affected by this problem.

Similarly, in the northbound direction left-turns impede the flow of the approximately 1,000 vehicles (for both AM and PM peak hours of traffic) traveling in the northbound direction, sometimes reducing the upstream capacity of the South King Street/Beretania Street/University Avenue intersection.

South King Street – University Avenue to Humane Society
South King Street, east of University Avenue has become a bottleneck for eastbound traffic during the PM peak hour of traffic. It has been observed that vehicles traveling eastbound along South King Street are affected by vehicles making left-turns into driveways and at the signalized intersection near the Seven Eleven/Aloha Gas station. Based on the conditions described above, it is recommended that a dialogue be initiated between community members and the City to assess the potential for left-turn prohibitions during the PM peak hour of traffic for:

- Northbound and southbound University Avenue traffic, south of Varsity Place, and north of King Street, and
- Eastbound South King Street traffic, east of University Avenue and west of the Humane Society.

It is recognized that the merit of this mitigative measure will have to be balanced with the needs of the local community and businesses.

It should be noted that should these prohibitions be implemented, they would not eliminate LOS F at the South King Street/Beretania Street/University Avenue intersection. However, they would improve the efficiency of the intersection and the capacity of University Avenue and South King Street in the area.

<u>University Avenue/Sinclair Library Driveway</u>
While this intersection experiences a relatively low turning movement volume and operates at LOS B, the bus traffic that passes through the turnaround often have difficulty making the westbound left turn out of the driveway. In conjunction, it is recommended that the bus stop located along University Avenue just north of Dole Street be relocated to the existing bus turnaround at this intersection.
<u>University Avenue/Maile Way</u>
Although the analysis indicates that this intersection operates at LOS C (B) during the AM (PM) peak hours of traffic, existing operations have been observed to be worse, especially during the AM peak hour of traffic where vehicles destined towards the Mid Pacific Institute and Saint Francis

cause the downstream intersection (Ka'ala Street) to be overburdened. Currently, this intersection only provides a single lane at each approach with no channelization (turning lanes). It is therefore recommended that a dialogue be initiated between community members and the City to assess the feasibility for widening the segment of University Avenue between Ka'ala Street and Maile Way to incorporate a second northbound lane. This lane would terminate at Ka'ala Street as an exclusive right-turn lane. The physical geometry of the site also creates some challenges for the development of this action.

Traffic Signal Coordination along University Avenue and Dole Street/Lower Campus Road
All of the signalized intersections along University Avenue between Dole Street and Maile Way, and the Dole Street/Lower Campus Road intersection are within approximately 1000 feet or less of each other. Therefore, in order to facilitate flow between these intersections, it is recommended that the following intersections be coordinated:

- University Avenue/Maile Way
- University Avenue/Metcalf Street
- University Avenue/Sinclair Library Parking Lot (New Signal)
- University Avenue/Dole Street
- Dole Street/Lower Campus Road

Year 2017 with Project Recommended Improvements
No improvements beyond those recommended in Base Year 2017 Mitigative Measures are recommended. Improvements at the Old Wai'alae Road Entrance/Exit and at Varsity Place were investigated, and are generally not recommended.

As part of the PRU Application, the University prepared a Traffic Demand Management Plan, August 2009 (*Appendix I*). The University of Hawai'i, Mānoa Campus is committed to providing transportation and parking management for students, faculty, staff and visitors. The goals of the University of Hawai'i, Mānoa Campus Transportation Demand Management (TDM) Plan projects and programs are to improve mobility and access, reduce congestion and air pollution, and increase safety. These TDM projects and programs reduce the level of drive-alone travel by promoting walking, bicycling, carpooling, vanpooling, public transportation, and other sustainable modes.

4.15 PARKING

Existing Conditions- The Parking Study conducted for the 2007 Update to the LRDP (Parking Planners, 2007) determined the effective physical inventory of parking spaces available for UHM Campus users as 5,940 spaces and an effect or demand of 6,242. In the analysis, it was concluded that the UHM Campus has a present-day parking deficit of 1,418 parking spaces. This deficit includes unrestricted 1,240 stalls used by students in the surrounding community; refer to *Table 4-1*. *Figure 4-13* depicts how the existing parking inventory is distributed around the campus. Through an analytical procedure detailed in the study, which is included as *Appendix J*, the conclusion was also reached that UHM has a present-day parking deficit of 178 spaces based purely on over-utilization. Parking Plans (2008-2009 Parking Permit Zone Map) included as *Appendix D* provides the layout and dimensions of the existing parking facilities on the UH Mānoa Campus.

The peak demand of 6,242 spaces includes approximately 1,240 spaces located in the surrounding neighborhoods. Since UHM is interested in relieving the parking congestion in the adjoining community and understands that these spaces may be removed from the effective supply due to possible restrictions implemented in the future, these estimated off-campus/on-street parking spaces were also included in the parking deficit summary, for which alternatives were considered. Therefore, to fully address the two objectives of current over-utilization and potential future loss of neighborhood parking, 1,418 additional parking spaces are required.

Table 4-1: Peak Campus Survey Data (by Zone) (Parking Planners, 2007)

	Effective Supply	Survey-Day Peak Demand	Parking Surplus (Deficit)	% Utilization
Central Campus				
Faculty/Staff	1,505	1,519	(14)	101%
Commuter Student	0	-	-	-
Resident Student	0	-	-	-
Visitor/Other	198	152		
Central Campus Total	**1,703**	**1,671**	**32**	**98%**
Lower Campus				
Faculty/Staff	880	943	(64)	107%
Commuter Student	1,376	1,477	(101)	107%
Resident Student	266	270	(4)	102%
Visitor/Other	599	640	(42)	107%
Lower Campus Total	**3,120**	**3,331**	**(211)**	**107%**
Campus Total	**4,824**	**5,002**	**(178)**	**104%**
On-Street/Off Campus	1,116	1,240	(124)	111%
Grand Total	**5,940**	**6,242**	**(302)**	**105%**

Impacts- The Parking Study determined that construction of the new buildings proposed in the 2007 LRDP Update would result in the loss of 175 existing parking space. Further, recommended improvements to the intersection of Dole Street and University Avenue would result in the elimination of 30 spaces from surface parking lots adjacent to the Music Complex and the Law School. When these lost parking spaces are added to the overall parking deficit summary, a total future deficit of 1,623 spaces results, refer to *Table 4-2*.

Table 4-2: Parking Deficit Summary (Parking Planners, 2007)

Objectives		Spaces
1	Address current over-utilization	-178
2	Address potential future loss of off-campus/on-street parking in neighborhoods	-1,240
3	Replace lost spaces resulting from planning projects (5-10) years	-175
4	Replace lost spaces resulting from improvements made to Dole Street & University Avenue	-30
Total for Objectives 1-4:		**-1,623**

Mitigation - Seven different potential parking facility sites were considered to address the parking deficits; while the evaluation of these options is detailed in the Parking Study and *Table 4-3*, the following discussion is focused on the feasible recommended solution to mitigate the deficit. The referenced parking facilities are highlighted in red in *Figure 4-13,* Site Alternative Evaluation.

The highest ranked option is to first build a 480 space, 4-level parking structure adjacent to Kennedy Theatre. Next, the Lower Campus Parking Structure Phase IIB would be constructed. In

addition to addressing "everyday" parking demands, this 900 space facility would also help remedy the shortage of parking spaces during special events, e.g. sporting events and graduations held in the Lower Campus area. Combined, these two facilities will provide 1,380 (85%) of the estimated 1,623 deficient parking spaces. *Section 3.7* provides a detailed description of the proposed parking facilities.

To qualify the calculated 243 space shortfall, the Parking Study notes that the estimated "off-campus/ on-street" supply figures, which were also factored into the deficit calculation, have a lower degree of certainty than the counted "on-campus" spaces. Accordingly, the study recommends additional studies focusing on the surrounding neighborhoods to obtain a more precise estimate of the parking supply in these areas. Considering that this estimated 1,240 figure accounts for 76% of the total deficit of 1,623, the study further recommends that UHM build the two noted parking facilities (Kennedy Theatre and Phase IIB) as planned and then re-evaluate parking conditions at that time, as these structures may fully address parking deficits occurring during the 5-10 year time period of this 2007 LRDP Update. It should be noted that the overall deficit counts the 1,248 stalls on the streets surrounding the University. As such the calculated 243 stall shortfall is really not an overall shortfall, since these spaces remain in the surrounding communities. The real net effect of the construction of the Kennedy Theatre and Makai Phase IIB Structures will be to reduce student parking in the surrounding community by about a 1,000 cars, from 1,248 to 243.

Table 4-3: Alternative Site Solutions for 5-10 Year Planning Horizon (Parking Planners, 2007)

	Parking Facility	Additional Spaces per level	Proposed Total Number of Levels	Supported Levels	Number of Below-Grade Levels	Additional Capacity (Cars)
1	Zone 1 Parking Facility – College of Education	100	0.0	0.0	0	0
2	Zone 14 Parking Facility – adjacent to Sinclair Library	65	0.0	0.0	0	0
3	Zone 4 Parking Facility – adjacent to Spalding Hall	60	0.0	0.0	0	0
4	Zone 5 Parking Facility – adjacent to Agricultural Sciences	105	4.0	3.0	0	0
5	Zone 10 Parking Facility – Kennedy Theatre	120	4.0	3.0	0	480
6	Zone 11 Parking Facility – adjacent to Pacific Ocean Sciences	60	0.0	0.0	0	0
7	Zone 20 Parking Facility – Lower Campus Structure Phase IIB	200	4.5	3.5	0	900
Total:						**1,380**
+10 Year Planning Horizon:						
4	Zone 5 Parking Facility – adjacent to Agricultural Sciences	105	4.0	3.0	0	420
+10 Year Planning Horizon Total:						**1,800**

This LRDP Update maintains the previous LRDP concept of giving priority to pedestrian circulation in the Central, Upper Central, Makai and Mauka Campus Areas. Vehicular arrival points such as parking lots, bus stops, and transit stations are typically indicated on the periphery of the campus, freeing the central areas for pedestrian use. In the Central Campus area, for example, valuable land is presently occupied by low efficiency on-grade parking lots and old roadways. The removal of the parking and roads such as the Varney Plaza, the Legacy Path, and Correa Mall will provide significant areas for pedestrian use. The location of additional parking in structures on the

periphery of the Central Campus is very feasible, as is the servicing of the Central Campus without such a large roadway system as exists today, *Figure 4-13*.

The proposed parking facilities will be surfaced with approved asphaltic concrete paving, decorative paving or other approved all-weather permanent surface material over an aggregate base at least four inches thick. Decorative paving materials such as brick, scored concrete, smooth cobble, and similar materials will be used at entries, crosswalks, pedestrian paths and may be used as an accent throughout a parking area. The choice of materials for proposed parking facilities is subject to review and approval.

Parking structures will be integrated into buildings whenever possible. As with downtown Honolulu, the integration of parking with buildings can serve to mitigate the visual impact of these structures. Parking structures are also prime candidates as sites for other buildings, thereby reducing the impermeable footprint of construction on campus. Finally, these structures are also candidates for "green" or landscaped roofs.

One of the alternate modes of transportation popular with the students is the moped. Moped parking is allowed only in designated areas on the periphery of the campus areas. These moped parking areas are adjoining or in the proximity of pedestrian gateways and adjoining parking structures.

Bicycle parking is allowed at specific locations within the body of the campus and is related to buildings and destinations. To the extent possible, bicycle paths will be designated to minimize serious conflicts with pedestrians. A bicycle committee has been tasked to look at further plans to make the Mānoa Campus more bicycle friendly.

Mass transit is projected as a future mode of transportation for Honolulu. Transit is envisioned to service the UHM Campus and neighboring communities. Future transit stations are recommended to be located in the surrounding commercial districts and not on campus in order to enhance campus security, while guaranteeing service to the public as well as University students and faculty.

Phase 1 of the project will end at Ala Moana Center and a shuttle system to the Mānoa Campus is being considered. In future phases, line extensions to the Mānoa Campus is planned. While specific adjustments and station locations have not been finalized, if the transit line is built this should further alleviate traffic and parking conditions around the UH Mānoa Campus.

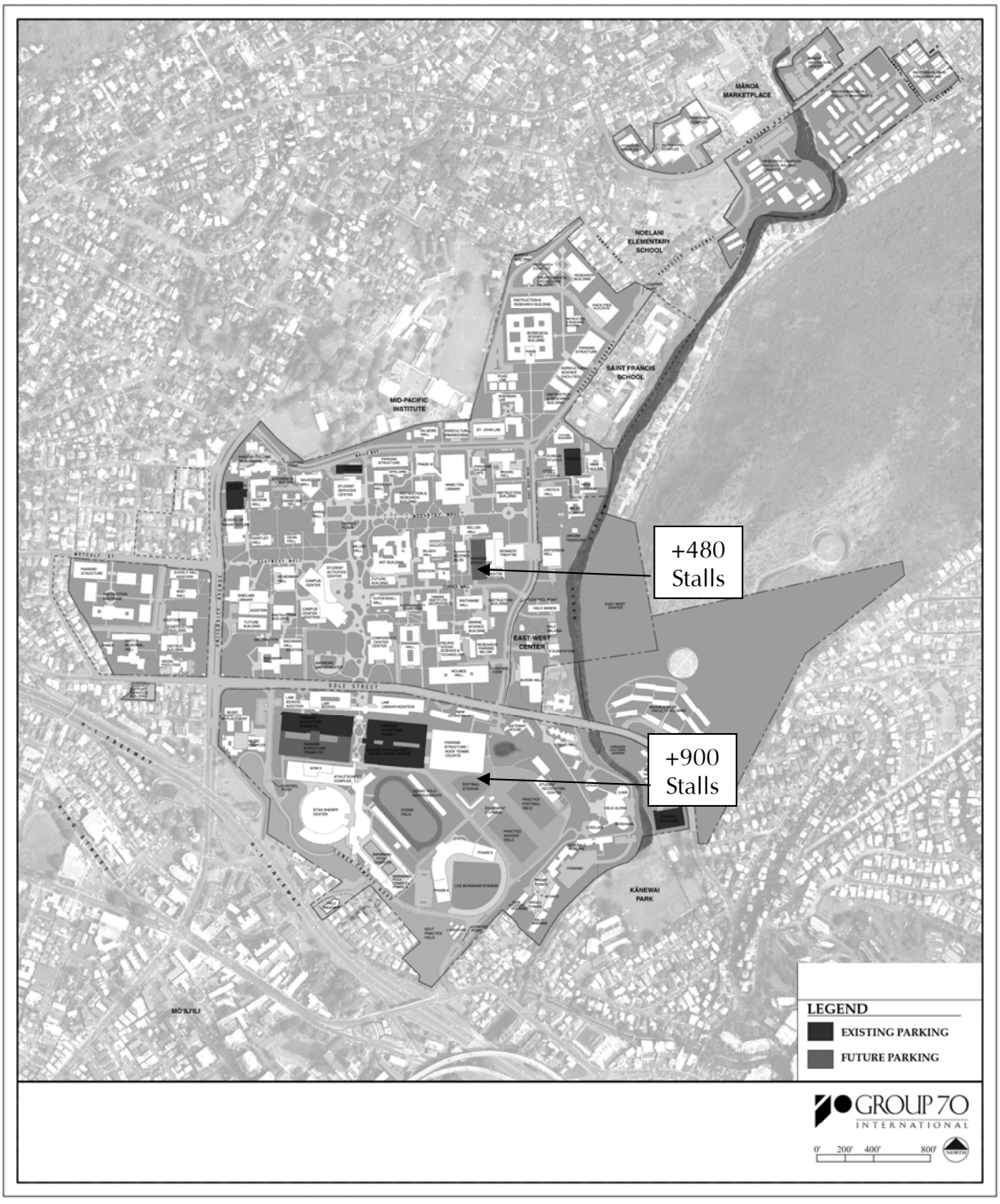


Figure 4-13: Parking Structures and Facilities

4.16 SOCIO-ECONOMIC CHARACTERISTICS

Existing Conditions – The communities adjoining the UHM Campus beyond its mauka and 'Ewa borders (Mānoa and Lower Mānoa, respectively) are largely older and stable neighborhoods or large single-family residences. Many of the homes were constructed in the early 1900s and are maintained in good condition. Wa'ahila Ridge, Mānoa Stream, and private and public educational and recreational facilities border the campus on the Koko Head side. The H-1 Freeway and the Mō'ili'ili residential and business communities border the campus on the makai side. Mānoa is generally considered a very desirable place to live, and home values are extremely high. Many UHM students, faculty and staff live in the surrounding communities.

In addition to UHM's current student enrollment of approximately 20,000 students, faculty and staff number almost 6,000. With visitors and others, the daytime campus population is estimated at about 30,000 people.

Impacts– The further development of the UHM Campus with projects identified in the 2007 LRDP Update is not expected to adversely impact property values around the campus, as in the past, major developments on campus have had no measurable negative impact on property values.

There may be short-term adverse impacts during construction of the various projects contained in the LRDP, but these will be controlled to minimize such impacts. Upon completion, the proposed improvements will have beneficial long-term social and economic impacts.

Mitigation - As noted above in *Section 4.14*, to help relieve parking congestion in the adjoining communities, the LRDP parking study included the estimated off-campus/ on-street parking spaces in the total UHM Campus parking deficit, and the planned parking facilities will make a large contribution to improving the parking congestion, and thus quality of life, in the adjoining communities.

4.17 PUBLIC SERVICES

Existing Conditions – The following paragraphs describe a variety of public services available on and around the UHM Campus, including Fire Protection, Security, Medical Emergencies, Solid Waste Management and Accessibility for Persons with Disabilities:

- Fire Protection: The Honolulu Fire Department has four stations in the proximity of the campus. Current University policy calls for access to fire apparatus, water supply and building construction to be in conformance with existing relevant codes and standards.

- Security: All routine patrols and surveillance are provided by the University's Campus Security Office. The Honolulu Police Department is called when situations arise that are beyond the capabilities of Campus Security or when arrests are required.

- Medical Emergencies: Routine and emergency medical services are provided by the University's Student Health Service (USHS). If a situation arises that is beyond USHS's capabilities, the case is referred to the patient's doctor and/ or to local hospitals. With numerous major hospitals or clinics in relative proximity to the UHM Campus, prompt attention is available to patients in medical emergencies.

- Solid Waste Management: Refuse is collected and disposed by University personnel at County transfer stations or landfills. The exceptions are the student housing and food service programs, which separately contract out refuse collection to private refuse disposal firms. The bulk of "green waste" from the UHM Campus is now composted and is not disposed as refuse. Recycling programs exist on campus and are managed by separate schools and programs.

- Accessibility for Persons with Disabilities: Decades ago, the UHM Campus embarked on a program to remove barriers for persons with disabilities. During this time, the University has removed barriers from many scattered locations throughout the campus based on very specific needs. While measurable progress has been made, the UHM Campus still strives to improve its efforts to become an institution that is more user friendly to persons living with disabilities.

- Public Transportation: Known as "TheBus," the Honolulu city bus stops on campus at Sinclair Circle and other nearby locations, providing the following routes and service levels: Route A City Express!, Route F2, 4, 5, 6, 18, AM: 80A, AM: 83, AM: 84, PM: 85 & 85A, AM: 90. UHM Parking Operations provides a free on-campus shuttle bus service for faculty, staff, students and visitors. The Rainbow shuttle bus system consists of various shuttle routes which provides a mode of transportation throughout the campus during the Fall and Spring semesters. Modified routes and schedules operate during semester breaks.

Impacts– As above, the following paragraphs describe how a range of public services will be impacted and, if necessary, mitigated by the proposed developments in the 2007 LRDP:

- Fire Protection: Enhanced fireflow and access to many parts of the campus will result from the proposed developments. Existing buildings to be refurbished during this planning period will be renovated to meet current fire protection codes, as will all new construction. The University will coordinate with the Fire Department to identify fire escape routes and the location of hydrants and standpipes, which will be included as necessary on detailed construction documents.

- Security: The proposed improvements, such as the construction of malls, paths and plazas are expected to improve student and staff safety in the evenings. Emergency phones, orientation programs and increased surveillance have been implemented and continue to be improved by the University.

- Medical Emergencies: The proposed improvements for the planning period will not impact the handling of medical emergencies on the UHM Campus. The Student Health Center will continue to function in its present location—not far from the Central Campus core and in proximity to student housing facilities

- Solid Waste Management: Solid waste is collected in dumpsters that are hauled away by private contractors. Recycling programs have been implemented on a building by building basis.

- Accessibility for Persons with Disabilities: The proposed developments will help create an enhanced network of accessible routes throughout all parts of the UHM Campus.

- Public Transportation: The proposed developments will help create an enhanced network of accessible routes throughout all parts of the UHM Campus. The proposed project will have no impacts on public transportation services during and after construction. During construction of the proposed projects, bus stops or routes may need to be temporarily moved or detoured in order to continue service.

Mitigation –

- Fire Protection: The University will coordinate with the Fire Department to identify fire escape routes and the location of hydrants and standpipes, which will be included as necessary on detailed construction documents. All proposed projects are required to comply with the Uniform Fire Code, Section 902.2.1, requiring a fire apparatus access road for every facility, building, or portion of a building hereafter constructed or moved into or within the jurisdiction when any portion of the facility or any portion of an exterior wall of the first story of the building is located more than 150 feet (45 720 mm) from fire apparatus access as measured by an approved route around the exterior of the building or facility. (1997 Uniform Fire Code, Section 902.2.1.) *Figure 4-14* displays service/fire access roads for all proposed projects and existing buildings at UHM.

- Security: The improvements mentioned above will encourage the use of routes that are more heavily traveled, better lit, and more easily patrolled.

- Accessibility for Persons with Disabilities: All campus improvements will be in conformance with the provisions of the Americans with Disability (ADA) Act, which been incorporated into the City's Building Code.

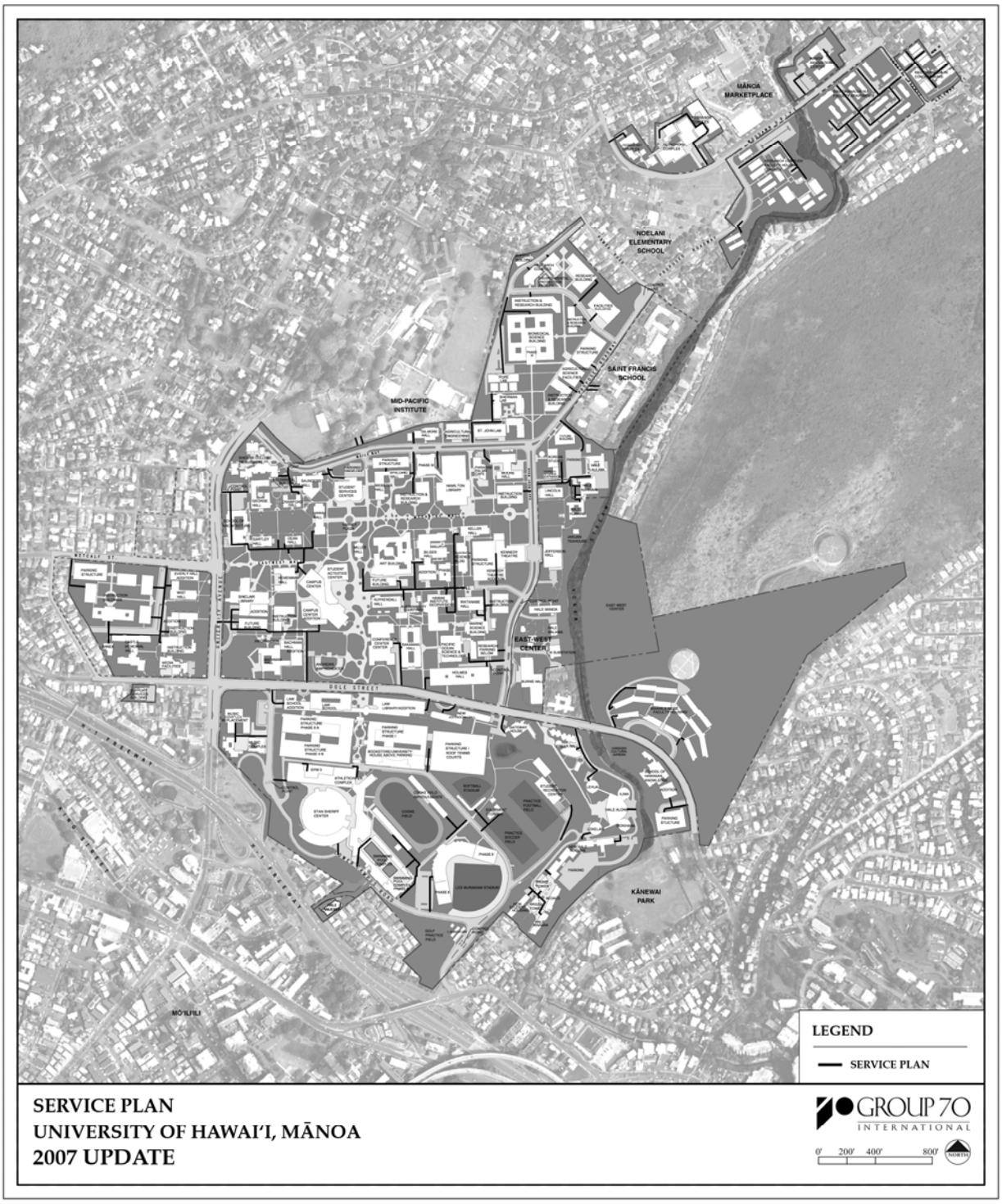


Figure 4-14: Service Plan Map

5.0 RELATIONSHIP TO GOVERNMENTAL PLANS AND POLICIES

5.0 COMPATIBILITY WITH PUBLIC POLICIES

The 2007 update to the UHM LRDP is compatible with current public policies regarding higher education in the State of Hawai'i. The public policies deal with higher education programs, the requisite facilities, and the lands upon which they are located.

5.1 HAWAI'I STATE LAND USE DISTRICT BOUNDARIES

Under the Chapter 205, HRS, all lands of the State are to be classified in one of four categories: urban, rural, agricultural, and conservation lands. The State Land Use Commission (LUC), an agency of the State Department of Business, Economic Development, and Tourism (DBEDT) is responsible for the standards and determining the boundaries of each district (Chapter 205-2(a), HRS). The LUC is also responsible to administer all requests for district reclassifications and/or amendments to district boundaries, pursuant to Chapter 205-4, HRS, and the Hawai'i Administrative Rules, Title 15, Chapter 15 as amended.

Discussion
The UHM Campus is situated on lands designated as Urban by the State Land Use Commission, pursuant to Chapter 205, HRS. The use of lands for a university campus conforms to the Urban designation. In addition, a small portion of UHM Campus is located on lands designated as Conservation by the State Land Use Commission, which is under state jurisdiction (Department of Land and Natural Resources) and not regulated by the City under the PRU permit. The lands designated as Conservation are projected for open space in the UHM Long Range Development Plan. The use of lands for open space at UHM conforms to the Conservation designation.

5.2 HAWAI'I STATE PLAN

The Hawai'i State Plan establishes a statewide planning system that provides goals, objectives, and policies which identify the broad policies and goals for functional areas in State Government and after concerns of the State of Hawai'i. Priority guidelines relating to the economy, education and the physical environment will be discussed as they relate to the UHM LRDP 2007 Update project. It is the goal of the State, under the Hawai'i State Planning Act (Chapter 226, HRS), to achieve the following:

- A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i present and future generations.
- A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life (Chapter 226-4, HRS).

The objectives and policies of the State Plan that are pertinent to the UHM LRDP 2007 Update project are discussed below.

Economy: General
The objectives for planning the State's economy include increasing and diversifying employment opportunities to provide a better economic quality of life for Hawai'i's people. It is also the

objective of the State to create a diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands. It is the policy of the State to:

- Promote Hawai'i as an attractive market for environmentally and socially sound investment activities that benefit Hawai'i's people.
- Seek broader outlets for new or expanded Hawai'i business investments.
- Expand existing markets and penetrate new markets for Hawai'i's products and services (HRS, Chapter 226-6).

Discussion

The LRDP is consistent with the provisions of the Hawai'i State Plan (Chapter 226, Hawai'i Revised Statutes [HRS]), which serves as a guide for the future long-range development of the State. The UHM 2007 LRDP Update will provide an impetus for future economic growth in education and research. The proposed project includes new and the expansion and maintenance of existing educational and research facilities, which may contribute to new market and industry growth and investment opportunities in Hawai'i.

The University of Hawai'i is a major economic driver in the State of Hawai'i and Mānoa is its flagship. Studies have shown the University generating high multiples of economic value for each dollar received by the University. The planned uses in the PRU are important projects that have this multiplier effect through construction and operations.

These projects will also maintain the University's advantages in their respective academic fields and help Hawai'i retain quality jobs that will benefit Hawai'i's people. The University is a prime catalyst and source of innovation and extramural funding that brings money into the State and diversifies our economy.

Economy: Potential Growth Activities

It is the objective of the State to increase and diversify Hawai'i's economic base through the development and expansion of potential growth activities. It is the policy of the State to:

- Facilitate investment and employment in economic activities that have the potential for growth such as diversified agriculture, aquaculture, apparel and textile manufacturing, film and television production, and energy and marine-related industries.
- Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research (HRS, Chapter 226-10).

Discussion

The proposed buildings and projects will avail new opportunities of economic growth in education, research and development at UHM for the State of Hawai'i. The proposed buildings and projects that are on the Capital Improvements Program and/or are anticipated for development within the next 5-10 years are projected into the Plan and reflect current and upcoming educational priorities. These projects will further propel and stimulate local and national interest and participation at UHM.

Socio-Cultural Advancement: Education

It is the objective of the State to adequately provide a variety of education opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations. It is the policy of the State to:

- Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.
- Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.
- Provide appropriate educational opportunities for groups with special needs.
- Provide higher educational opportunities that enable Hawai'i's people to adapt changing employment demands.
- Emphasize quality educational programs in Hawai'i's institutions to promote academic excellence.
- Support research programs and activities that enhance the education programs of the State (HRS, Chapter 226-21).

Discussion

The 2007 LRDP Update provides opportunities to enhance personal development and educational opportunities that give people the tools to adapt to changing employment demand. The UHM 2007 LRDP Update reflects current and upcoming educational priorities, which are committed to the continued development of educational programs, research, services, and curriculum. Education programs include pre-college curriculum enhancements, in service teacher training and formal undergraduate/graduate and post-doctoral programs. In addition to these education programs, UHM is committed to training the next generation by working with K-12 students and their teachers through partnerships with existing K-12 programs. UHM is also committed to increasing diversity by reaching out to underrepresented groups, including ethnic minorities and persons with disabilities.

Collaborative efforts with local organizations and institutes will continue to create new linkages and applications, such as the development of creative outreach programs that are derived from the efforts of pure research.

5.3 HAWAI'I STATE FUNCTIONAL PLANS

The State Functional Plans implement the Goals, Objectives, Policies and Priority Guidelines of the Hawai'i State Plan. The Functional Plans provide the connection between State programs and State policy. Twelve functional plans have been adopted by the State Legislature, which includes the areas of Agriculture, Conservation Lands, Education, Energy, Health, Higher Education, Historic Preservation, Housing, Recreation, Tourism, Transportation and Water Resources. The Functional Plans are designed to address issues pertaining to physical resource needs and development. The functions and activities of the 2007 UHM LRDP Update are required to be in conformance with these functional plans, and particularly consistent with the provisions of the State Educational Functional Plan. The proposed 2007 UHM LRDP Update was not a specific implementing action within the functional plans. However, the spirit and intent of the plans as related to higher education will be respected.

5.4 HAWAI'I COASTAL ZONE MANAGEMENT PROGRAM

The Coastal Management Program (CMP) is a comprehensive state plan that establishes and enforces standards and policies to guide the development of public and private lands within the coastal areas. In the State of Hawai'i, the CMP is articulated in the State Coastal Zone Management (CZM) Law (Hawai'i Revised Statutes, Chapter 205A). The Hawai'i CZM Law charges

the counties with designating and administering Special Management Areas (SMA) within the State's coastal areas. Any "development", as defined by the CZM Law, that is located within the SMA requires an SMA Use Permit.

Discussion
While the UHM Campus is not within the Special Management Area, as established pursuant to Chapter 205A, HRS, (Coastal Zone Management [CZM]), the development of LRDP projects will be scrutinized for compliance with the statutory CZM objectives and policies of Chapter 205A, HRS.

5.5 2050 SUSTAINABLE PLAN

The Hawai'i 2050 Sustainability Plan as a long-term strategy has as its main goals and objectives respect for culture, character, beauty, and history of the state's island communities; balance among economic, community, and environmental priorities; and an effort to meet the needs of the present without compromising the ability of future generations to meet their own needs.

The 2050 Plan delineates five goals toward a sustainable Hawai'i accompanied by strategic actions for implementation and indicators to measure success or failure. The goals and strategic actions that are pertinent to the 2007 UHM LRDP Update are as follows.

Goal One: Living sustainably is part of our daily practice in Hawai'i.

Strategic Actions:

- *Develop a sustainability ethic.*
- *Conduct ongoing forums and cross-sector dialogue to promote collaboration and progress on achieving Hawai'i's sustainability goals.*
- *Continually monitor trends and conditions in Hawai'i's economy, society and natural systems.*

Goal Two: Our Diversified and globally competitive economy enables us to meaningfully live, work, and play in Hawai'i.

Strategic Actions:

- *Develop a more diverse and resilient economy.*
- *Increase the competitiveness of Hawai'i's workforce.*

Goal Three: Our natural resources are responsibly and respectfully used, replenished, and preserved for future generations.

Strategic Actions:

- *Reduce reliance of fossil (carbon-based) fuels.*
- *Conserve water and ensure adequate water supply.*
- *Increase recycling, reuse and waste reduction strategies.*
- *Provide greater protection for air, and land-, fresh water- and ocean-based habitats.*
- *Research and strengthen management initiatives to respond to rising sea levels, coastal hazards, erosion and other natural hazards.*
- *Develop a comprehensive environmental mapping and measurements system to evaluate the overall health and status of Hawai'i's natural ecosystems.*

Goal Four: Our community is strong, healthy, vibrant and nurturing, providing safety nets for those in need.

Strategic Actions:

- *Strengthen public education.*

Goal Five: Our Kanaka Maoli and island cultures and values are thriving and perpetuated.

Strategic Actions:

- *Honor Kanaka Maoli culture and heritage.*

Discussion

The 2007 UHM LRDP Update addresses sustainability through incorporating goals and visions of the university as a leader in environmental sustainability. The University is committed to perpetuating Hawai'i's culture while furthering educational and economic development in an environmentally sensitive way. UHM partners with a number of educational programs, many of which are Native Hawaiian serving organizations, such as Ka 'Imi 'Ike, Na Pua No'eau and Ka Hana 'Imi Na'auao, to share information and train the next generation. The 2007 LRDP Update proposed projects will strengthen research and education at UHM and will lend to the future support, economic incentives and opportunities, and continuance of educational outreach programs.

The 2007 LRDP Update includes design and sustainability guidelines, which incorporate green building design using water saving features and energy saving features such as photovoltaic panels and green roofs. The 2007 LRDP Update Landscape Plan also integrates Hawaiian culture through the use of native plants and landscaping elements that are representative of the natural and cultural landscape. Themes and visions of the LRDP such as a globally connected Hawaiian place of learning, leadership and service are also key components that are integrated in the planning and design of the proposed projects. A campus-wide green roof and permeability plan is part of the LRDP and addresses many sustainability issues.

5.6 CITY AND COUNTY OF HONOLULU GENERAL PLAN

Adopted by resolution in 1977, the General Plan for the City and County of Honolulu sets forth the long-range objectives for the general welfare and prosperity of the people of O'ahu and broad policies to attain those objectives. The General Plan provides objectives and policies intended to guide and coordinate City land use planning and regulation, and budgeting for operations and capital improvements. Provided below are the applicable objectives and policies of the City and County of Honolulu General Plan.

The objectives and policies of the City and County of Honolulu General Plan that are pertinent to the 2007 LRDP Update are discussed below.

Economic Activity

Objective A: To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living.

- *Policy 1: Encourage the growth and diversification of Oahu's economic base.*
- *Policy 2: Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of Oahu residents.*
- *Policy 3: Encourage the development in appropriate locations on Oahu of trade,*

communications, and other industries of a nonpolluting nature.

Objective B: To maintain the viability of Oahu's visitor industry.

- *Policy 8: Preserve the well-known and widely publicized beauty of Oahu for visitors as well as residents*

Objective D: To make full use of the economic resources of the sea.

- *Policy 2: Encourage the development of aquaculture, open research, and other ocean-related activities.*

Discussion

The proposed projects outlined by the 2007 LRDP Update promote the objectives and policies of "Economic" by serving as an economic stimulus to the State, as a center for educational and research activities and employment opportunities. The UHM Campus is the flagship campus of the University of Hawai'i. A destination of choice, students and faculty come from across the nation and the world to take advantage of the unique research opportunities, diverse community, nationally ranked Division I athletics program, and beautiful landscape provided at UHM. UHM is consistently ranked a "best value" among U.S. colleges and universities. UHM is one of only 13 institutions to hold the distinction of being a land-,sea-, and space-grant research institution. Classified by the Carnegie Foundation as having "very high research activity," UHM is known for its pioneering research in such fields as oceanography, astronomy, Pacific Islands and Asian area studies, linguistics, cancer research and genetics. The National Science Foundation ranks UHM in the top 30 public universities in federal research funding for engineering and science and 49th overall. In 2007, the campus received over $209 million in research awards. The 2007 LRDP Update allows UHM to provide new buildings and facilities, expansion and stimulus for the campus, thereby affording new economic incentives and opportunities that will contribute in stimulating and stabilizing the local economy.

Natural Environment

Objective A: To protect and preserve the natural environment.

- *Policy 2: Seek the restoration of environmentally damaged areas and natural resources.*
- *Policy 3: Retain the Island's streams as scenic, aquatic, and recreation resources.*
- *Policy 10: Increase public awareness and appreciation of Oahu's land, air, and water resources.*

Discussion

The 2007 LRDP Update proposed projects will allow UHM to continue its commitment and service in the development of educational and research programs pertaining to environmental sciences, sustainability, design, and preservation and conservation of the environment through the continued partnerships with community organizations, private entities, as well as local and federal governmental agencies. These educational and research programs include a critical research and educational component that is intended to increase the knowledge, understanding, and appreciation of the general public as to the importance of the natural environment and its inherent resources.

In addition, two major components of the 2007 LRDP Update are Sustainability and Landscape Design Guidelines, which promote preservation of the natural environment at the UHM and encourage conservation and maintenance of the UHM Campus as an "urban park" of Honolulu.

Physical Development and Urban Design

Objective E: To create and maintain attractive, meaningful, and stimulating environments throughout O'ahu.

- *Policy 5: Require new developments in stable, established communities and rural areas to be compatible with the existing communities and areas.*

Discussion

The improvements proposed in the 2007 LRDP Update will have beneficial effects on the UHM Campus and the surrounding neighborhoods. The proposals would improve the quality of building design, create a "sense of place", preserve and enhance the natural and cultural resources, and generally improve the overall student experience – all to provide an enhanced educational environment in support of the mission of the University.

The 2007 LRDP Update builds on planning principles and concepts established in the 1987 UHM LRDP. The 1987 UHM LRDP was commissioned to provide an organizing vision for the campus and serve as a guiding document for campus development. The update continues to propose to reverse the existing orientation on campus from vehicles to pedestrians by proposing the removal of roads and parking facilities from the heart of the Central Campus to peripheral locations. The plan is to organize the campus around gateways, malls, paths. In result the plan offers significantly more landscaped areas on campus. The design of new facilities is guided by criteria establishing height, bulk, density and character. In addition, sustainability and design guidelines are provided to assist project teams in their efforts to achieve the goals of the LRDP, which address building design, sustainability and landscape, incorporating "best practices", national standards as well as campus specific design criteria.

Health and Education

Objective B: To provide a wide range of educational opportunities for the people of O'ahu.

- *Policy 1: Support education programs that encourage the development of employable skills*
- *Policy 2: Encourage the provision of informal educational programs for people of all groups.*
- *Policy 5: Facilitate the appropriate location of learning institutions from the preschool through the university levels.*

Objective C: To make Honolulu the center of higher education in the Pacific.

- *Policy 1: Encourage continuing improvement in the quality of higher education in Hawai'i.*
- *Policy 2: Encourage the development of diverse opportunities in higher education.*
- *Policy 3: Encourage research institutions to establish branches on O'ahu.*

Discussion

The improvements proposed by the 2007 LRDP Update promote the objectives and policies of "Health and Education" by addressing current and projected space and activity needs at UHM, thereby allowing UHM to continue its commitment and service in the development of educational and research programs. As mentioned previously, the UHM Campus is the flagship campus of the University of Hawai'i. A destination of choice, students and faculty come from across the nation and the world to take advantage of the unique research opportunities, diverse community, nationally ranked Division I athletics program, and beautiful landscape provided at UHM. UHM is consistently ranked a "best value" among U.S. colleges and universities. UHM is one of only 13

institutions to hold the distinction of being a land-,sea-, and space-grant research institution. Classified by the Carnegie Foundation as having "very high research activity," UHM is known for its pioneering research in such fields as oceanography, astronomy, Pacific Islands and Asian area studies, linguistics, cancer research and genetics. The National Science Foundation ranks UHM in the top 30 public universities in federal research funding for engineering and science and 49th overall. In 2007, the campus received over $209 million in research awards.

Culture and Recreation

Objective A: To foster the multiethnic culture of Hawai'i.

- *Policy 1: Encourage the preservation and enhancement of Hawai'i's diverse cultures.*
- *Policy 2: Encourage greater public awareness, understanding, and appreciation of cultural heritage and contributions to Hawai'i made by the City's various ethnic groups.*

Objective B: To protect Oahu's cultural, historic, architectural, and archaeological resources.

- *Policy 1: Encourage the restoration and preservation of early Hawaiian structures, artifacts, and landmarks.*
- *Policy 4: Promote the interpretive and educational use of cultural, historic, architectural, and archaeological sites, buildings, and artifacts.*

Objective D: To provide a wide range of recreational facilities and services that are readily available to all residents of Oahu.

- *Policy 4: Encourage public and private botanic and zoological parks on Oahu to foster an awareness and appreciation of the natural environment.*

Discussion

The proposed projects outlined by the 2007 LRDP Update promote the objectives and policies of "Culture and Recreation" by serving as a center for multiethnic education and awareness, as well as center for recreational activities for the State of Hawai'i. The UHM Campus is a world-renowned center known for its extensive multi-cultural and -ethnical educational and research opportunities. UHM is known for its pioneering research in Pacific Islands and Asian area studies, which foster the multiethnic culture of Hawai'i. Specifically, the School of Hawaiian Knowledge promotes Hawai'i's cultural heritage and practices, thereby encouraging a greater public awareness, understanding and appreciation for cultural heritage. One of the projects in this PRU application is a new building for the School of Hawaiian Knowledge which will futher knowledge and development of native culture.

The 2007 LRDP Update proposed improvements provide recreational facilities and encourage recreational activities. The UHM houses a nationally ranked Division I athletics program, and provides a wide range of recreational facilities and services including intramural sports, public sporting events, and access to Mānoa Valley. The two parking projects identified in the LRDP will support the cultural and recreational program by adding facilities that support Kennedy Theater and the Quarry recreational facilities.

5.7 CITY AND COUNTY OF HONOLULU PRIMARY URBAN CENTER (EAST) DEVELOPMENT PLAN LAND USE MAP

The City and County of Honolulu Primary Urban Center (PUC) includes the communities from Waiʻalae-Kahala to Pearl City. It is the most populated part of the State of Hawaiʻi and is Oʻahu's largest employment center. In keeping with the policies of the general plan, the PUC is planned to efficiently accommodate more intensive commercial, governmental, residential and recreational functions in a manner that safeguards and adds to the existing amenities of the city's urban environment.

The Development Plan for the PUC describes the desired urban character and the significant natural, scenic and cultural resources. It includes general guiding principles for the PUC and area specific guiding principles for campuses that detail appropriate land uses. The 2007 LRDP UHM Update projects are located in the PUC. The applicable guiding principles are listed below.

1. Stimulate development of high technology and knowledge-based industries. Take advantage of Honoluluʻs active urban ambience to attract high-technology businesses. Use State lands in Kakaʻako for a campus dedicated to biomedical research and other high-technology businesses. Encourage investment in infrastructure in commercial buildings to accommodate and attract high-technology and biotechnology businesses.

2. Provide usable open space. Zoning requirements and bonus provisions for open space associate with larger office buildings should specify design guidelines for usable plazas, parks, and arcades. Key elements of open space are enclosure, shade, seating, and location at street level.

Discussion

Improvements proposed by the 2007 LRDP Update include development of education and research facilities dedicated to high-technology business and biomedical research. New technology and knowledge-based research such as biotechnology attract academic partnerships and high-technology business and development. Leading edge research ventures and technology based businesses typically locate near other office and laboratory facilities. The investment of the proposed 2007 LRDP improvements will accommodate and bring interest from high-technology businesses and related industries.

All campuses located in the PUC, such as UHM, contribute to the urban open space network. The Mānoa Campus LRDP specifically highlights the open spaces on the campus to improve their importance and utility through projects that eliminate cars from the interior of the campus to redevelopment of malls and outdoor features such as Varney circle and the Legacy Mall. The goal of increasing the tree canopy and addition of green roofs also enhance these goals. The creation of new malls and plazas and renovation of existing malls and plaza throughout the campus are all intended to achieve these purposes. Visible landscaped grounds at UHM demonstrate the use of design guidelines that provide key elements of usable open space.

5.8 CITY AND COUNTY OF HONOLULU LAND USE ORDINANCE

The purpose of the County Land Use Ordinance (LUO) is to regulate land use in a manner that will encourage orderly development in accordance with adopted land use policies, including the O'ahu General Plan and Development Plans. The LUO is intended to provide reasonable development and design standards. These standards are applicable to the location, height, bulk and size of structures, yard areas, off-street parking facilities, and open spaces, and the use of structures and land for agriculture, industry, business, residences or other purposes (Revised Ordinance for the City and County of Honolulu, Chapter 21).

Discussion

The existing underlying zoning of the UHM Campus site is Residential R-5 and R-7.5. Portions of TMK 3-3-56:001 are P-1 Restricted Preservation and P-2 General Preservation. Pursuant to the City's Land Use Ordinance, the use of these zoning districts for University facilities is permitted provided a Plan Review Use (PRU) has been approved by the City Council.

The University is currently operating under Plan Review Use (PRU) Permit No. 8/PRU-3 (Resolution No. 89411, CD-2), approved on December 13, 1989, for the Five-Year Master Plan expansion of the University of Hawai'i Mānoa Campus. A major modification to the master plan to increase the seating capacity of the Special Events Arena (now the Stan Sheriff Center) was approved by Resolution No. 92-286, CD-1, FD-1. A major modification to the master plan was also approved for the redevelopment of Frear Residence Hall (Resolution No. 06-255, CD1).
The PRU permit (No. 94/PRU-3) for the 1994 LRDP was reviewed by the DPP and transmitted to the City Council. The resolution (No. 95-278) was introduced, but not adopted within one (1) year of the date of introduction; and, therefore was deemed filed, i.e., Resolution No. 95-278 was not approved.

As part of the 2007 LRDP Update a new Plan Review Use (PRU) permit will be submitted for approval to the City and County of Honolulu, Department of Planning and Permitting.

5.9 THE UNIVERSITY OF HAWAI'I AT MĀNOA STRATEGIC PLAN 2002-2010

The University of Hawai'i at Mānoa Strategic Plan, 2002-2010 is responsive to focusing on achieving key strategic goals for the University. The 2007 LRDP Update project advocates all of the goals and objectives of the University of Hawai'i at Mānoa's Strategic Plan including:

Goal 1: Educational Effectiveness and Student Success

Objective 1: To achieve a shared institutional culture that makes student learning and success the responsibility of all.
Objective 2: To achieve a shared institutional culture that treasures diversity and inclusion, honors collegiality, and continuously strives for exceptional performance.

Goal 2: A Learning, Research, and Service Network

Objective 1: To excel in basic and applied research for the discovery and dissemination of new knowledge.

Objective 2: To support Hawaiʻi's economy, workforce development, and improved access and flow of education in Hawaiʻi from preschool through a lifetime of learning by building partnerships within the University and with other public and private educational, governmental, and business institutions.

Objective 3: To provide access for students, faculty, and staff to a first-class information technology infrastructure, support, and services that sustain and enhance University instruction, research, and administrative services within the University, throughout Hawaiʻi, and beyond.

Goal 3: A Model Local, Regional, and Global University

Objective 1: To establish the University of Hawaiʻi and the state of Hawaiʻi as the research, service, and training hub of Oceania, with bridges to the Asia-Pacific region, the Americas, and the rest of the world.

Objective 2: To strengthen the crucial role that the University of Hawaiʻi system performs for the indigenous people and general population of Hawaiʻi by actively preserving and perpetuating Hawaiian culture, language, and values.

Goal 4: Investment in faculty, staff, students, and their environment

Objective 1: To create a University culture of excellence by recruiting, rewarding, and empowering top-performing faculty and staff and to foster a spirit of joint enterprise and appreciation for all University employees, including graduate assistants and student employees.

Objective 2: To create positive, healthful, resource efficient, and sustainable physical environments on the campuses of the University that enhance the psychological well-being of the students, employees, and community members.

Goal 5: Resources and Stewardship

Objective 1: To build an effective constituency that converts community support for the University of Hawaiʻi into public and private revenue streams that support achievement of strategic plan goals.

Objective 2: To allocate and manage resources to achieve continuing improvement in organization, people, and processes and to secure competitive advantage.

Discussion

The 2007 UHM LRDP Update promotes the goals of the University of Hawaiʻi at Mānoa Strategic Plan by planning for first class resources and facilities to carry out educational programs, research, and training opportunities for UHM. The purpose the LRDP Update is to reflect current and upcoming educational priorities by preparing for future buildings and projects, and to address current space and activity needs. Through proper development of the Mānoa Campus, the

University of Hawai'i will continue to grow as a distinguished resource nationally, in the Asia-Pacific region, and the rest of the world.

Through collaboration with the administration, constituent bodies associated with UHM, the LRDP incorporates new themes and visions into future developments of the campus, aiming to achieve a shared institutional culture of excellence and the achievement of strategic planning goals.

In addition, the LRDP is consistent with the University's past development plans adopted by the Board of Regents (BOR) and the general BOR policies. These plans include:

- A Strategy for Academic Quality, 1985-95 (UH, July 1984)
- A Master Plan for the University of Hawai'i (UH BOR, Jan 1991)
- Academic Development Plan IV, 1991-97 (UHM, April 1994)

5.10 THE UNIVERSITY OF HAWAI'I AT MĀNOA LONG RANGE DEVELOPMENT PLAN

The Physical LRDP, 2007 Update, was approved by the UH BOR November, 2007. The 2007 LRDP updated the 1987 LRDP, which was originally approved by the BOR and the City Council (PRU) in 1989, and then first updated in 1994.

The purpose of this PRU amendment is to implement the UHM LRDP.

6.0 PLAND REVIEW USE

6.0 PLAN REVIEW USE

The purpose of the PRU is to establish a review and approval mechanism for uses of a permanent and institutional nature which, because of characteristics fundamental to the nature of the use, provide essential community services but which could also have a major adverse impact on surrounding land uses.

The intent is that the design and siting of structures and landscaping, screening and buffering for these uses can be master planned so as to minimize any objectionable aspects of the use or the potential incompatibility with other uses permitted in the zoning district.

The general provisions for a PRU are that a master plan, spanning at least five years, shall be submitted and shall be reviewed and commented upon by all applicable city, state and federal planning and development agencies. The proposed master plan shall encompass the entirety of all lots for which the PRU is applied. The master plan may consist of both existing and future development; future development in the plan shall indicate general height and bulk concepts, land expansion, landscaping, setbacks and buffering of adjacent parcels.

The master plan shall be approved by City Council Resolution. Only uses and structures in the approved master plan shall be permitted on the subject lots. Density, height and yards shall be determined by taking into consideration the surrounding land use, adopted land use policy and applicable zoning regulations. Parking, loading and sign requirements shall be specified in the approval of the plan.

Subsequent to City Council approval, the Director of the Department of Planning and Permitting shall approve drawings before building permits are issued, in accordance with the approved plan. While the director may approve minor amendments to the plan, other proposed amendments to an approved plan shall require council approval.

Discussion

In 1989, a PRU was approved for the original LRDP for the UHM Campus (City Council Resolution No.89-411, CD-2, as amended). Presently, a PRU application is being prepared for the 2007 update to the LRDP.

In 1992, the University of Hawaiʻi amended the LRDP for Mānoa with the addition of a new special events arena subsequently named the Stan Sheriff Center (City Council Resolution No. 92-286). Some additional minor amendments were also included during the amendment process.

In 2006, the University of Hawaiʻi at Mānoa was issued an amendment for a major modification to the University of Hawaiʻi, Mānoa Campus, five-year master plan, (Resolution 89-411, CD-2), to allow redevelopment of the Frear Residence Hall (City Council Resolution No. 06-255).

As part of the 2007 LRDP Update a new PRU application is being prepared and will be submitted for approval to the City and County of Honolulu, Department of Planning and Permitting. The following Table 5-1 provides a summary of compliance with each condition of Resolution Nos. 89-411, CD-2; 92-286, CD-1, FD-1; and, 06-255, CD-1.

6.1 SUMMARY OF PRU COMPLIANCE

6.1.1 Resolution No. 89-411, CD-2

Conditions:

1. ***This Plan Review Use pertains to the land areas described on the map attached and identified in the DLU Report (D-685) as Location Map;***

   Yes, this Plan Review Use pertains to the land areas described on the map identified in the DLU Report (D-685) as Location Map. Please refer to Figure 1-7 of this Plan Review Use.

2. ***Development of the sites shall be in general conformance with attached Exhibits A, A-1, and A-2 labeled Five-Year Master Plan- University of Hawai'i- Mānoa Campus – 1988-1993, and the standards and design criteria established in the Long Range Development Plan Report adopted by the University of Hawai'i's Board of Regents in 1987.***

   Yes, development of the sites are in conformance with Exhibits A, A-1, and A-2 labeled Five-Year Master Plan – University of Hawai'i – Mānoa Campus – 1988-1993, and the standards and design criteria established in the 1987 Long Range Development Plan Report.

3. ***Prior to the issuance of a building permit for structures listed in Exhibit A and identified as Numbers 1 through 10, 12, 14 through 16, and 1A through 7A, the applicant shall:***
   a. ***Submit preliminary plans for the Five-Year Master Plan for water, sewerage disposal, and drainage to the Board of Water Supply and Department of Public Works for their review and comment;***

   The plans for the Five-Year Master Plan for water, sewerage disposal, and drainage were submitted to the Board of Water Supply and Department of Public Works for review and comment.

   b. ***Coordinate a transportation improvement timetable and phasing plan with the State Department of Transportation and the City Department of Transportation Services. This plan shall incorporate the traffic mitigation measures recommended in the Traffic Impact Report for Phase I, dated June, 1989, prepared by Austin, Tsutsumi and Associates, Inc,. and shall coincide with the Board of Regents Capital Improvements' Budget for new and remodeled facilities on the University of Hawai'i – Mānoa Campus. A copy of the plan shall be submitted to the Director of Land Utilization.***

   A transportation improvement timetable and phasing plan was coordinated with the State Department of Transportation and the City Department of Transportation Services. The plan incorporated the traffic mitigation measures recommended in the Traffic Impact Report for Phase I, dated June 1989, prepared by Austin, Tsutsumi and Associates, Inc., and coincided with the Board of Regents Capital Improvements' Budget for new and remodeled facilities on the University of Hawai'i – Mānoa Campus. In addition, a copy of the plan was submitted to the Director of Land Utilization.

Modification of the phasing plan may occur for good cause only upon approvals by the Directors of Land Utilization, the State Department of Transportation, and the City Department of Transportation Services.

Modifications of the phasing plan may occur for good cause only upon approvals by the Directors of Planning and Permitting, the State Department of Transportation, and the City Department of Transportation Services.

4. ***Any modifications to the project and/or conditions of change in use stated herein shall be subject to approval of the Director of Land Utilization;***

   Yes, we understand that any modifications to the project and/or conditions of change in use shall be subject to approval of the Planning and Permitting.

5. ***In the event of noncompliance with any of the conditions set forth herein, the Director of Land Utilization may initiate action to halt operation until all conditions are met;***

   Yes, we understand that in the event of noncompliance with any of the conditions set forth herein, the Director of Planning and Permitting may initiate action to halt operation until all conditions are met.

6. ***Any plans relating to the location of a mass transit alignment or station(s) shall be flexible and shall continue to be coordinated with the City; and***

   The University of Hawaiʻi remains flexible regarding plans relating to the location of a mass transit alignment or stations(s) and the University will continue to coordinate this discussion with the City.

7. ***Prior to any closure of the Varsity Place/Kalo Place gate, the APPLICANT shall consult with and obtain the concurrence of the City Department of Transportation Services.***

   Prior to any closure of the Varsity Place/Kalo Place gate, the University shall consult with and obtain the concurrence of the City Department of Transportation Services.

6.1.2 Resolution No. 92-286, CD-1, FD-1

Conditions:

1. ***This Major Modification to Resolution No. 89-411 pertains to the land areas described on the map identified in the DLU Report 88/PRU-3 as Location Map.***

   This Plan Review Use pertains to the land areas described on the map identified in the DLU Report 88/PRU-3 as Location Map. Please refer to Figure 1-7 of this Plan Review Use.

2. ***Development of the sites shall be in general conformance with attached Exhibit A, labeled Five-Year Master Plan- University of Hawaiʻi- Mānoa Campus- 1988-1993, and the standards and design criteria established in the Long Range Development Plan Report adopted by the University of Hawaiʻi's Board of Regents in 1989. Development of the Special Events Arena shall be in the location depicted in Exhibit B attached hereto and***

shall generally be in conformity with the Plans depicted in Exhibits C and D attached hereto.

Development of the sites are in conformance with Exhibits A, A-1, and A-2 labeled Five-Year Master Plan – University of Hawai'i – Mānoa Campus – 1988-1993, and the standards and design criteria established in the Long Range Development Plan Report adopted by the University of Hawai'i's Board of Regents in 1989. Yes, the Special Events Arena is in the location depicted in Exhibit B and conforms to the Plans depicted in Exhibits C and D.

3. ***Prior to six months following the issuance of a building permit for the Special Events Arena the Applicant shall:***
    a. ***Prepare a Traffic Mitigation Plan containing a Transportation Improvement Timetable and Phasing Plan as attachments. This plan shall incorporate off-site traffic mitigation measures recommended in the Traffic Impact Report for Phase I, dated June, 1989, prepared by Austin, Tsutsumi and Associates, Inc., and shall coincide with the Board of Regents Capital Improvements Budget for new and remodeled facilities on the University of Hawai'i- Mānoa Campus. The plan shall be reviewed and approved by the State Department of Transportation Services prior to application for building permits. A copy of the approved plan shall be submitted to the Director of Land Utilization.***

A Traffic Mitigation Plan containing a Transportation Improvement Timetable and Phasing Plan was prepared. The plan incorporates off-site traffic mitigation measures recommended in the Traffic Impact Report for Phase I, dated June 1989, prepared by Austin, Tsutsumi and Associates, Inc., and coincides with the Board of Regents Capital Improvements Budget for new and remodeled facilities on the University of Hawai'i – Mānoa Campus. The plan was reviewed and approved by the State Department of Transportation Services prior to application for building permits and a copy was submitted to the Director of Land Utilization.

    b. ***Submit a Landscape Plan for the Special Events Arena to the Department of Land Utilization for review and approval prior to application for building permits. The Landscape Plan shall focus on reducing the visual impact of the proposed development from the adjoining and surrounding areas. The Plan should include the names, sizes, locations, and quantities of the plant materials to be installed.***

A Landscape Plan for the Special Events Arena was submitted to the Department of Planning and Permitting for review and approval. The Landscape Plan does focus on reducing the visual impact of the proposed development from the adjoining and surrounding areas and includes the names, sizes, locations, and quantities of the plant materials to be installed.

Prior to the issuance of a building permit for the Special Events Arena the Applicant shall:

    c. ***Submit a site plan, a floor plan and elevation plan, of the Special Events Arena to the Department of Land Utilization for review and approval. Plans indicating the texture and color of the Arena should also be included.***

A site plan, floor plan and elevation plan, of the Special Events Arena was submitted to the Department of Planning and Permitting for review and approval. The Plans included indication of the texture and color of the Arena.

4. ***Any minor modifications to the project's plans shall be subject to the approval of the Director of Land Utilization. Any major modifications to the project and/or conditions or change in use stated herein shall be subject to the approval of the Honolulu City Council.***

   Any minor modifications to the project's plans shall be subject to approval of the Director of Planning and Permitting. Yes, any major modifications to the project and/or conditions or change in use stated herein shall be subject to the approval of the Honolulu City Council.

5. ***In the event of noncompliance with any of the conditions set forth herein, the Director of Land Utilization may initiate action to halt operation until all conditions are met.***

   It is our understanding that in the event of noncompliance with any of the conditions set forth herein, the Director of Planning and Permitting may initiate action to halt operation until all conditions are met.

6. ***Prior to any permanent closure of the Varsity Place/Kalo Place Gate, the Applicant shall consult with and obtain the concurrence of the City Council by Resolution and of the City Department of Transportation Services. Until such time as it may be permanently closed, the gate shall remain open from at least one hour prior to the beginning of any major event on the lower campus until at least one hour after the end of the major event.***

   Prior to any closure of the Varsity Place/Kalo Place gate, the University shall consult with and obtain the concurrence of the City Council by Resolution and of the City Department of Transportation Services. Yes, until such time as it may be permanently closed, the gate shall remain open from at least one hour prior to the beginning of any major event on the lower campus until at least one hour after the end of the major event.

7. ***The Special Events Arena shall be named in honor of former University of Hawai'i Director of Athletics Stan Sheriff.***

   The Special Events Arena was named in honor of former University of Hawai'i Director of Athletics, Stan Sheriff.

8. ***Following demolition of Klum Gym, the Special Events Arena shall be the only indoor arena facility on the campus of the University of Hawai'i at Mānoa. No other new arena facility shall be constructed on the Mānoa Campus.***

   The Special Events Arena will be the only indoor arena facility on the campus of the University of Hawai'i at Mānoa. Following demolition of Klum Gym, Klum Gym will be replaced at another location on campus in order to continue to house UHM's inter-mural sports and activities.

9. ***In order to mitigate negative traffic impacts upon the lower campus of the University of Hawai'i at Mānoa and its surrounding residents, no more than one "major event" may be conducted at the same time in the lower campus area. For the purposes of this Condition and the other conditions of this resolution, "major event" means an intercollegiate basketball game, an intercollegiate volleyball game, an intercollegiate baseball (but not softball) game, any high school volleyball, baseball, or basketball tournament, any***

university graduation exercise, or any event with in excess of 5,000 spectators, participants, or combination of both.

The University of Hawaiʻi, Mānoa Campus has been in general compliance with this condition but requests that this condition be amended. Please consider the amendment proposed at the end of this chapter.

10. ***The performance floor and seating area of the Special Events Arena shall be used for lectures, classes, activities, athletic and other events, festivals, programs, concerts, performances, banquets, productions, registration, exhibitions, convocations and commencement exercises held by or sponsored by the University of Hawaiʻi or a University- affiliated organization. In addition, the performance floor and seating areas may be used for high school sporting events, for non-profit community groups such as youth athletic teams, and for sports tournaments and sporting events for nonprofit organizations serving the physically and mentally challenged. Other activities, and in particular other activities of a commercial nature, shall not be permitted on the performance floor or in the seating area of the Special Events Arena.***

    The University of Hawaiʻi, Mānoa Campus has been in general compliance with this condition but requests that this condition be amended. Please consider the amendment proposed at the end of this chapter.

11. ***Except with the prior approval of DLU, hours of operation for the Special Events Arena shall be limited to the hours from 8:00 a.m. to 10:30 p.m., Sunday through Thursday, and from 8:00 a.m. to 11:30 p.m., Friday through Saturday. Without the prior approval of DLU, no major events may be held at the Special Events Arena between the hours of 4:00 p.m. to 6:00 p.m. on Mondays through Fridays, excluding holidays. The Applicant shall give the Department of Land Utilization a "strong" reason and a minimum of three weeks advance notice to review and approve any waiver of the restrictions on hours of operation stated in this Condition.***

    The University of Hawaiʻi, Mānoa Campus been in general compliance but requests that this condition be amended. Please consider the amendment proposed at the end of this chapter.

12. ***The Phasing Plan of the Applicant's Traffic Mitigation Plan may be modified only for good cause and only upon receiving approvals from the Directors of Land Utilization, the State Department of Transportation, and the City Department of Transportation Services.***

    It is understood that the Phasing Plan of the Traffic Mitigation Plan may be modified only for good cause and only upon receiving approvals from the Directors of Planning and Permitting, the State Department of Transportation, and the City Department of Transportation Services.

13. ***Parking Structure Phase IIB shall be constructed by the University as soon as possible following construction of the Special Events Arena and Parking Structure Phase IIA. In any event, construction of Parking Structure Phase IIB shall commence by 1999. Following completion of the Special Events Arena and pending construction of Parking Structure Phase IIB, the Applicant and the University shall take all steps necessary to***

provide surface parking on the University's lower campus as necessary to serve the Special Events Arena and other lower campus uses.

The University Hawaiʻi at Mānoa intends to construct Parking Structure Phase IIB as soon as funding is available to replace Klum Gym. Currently, the University has operated parking and traffic mitigation measures effectively for special events and has sufficient capacity to hold special events at the Lower Campus. In addition, the University institutes traffic management policies to manage increased traffic through extra policies and other measures.

14. ***The University of Hawaiʻi at Mānoa Athletic Advisory Board shall establish a committee, or ensure the continued existence of any current committee, the purpose of which is to provide an avenue for input into the operations of the Special Events Arena for persons representing the various communities neighboring the University of Hawaiʻi- Mānoa Campus and particularly the lower campus thereof.***

An advisory committee was organized but slowly dissolved as its function was covered at Neighborhood Board reports by UH personnel, and committee meetings seemed redundant. The University of Hawaiʻi, Mānoa Campus requests that this condition be amended. Please consider the amendment proposed at the end of this chapter.

6.1.3 Resolution No. 06-255, CD-1

Conditions:

1. ***This Plan Review Use pertains to the land area described on the map attached as Exhibit A.***

   Yes, this Plan Review Use pertains to the land area described on Exhibit A of Resolution No. 06-255, CD-1. Please refer to Figure 1-7 of this Plan Review Use.

2. ***Development of the site shall be in general conformance with the attached Exhibit B (labeled University of Hawaiʻi at Mānoa- Redevelopment of Frear Residence Hall), and the plans on file with the Department of Planning and Permitting (DPP), and as described in the Director's Report. The Director of Planning and Permitting may approve minor or non-substantive deviations.***

   Yes, development of the site was done in conformance with Exhibit B (labeled University of Hawaiʻi at Mānoa Redevelopment of Frear Residence Hall), and the plans on file with the Department of Planning and Permitting, and as described in the Director's Report.

3. ***All conditions of Resolution No. 89-411, CD-2, and Resolution No. 92-286, CD-1, FD-1, shall remain in force.***

   We understand that all conditions of Resolution No. 89-411, CD-2, and Resolution No. 92-286, CD-1, FD-1, remain in force.

4. ***A parking analysis, prepared by a traffic engineer, shall be provided in the new UH-M Five-Year Master Plan. The parking analysis shall include a comprehensive study of the***

on-site parking supply and demand and take into consideration not only parking for students, but also faculty and support staff, and visitors.

As part of the 2007 UHM LRDP Update a *Parking Supply/Demand Study & Site Alternatives Evaluation*, dated October 2007, was prepared by Parking Planners, Inc. The parking analysis includes a comprehensive study of the on-site parking supply and demand and considers not only parking for students, but also faculty and support staff, and visitors. We feel that this report and plan satisfied this condition.

5. ***Prior to approval of building permit applications for structures approved under this PRU permit, the Applicant shall submit to the Traffic Review Branch (TRB) of the DPP for review and approval:***
    a. ***A revised plan showing the drop-off and pick-up area which as access from Dole Street recessed as far into the site as possible, and the current configuration which provides parking spaces and loading opportunities for both Frear Hall and Gateway Hall, maintained.***

The University of Hawai'i at Mānoa submitted a revised plan showing the drop-off and pick-up area which as access from Dole Street recessed as far into the site as possible, and the current configuration which provides parking spaces and loading opportunities for both Frear Hall and Gateway Hall, maintained.

    b. ***A traffic management plan (TMP) prepared for use by dorm administrators to facilitate and contain traffic flow within the site during periods of peak traffic activity. Approval of the TMP must be obtained prior to issuance of a certificate of occupancy for the facility.***

The University of Hawai'i at Mānoa submitted a traffic management plan prepared for use by dorm administrators to facilitate and contain traffic flow within the site during periods of peak traffic activity. Approval of the TMP was obtained prior to issuance of the certificate of occupancy for the facility.

6. ***Construction plans for all work within or affecting public streets and traffic control plans during construction shall be submitted to the TRB of the DPP for review and approval.***

Construction plans for all work within or affecting public streets and traffic control plans during construction were submitted to the TRB of the DPP for review and approval.

7. ***If, during construction, any previously identified archeological sites or remains (such as artifacts, shell, bone, or charcoal deposits, human burials, rocks or coral alignments, paving, or walls) are encountered, the Applicant shall stop work and contact the State Historic Preservation Division (SHPD) immediately. Work in the immediate area shall be stopped until the SHPD is able to assess the impact and make further recommendations for mitigative activity.***

During construction no previously identified archeological sites or remains (such as artifacts, shell, bone, or charcoal deposits, human burials, rocks or coral alignments, paving, or walls were encountered.

8. ***All exterior lighting shall be subdued or shielded to prevent glare and light spillage on adjoining properties and public rights-of-way.***

   All exterior lighting was subdued or shielded to prevent glare and light spillage on adjoining properties and public rights-of-way.

9. ***The Applicant shall obtain all other governmental approvals or permits which may be required for the proposed project.***

   The University of Hawaiʻi at Mānoa has obtained all other governmental approvals or permits which were required for the proposed project.

10. ***As may be required by the Director of Planning and Permitting for the review of development permits, the Applicant shall submit reports updating the Applicant's status in complying with applicable conditions.***

    The University of Hawaiʻi at Mānoa will submit reports updating the University's status in complying with applicable conditions. This PRU update is part of the update process.

6.2 SUMMARY OF PROPOSED PRU AMENDMENTS:

Resolution No. 92-286, CD-1, FD-1 **Condition 9:**
In order to mitigate negative traffic impacts upon the lower campus of the University of Hawai'i at Mānoa and its surrounding residents, no more than one "major event" may be conducted at the same time in the lower campus area. For the purposes of this Condition and the other conditions of this resolution, "major event" means an intercollegiate basketball game, an intercollegiate volleyball game, an intercollegiate baseball (but not softball) game, any high school volleyball, baseball, or basketball tournament, any university graduation exercise, or any event with in excess of 5,000 spectators, participants, or combination of both.
Amendment or Modification to Resolution No. 92-286, CD-1, FD-1 **Condition 9:**
The University of Hawai'i at Mānoa would like to amend this condition because it unnecessarily restricts the University's flexibility of scheduling and the University has demonstrated its ability to address the conditions that were the original reason for placement of this condition. As a proposed amendment to the condition, the University of Hawai'i at Mānoa would like to replace the condition with the following language: ***In the event that the University of Hawai'i at Mānoa conducts more than one "major event" at the same time in the lower campus area, the University of Hawai'i at Mānoa Transportation Demand Management Plan shall be implemented. For the purposes of this Condition and the other conditions of this resolution, "major event" means an intercollegiate basketball game, an intercollegiate volleyball game, an intercollegiate baseball (but not softball) game, any high school volleyball, baseball, or basketball tournament, any university graduation exercise, or any event with in excess of 5,000 spectators, participants, or combination of both.***
Reasoning:
As a general policy, the University of Hawai'i at Mānoa does not allow more than one "major event" to occur at the same time in the lower campus area because: 1. The University of Hawai'i at Mānoa seeks to achieve maximum attendance at "major events", and does not want to compete with itself. 2. Staffing levels at the University of Hawai'i at Mānoa do not usually allow for the University to host more than one major event at the same time in the lower campus area. If the University of Hawai'i at Mānoa was forced to conduct more than one "major event" at the same time in the lower campus area, the University of Hawai'i at Mānoa would mitigate negative traffic impacts upon the lower campus of the University of Hawai'i at Mānoa and its surrounding residents by committing to the University of Hawai'i at Mānoa Transportation Demand Management (TDM) Plan measures. 1. The University of Hawai'i at Mānoa has enough parking on campus to support more than one "major event" in the lower campus area. The lower campus provides more than 1,800 stalls, overflow parking would be made available and parking stalls throughout the campus could provide the required amount of parking necessary. 2. Historical records show that with proper traffic management measures the University of Hawai'i at Mānoa has been able to avoid traffic impacts to the lower campus area and H-1 Freeway. 3. During Special Events held on the Lower Campus, the traffic and parking managers are committed to the TDM Plan for the University in order to mitigate traffic impacts. Some of these TDM measures include: a. Both Dole Street and Old Waialae Road entrances are opened.

b. The reversible lane on lower campus road and the parking structure ramp operate under AM conditions before the event and PM conditions after the event.
c. A more efficient means for the collection of parking fees is implemented.
d. Buses are provided to shuttle people to the lower campus from outlying parking areas.
e. Speed bumps on lower campus road have been removed in order to allow the Shuttle Buses and traffic to move more efficiently in and out of the lower campus.
f. Coordination with the Honolulu City and County Police Department.

In addition, the University of Hawaiʻi at Mānoa has not received any complaints from its surrounding communities in connection with any "major event". A University of Hawaiʻi at Mānoa Representative reports to the Mānoa #7, McCully/Moʻiliʻili #8 and Diamond Head/Kapahulu/St. Louis #5 Neighborhood Boards on a monthly basis, providing a status report on UHM's activities and events and responds to any questions.

Resolution No. 92-286, CD-1, FD-1 **Condition 10:**
The performance floor and seating area of the Special Events Arena shall be used for lectures, classes, activities, athletic and other events, festivals, programs, concerts, performances, banquets, productions, registration, exhibitions, convocations and commencement exercises held by or sponsored by the University of Hawai'i or a University- affiliated organization. In addition, the performance floor and seating areas may be used for high school sporting events, for non-profit community groups such as youth athletic teams, and for sports tournaments and sporting events for nonprofit organizations serving the physically and mentally challenged. Other activities, and in particular other activities of a commercial nature, shall not be permitted on the performance floor or in the seating area of the Special Events Arena.
Amendment or Modification to Resolution No. 92-286, CD-1, FD-1 **Condition 10:**
The University of Hawai'i at Mānoa would like to amend this condition because it unnecessarily restricts the University's flexibility for revenue generation for the University of Hawai'i at Mānoa. As a proposed amendment to the condition, the University of Hawai'i at Mānoa would like to replace the condition with the following language: ***In the event that the performance floor and seating area of the Stan Sheriff Arena is used for activities of a commercial nature held by or sponsored by the University of Hawai'i or a University- affiliated organization, UHM shall consult and coordinate with the Neil Blaisdell Center and the State of Hawai'i Convention Center.***
Reasoning:
At the time this condition was imposed there was a concern that the Stan Sheriff Center would compete with the Neal Blaisdell Center if it was allowed to host commercial events. This was based on the fear that the number of events requiring a venue for the small population base of Honolulu would affect the operations of the Neal Blaisdell Center. Today, the population and density of Honolulu has grown, including the demand for more use and activities for both arenas. For instance, for the 2007 Toyota 50th Anniversary Event both the Hawai'i Convention Center and the University of Hawai'i at Mānoa were needed to support the event. The University of Hawai'i at Mānoa met with representatives from Toyota and Neal Blaisdell Center and it was ascertained that the Neal Blaisdell Center did not have the space, number of seats, and other amenities to accommodate this event. The University of Hawai'i at Mānoa was informed by Toyota representatives that if UHM facilities were not available for use the event would be moved to another city. Therefore, the University of Hawai'i at Mānoa accommodated this event in order to maintain the event in the State of Hawai'i. During this economic downturn, the ability to hold commercial events at the University of Hawai'i at Mānoa would allow for the opportunity to create revenue for the University. The University of Hawai'i at Mānoa should have the right to assist in revenue generation for its functions and activities. This amendment allows for synergistic cooperation between three public gathering facilities.

Resolution No. 92-286, CD-1, FD-1
Condition 11:

Except with the prior approval of DLU, hours of operation for the Special Events Arena shall be limited to the hours from 8:00 a.m. to 10:30 p.m., Sunday through Thursday, and from 8:00 a.m. to 11:30 p.m., Friday through Saturday. Without the prior approval of DLU, no major events may be held at the Special Events Arena between the hours of 4:00 p.m. to 6:00 p.m. on Mondays through Fridays, excluding holidays. The Applicant shall give the Department of Land Utilization a "strong" reason and a minimum of three weeks advance notice to review and approve any waiver of the restrictions on hours of operation stated in this Condition.

Amendment or Modification to Resolution No. 92-286, CD-1, FD-1
Condition 11:

The University of Hawaiʻi at Mānoa would like to amend this condition as we feel it is unnecessary and the UHM has addressed these issues over time. However, as a proposed amendment to this condition, the University Hawaiʻi at Mānoa would like to propose the following amendment:

The hours of operation for the Stan Sheriff Arena shall be limited to the hours from 8:00 a.m. to 10:30 p.m., Sunday through Thursday, and from 8:00 a.m. to 11:30 p.m., Friday through Saturday. In the event that the University of Hawaiʻi at Mānoa conducts a "major event" outside of the hours of operations, the University of Hawaiʻi at Mānoa Transportation Demand Management Study shall be implemented, in order to mitigate negative traffic impacts upon the lower campus of the University of Hawaiʻi at Mānoa and its surrounding residents. The Applicant shall give the Department of Planning and Permitting a "strong" reason at the earliest practicable time to review and comment on the proposed.

Reasoning:

For the most part, the University of Hawaiʻi at Mānoa has been in compliance with this condition. On occasion there is an event that needs or desires to be held outside of the hours of operation for the Stan Sheriff Arena. For instance, Midnight ʻOhana, the inter-squad scrimmage was held annually at the Stan Sheriff Arena until 2005, when the event was moved to 8:00 p.m. Generally, since 2006 this event has been in compliance with this condition. In addition, ESPN asked the University to hold a basketball game on November 19th, 2008 at 11:00 p.m. as part of their 24 hours of men's basketball promotion. The game was televised nationally. UHM is a public agency and for the most part has similar interests with the City, and we do not feel this oversight and restriction is necessary.

The University of Hawaiʻi at Mānoa is required to be in compliance with Department of Planning and Permitting Zoning Code for noise. The University of Hawaiʻi at Mānoa has historically managed the noise levels at the Stan Sheriff Arena:

1. The University of Hawaiʻi at Mānoa has not received any complaints from its surrounding communities in connection with any "major event". A University of Hawaiʻi at Mānoa Representative reports to the Mānoa #7, McCully/Moʻiliʻili #8 and Diamond Head/Kapahulu/St. Louis #5 Neighborhood Boards on a monthly basis, providing a status report on UHM's activities and events and responds to any questions.
2. The noise from the Stan Sheriff Arena at Lower Campus does not spill over into adjacent areas or surrounding communities.

Resolution No. 92-286, CD-1, FD-1 **Condition 14:**
The University of Hawaiʻi at Mānoa Athletic Advisory Board shall establish a committee, or ensure the continued existence of any current committee, the purpose of which is to provide an avenue for input into the operations of the Special Events Arena for persons representing the various communities neighboring the University of Hawaiʻi- Mānoa Campus and particularly the lower campus thereof.
Amendment or Modification to Resolution No. 92-286, CD-1, FD-1 **Condition 14:**
The University of Hawaiʻi - Mānoa requests that this condition be deleted.
Reasoning:
The purpose of this condition is to inform the community of upcoming events at the makai campus and athletic activities. In 1994, the committee was initiated by the University of Hawaiʻi at Mānoa Athletic Advisory Board, but it was not maintained. The committee is dormant and the University of Hawaiʻi at Mānoa has not received any complaints from the neighboring communities in regards to the Stan Sheriff Arena and/or Lower Campus activities. In order to effectively provide an avenue for input into the operations of the Stan Sheriff Arena for persons representing the various communities neighboring the University of A University Hawaiʻi at Mānoa, a University of Hawaiʻi, Mānoa Campus Representative reports to the Mānoa #7, McCully/Moʻiliʻili #8 and Diamond Head/Kapahulu/St. Louis #5 Neighborhood Boards on a monthly basis, providing status reports on the University of Hawaiʻi, Mānoa Campus activities and events and responds to any questions. We think the University is meeting the intent of this condition without the committee. Discussions with Neighborhood Board Chairmen indicated a general agreement that the intent is being met and additional committee meetings were not needed.

7.0 CONCLUSION

7.0 CONCLUSION

7.1 SUMMARY OF FINDINGS

A summary of findings to support the approval of this application are as follows:

- The LRDP is consistent with the Hawai'i State Plan; the City's General Plan and Development Plan; the City's Zoning Ordinance; the University's Strategic Plan; the BOR Master Plan: and the UHM Academic Development Plan.

- The enrollment ceiling for the UHM Campus established by the BOR remains unchanged from the 1987 LRDP at 23,000 students. Enrollment was 20,644 students in the fall of 2007, and is projected to remain relatively stable through 2012. Additionally, the anticipated opening of the new West O'ahu Campus is also anticipated to reduce the pressure on undergraduate enrollment at the UHM Campus.

- The current CIP in the LRDP addresses critical program needs in instruction, research, academic support, student services, and institutional support. The CIP, through general appropriations, also addresses needs in infrastructure improvements such as for utility systems, site improvements, health and safety improvements, accessibility improvements and energy conservation measures.

- The practice of the University is to adopt campus Long Range Development Plans (LRDP) with an Environmental Assessment (EA) and Plan Review Use (PRU) rather than an EIS because the LRDP, which is a conceptual plan does not trigger the actual construction of any specific project. When specific projects are funded, they will go through an individual HRS 343 and PRU process and an EA/EIS will be completed as needed. The policy position has been that the adoption of the plan does not generate significant impacts.

- The improvements proposed in the LRDP do not have significant socio-economic or environmental impacts on the surrounding land uses. The PRU recommends mitigation measures to alleviate impacts when identified.

- The improvements proposed in the LRDP will have beneficial effects on the UHM Campus and the surrounding neighborhoods. The proposals would improve the quality of building design, create a "sense of place," preserve and enhance the natural and cultural resources, and generally improve the overall student experience—all to provide an enhanced educational environment in support of the mission of the University.

7.2 CONCLUSION

Based on the above findings presented in this application and supporting technical studies, UH Mānoa finds the potential impacts of the construction of improvements listed in the LRDP have been sufficiently examined and discussed. With the execution of the mitigation measures recommended in this document, the action is anticipated to not result in significant adverse impacts on the natural and human environment and surrounding land uses. We think these measures adequately address to the known concerns of the University, adjoining communities and governmental agencies.

8.0 List of References

8.0 LIST OF REFERENCES

Capital Improvements Program, *Fiscal Biennium and Future Requirements, University of Hawai'i, Mānoa Campus*

E.V. Walter (1988). *Placeways: A Theory of the Human Environment*

Fukunaga & Associates, Inc. *Utilities Master Plan*, University of Hawai'i, Mānoa Campus

Group 70, Limited (December 1987). *Long Range Development Plan*, University of Hawai'i, Mānoa Campus

Group 70 International, Inc. (1994). *Long Range Development Plan,* University of Hawai'i, Mānoa Campus

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PBR Hawai'i (December 2006). *Residence Hall Study*, University of Hawai'i, Mānoa Campus

University of Hawai'i, Mānoa Campus (2003). *Improving the Mānoa Campus Pedestrian Environment,* Campus Design Group

University of Hawai'i, Mānoa Campus (November 2002), *Defining Our Destiny: Strategic Plan 2002-2010.*

University of Hawai'i, Mānoa Campus, *2006-2007 General and Graduate Information Catalog*

University of Hawai'i, Mānoa Campus, Institutional Research Office (2008). Website: http://www.uhm.hawaii.edu/about

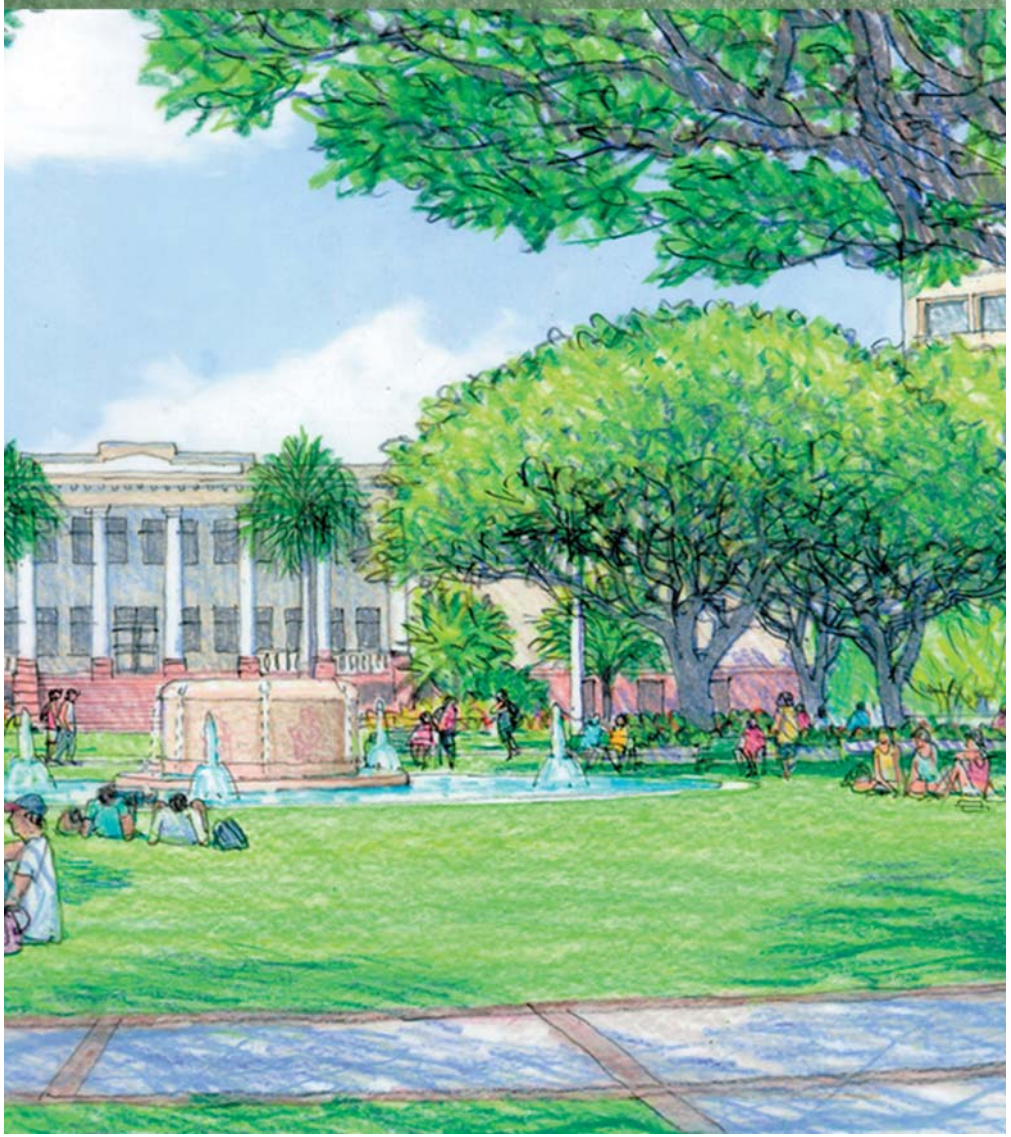
Wm. C. Wimson/Design Detail (January 1992). *Exterior Building Colors,* University of Hawai'i, Mānoa Campus

APPENDIX A. UH MĀNOA LONG RANGE DEVELOPMENT PLAN SUMMARY REPORT

UNIVERSITY OF HAWAI'I

LONG RANGE DEVELOPMENT PLAN

2007 UPDATE SUMMARY REPORT



WHY?

Today, the University of Hawai'i at Mānoa is a multi-dimensional institution of higher learning conducting education, research, and public service programs for the state, the nation and the world community. UHM has grown from a small pastoral campus to one of the largest urban centers in Hawai'i with a daytime population of over 30,000 persons. The land area of the campus is 304 acres, larger than the Central Business District of Honolulu.



2007 UH LRDP UPDATE

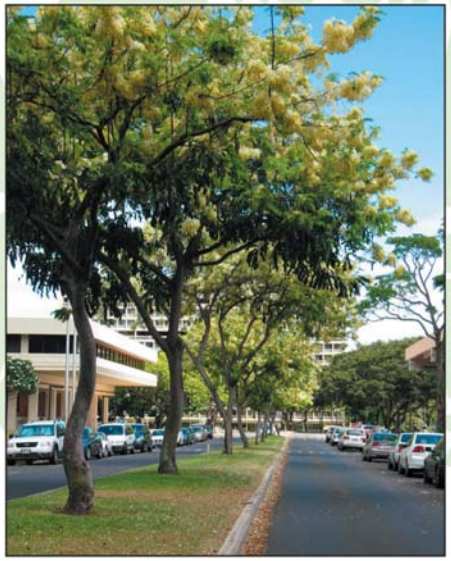
The 2007 UH LRDP Update is based on planning principles established in the 1987 UHM LRDP. Its main purpose is to update the Plan to reflect current and upcoming educational priorities. Future buildings and projects, with emphasis given to the next 5-10 years, are projected in the plan. The Update also incorporates several new "Major Themes" developed through a process of consultation with the Mānoa campus administration and constituent bodies, which include students, faculty members, administrators, and community representatives.





1994 UPDATE

A comprehensive 1994 Update provided refinement to the 1987 Master Plan to guide the design of buildings and ensure a functional and aesthetically appropriate campus. It was anticipated in the 1987 Plan that the document would require updating in five to six year intervals so as to adequately respond to changes in academic priorities, Capital Improvement Program (CIP) priorities, enrollment, environmental issues, funding, changes in the campus caused by the construction of new buildings, and other major factors influencing the campus' development. This update was also necessitated by the City and County of Honolulu's requirement for Plan Review Use (PRU) approval prior to the issuance of building permits.



PROJECTS SINCE THE 1994 UPDATE

- Agricultural Science Facilities, Phase III
- Hamilton Library, Phase III
- Hawai'i Hall Renovations
- Dole Street Parking Structure
- Hamilton Library Renovations to Phases I and II
- Webster Hall Renovations
- Spalding Hall Renovations
- Dean Hall Renovations
- Gartley Hall Renovations
- HIG Building Renovations
- Crawford Hall Renovations
- Center for Hawaiian Studies
- Holmes Hall Renovations
- Environmental Protection Facility
- Biogenesis Research Laboratory
- Center for Student Services
- George Hall Renovation
- Pacific Ocean Science and Technology Building
- Paradise Palms Cafe
- Softball Stadium
- Tennis Court Renovations
- Stan Sheriff Center
- Parking Structure IIA
- Architecture Building
- Makai Substation
- Wist Hall Annex Renovations
- Frear Hall - Replacement Dormitory
- Faculty Housing - Waiahila Ridge Renovations

1987 VISION

The 1987 LRDP envisioned a vital urban setting not unlike that of a successful small town. The plan proposed to reverse the existing orientation on campus from vehicles to pedestrians by proposing the removal of roads and parking facilities from the heart of the Central Campus to peripheral locations. The campus was to organize around gateways, malls, paths and plazas. The resulting plan offered significantly more landscaped areas on campus while providing for the addition of 3,000 parking spaces and approximately three million additional square feet of new construction. The design of new facilities was guided by criteria establishing height, bulk, density, and character. The LRDP was adopted by the Board of Regents in 1987 and has since served as the guiding document for campus development.

2007 UPDATE

FUTURE PROJECTS

The 2007 LRDP Update focuses on projects, which are on the Capital Improvement Program (CIP) and/or are anticipated for development within the next 5-10 years. Projects that are anticipated for development beyond the 5-10 year period are listed and noted in the comprehensive LRDP Site Plan.

Category I – Within 5-10 Years

- Kennedy Theatre Expansion
- Parking Structure at Kennedy Theatre
- Instruction Building at Henke Hall Site
- Campus Center Expansion to Northeast
- Law School Expansion
- I.T.S. - Bilger Hall Addition, Phase II
- Research Space - Infill South Courtyard of Biomedical Building
- Klum Gym Replacement
- Instruction Building - College of Education
- Media Facilities at KHET Site
- Parking Structure IIB/Bookstore
- Faculty Housing - Wa'ahila Ridge or Mauka Campus
- Research Buildings – North and East of Biomedical Building
- Research Buildings - Mauka Campus
- Johnson Hall - Replacement Dormitory
- Hale Noelani - Replacement Dormitory
- School of Hawaiian Knowledge

Category II – Beyond 10 Years

- Bachman Addition for Administration/Instruction Use
- Parking Structure with Tennis Court Roof-Top
- Instruction Building between Sinclair & Bachman
- Research Buildings Replacement –Edmondson Hall & Snyder Hall
- Student Housing at Hale Wainani Parking Lot
- Campus Center Expansion to Southwest
- Korean Studies Art Gallery Addition
- Instruction Building at Health Services Site
- Sinclair Library Addition
- Athletics Department Expansion
- Music Complex Replacement
- Conference Center
- Student Recreation Center
- Andrews Amphitheatre Amenities
- University House
- Facilities Building
- Future Buildings - 1994 LRDP



Varsity Place Gateway - Existing



Varsity Place Gateway - Proposed

VISION

MAJOR THEMES AND VISION

1. Globally Connected Hawaiian Place of Learning, Leadership and Service

This theme, which derives from the University of Hawai'i's Strategic Plan, has many implications. These include the reality of UHM's global reach and influence while being rooted in Hawai'i. This LRDP theme reflects an aspiration of the campus to be a physically appropriate Hawaiian place as it functions as a global center of learning, leadership and service.

Related supporting themes include the strengthening of the relationship of the campus to the ahupua'a of Waikīkī; reinforcing Hawaiian character on the campus; improving entryways, or "ahu", to the campus; making the campus a "people friendly" place; and highlighting places of international connections.

2. Livable Urban Campus

This theme recognizes the need to enhance the residential component of campus that has traditionally been viewed as a commuter campus. This includes the development of significantly more housing for students and faculty on or adjacent to the campus (a departure from the 1994 UH LRDP Update) with more supporting commercial, entertainment, and cultural amenities. The theme envisions a lifestyle for students, faculty, researchers, staff, and visitors which is available in urban communities which attract young, intellectually, and physically active students and experienced faculty and research members seeking a good quality of life.

Supporting themes include a "24 hour – live, learn, work and play" environment; mixed use retail centers with nightlife; venues for cultural, social and artistic interaction, dining in multiple locations; places for fitness and wellness; and wireless access throughout.





3. Outdoor Spaces for Living and Learning

Much of the campus reflects and capitalizes upon the beauty of the surrounding Mānoa Valley. Nonetheless, there are many spaces which are merely remnant areas, which do not encourage functional use. A positive characteristic of many of the buildings, notably the Art Building, is that they are permeable buildings, allowing for shortened, sheltered and shaded walks. This theme envisions the spaces between buildings as either "outdoor rooms" functioning in concert with indoor spaces as venues for education, social gathering, recreation, contemplation, unprogrammed uses, or as outdoor corridors. Remaining mountain and ocean views should be preserved and celebrated as part of a Hawaiian place.

Related supporting themes include the creation of a wide variety of places identified by special vegetation, function, and historic, visual and environmental characteristcs. These places should be usable day and night with comfortable shade and appropriate lighting.

4. UHM – Leader in Environmental Sustainability

the UHM community includes experts in various fields who are working on issues and projects related to environmental sustainability. In addition to education and research, UHM has an institutional commitment to sustainability for social, cultural, and economic reasons. This theme envisions the campus as a laboratory, model, and institutional leader for sustainable practices.

Supporting themes include a goal of increasing the permeable surfaces from 40% to 60% of campus land area to allow more absorption of rainwater into the ground; protecting the existing trees of the campus' "urban park", and expanding its canopy from approximately 20% to 30%; the use of Leadership in Energy and Environmental Design (LEED) criteria and practice in the design of facilities and management; and programmed reduction of energy, water, and other resources.

GATEWAYS

GATEWAYS
VEHICULAR AND PEDESTRIAN

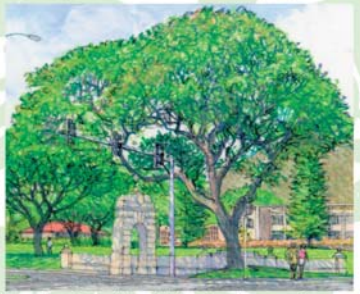
Two types of gateways are proposed for the Campus: pedestrian and vehicular. Vehicular arrival points such as parking lots, bus stops and transit stations are sited on the periphery of the campus; freeing the central areas for pedestrian use. Vehicular gateways are envisioned at primary roadways into the campus. The structures at these gateways would be designed to reflect the quality of the school and to be welcoming with entry signage.

Four pedestrian gateways serving each side of campus and tied to transportation links and parking facilities are proposed. Pedestrian gateways are to be meeting and gathering areas; small paved plazas with benches. Low, manicured hedges are planned to embrace the spaces which will be shaded by canopy trees. Proper night lighting will be provided and, when possible, a safe drop-off apron will be provided.





Founders Gate Along University Avenue - Existing



Founders Gate Along University Avenue - Proposed

MALLS AND PATHWAYS

Leading from each pedestrian gateway, a major landscaped system connecting the Legacy Path, McCarthy, East-West and Correa Malls is to be developed. Each of these major malls will have distinctive characteristics while relating to the whole. The Legacy Path will focus on the history and traditions of the campus and its alumni. The McCarthy Mall is already characterized by its mature monkey pod trees. The East-West Mall projected from University Avenue to Varney Plaza, passing makai of the Old Quadrangle, will feature existing mature botanical trees. Seating and gathering areas should be integrated into these malls. Coffee kiosks and sidewalk cafes should provide life and activity. Malls should allow for security with proper night lighting, call stations and plantings which maintain sight lines.

PLAZAS

PLAZAS

The common conception of paths is that they merely connect buildings. In Europe, however, and in many revitalized American downtowns, it is understood that paths also lead to active and functional gathering places such as plazas. It is in these public spaces, rather than in buildings, that the life of a community is best experienced. These gathering places should be planned to accommodate activities such as craft fairs, concerts, public meetings, informal gatherings, daily lounging and people watching. Paved and grassed tree-covered terraces could provide areas for reading, chatting, eating and simply sitting down.



Varney Plaza - Proposed

VARNEY PLAZA

Varney Plaza would provide an open space focus for the Central Campus. Surrounding buildings such as Hawai'i Hall, Saunders Hall, Webster Hall, Art, the Campus Center, and the Student Services Center attract students, faculty and staff to the area. As the heart of this vibrant campus, this plaza will be a place where the UHM community can meet, eat lunch, play, rest, and study.

CAMPUS CENTER PLAZA

At the intersection of the Legacy Path and Correa Road, the Campus Center Plaza will serve as an active meeting and gathering place for students.

BUILDINGS

BUILDINGS

An opportunity exists for the Mānoa Campus to become a more cohesive campus. Key sites are identified for development during this time. The challenge in the design of new buildings on these sites, as well as the expansion of existing facilities, is to maximize the contribution of each project towards providing a greater aesthetic and functional wholeness to the campus. No building can be seen as an independent facility expressing its "unique" functions. A primary determinant of building's form and character should be its contribution to the whole.

Buildings are shaped by external and internal needs. In turn, they shape exterior spaces. Like the Old Quadrangle, "outdoor rooms" should be formed to the extent possible. Adjacent buildings should "speak" to each other in a dialogue of form, style and space at the same time as responses to mass and scale, definition of outdoor spaces and functional elements such as entries, fenestration and material systems are considered.

New buildings must respond to issues of environmental sustainability. Structures should be models of sustainable design. Recent legislation mandates that all State structures must satisfy the Silver criteria of Leadership in Energy and Environmental Design (LEED) Green Building Rating System™, which is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. These strategies include daylighting, energy generation and conservation, the use of sustainable materials, and water savings. Site design strategies include minimizing storm water run-off and planting shade tree canopy to absorb greenhouse gases, as well as absorb storm water, cool buildings and provide visible benefits.



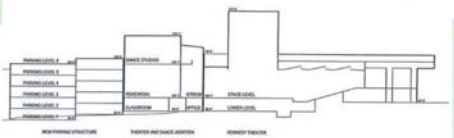


Green Roof Potential for Further Investigation

KENNEDY THEATRE

Kennedy Theatre is proposed to be expanded to include additional studio, rehearsal, classroom, shops, performance, and theatre spaces. The proposed addition will occur on both sides of the Kennedy Theatre and to the rear of the building. The proposed addition is to be aesthetically sensitive to the existing buildings and will not significantly affect any other existing facilities.

As part of the planned Kennedy Theatre addition, the existing parking lot behind Kenndy Theatre will be replaced with a structure that will provide greater parking capacity. It will accommodate approximately 80 stalls per floor. The parking structure would occupy roughly the same area as the existing parking lot, but would nearly triple the existing parking capacity providing approximately 480 parking stalls. Parking for mopeds and motorcycles should be accommodated within the structure, with bicycle parking adjacent.



Kennedy Theatre Expansion and Parking Structure Elevation Plan



LAW SCHOOL EXPANSION

The expansion of the Law School is an opportunity to upgrade the entire facility to provide a unified facility with a modern library, spaces, which accommodate new forms of teaching and learning and one which allows students and faculty to work in an interactive way. The existing and future heavy pedestrian traffic from the quarry parking structure to Dole Street between the two buildings is to be maintained in a green corridor.

RESEARCH SPACE

The Research Space proposed for the Biomedical Building will be a significant feature in the development of the Upper Center Campus. The Research Space will function as an instructional and research facility, which will partially infill the south courtyard of the Biomedical Building and extend outward at the main entrance. The proposed Research Space will expand the health/biological sciences facilities in the Biomedical Sciences Building and expand the health/biological sciences facilities, including additional classroom, laboratory, storage and office space.



DESIGN REVIEW

DESIGN REVIEW PROCESS



The University of Hawai'i at Mānoa is a major development area and a place of great significance in the city and state. As such, it deserves the discipline and consistency of a design review process. This process would ensure that projects conform to the design concepts, themes and guidelines set forth in the LRDP Update and thus consistently contribute to the overall environmental quality of the campus.

A Design Advisory Panel (DAP) would convene periodically to review all projects from a design point of view. It would consist of professionals such as architects, planners, civil engineers, and landscape architects from outside the University, as well as staff and administrators. The DAP would be a consistent third-party group that would assist development teams and advise the University as to the appropriateness of building and landscape design.

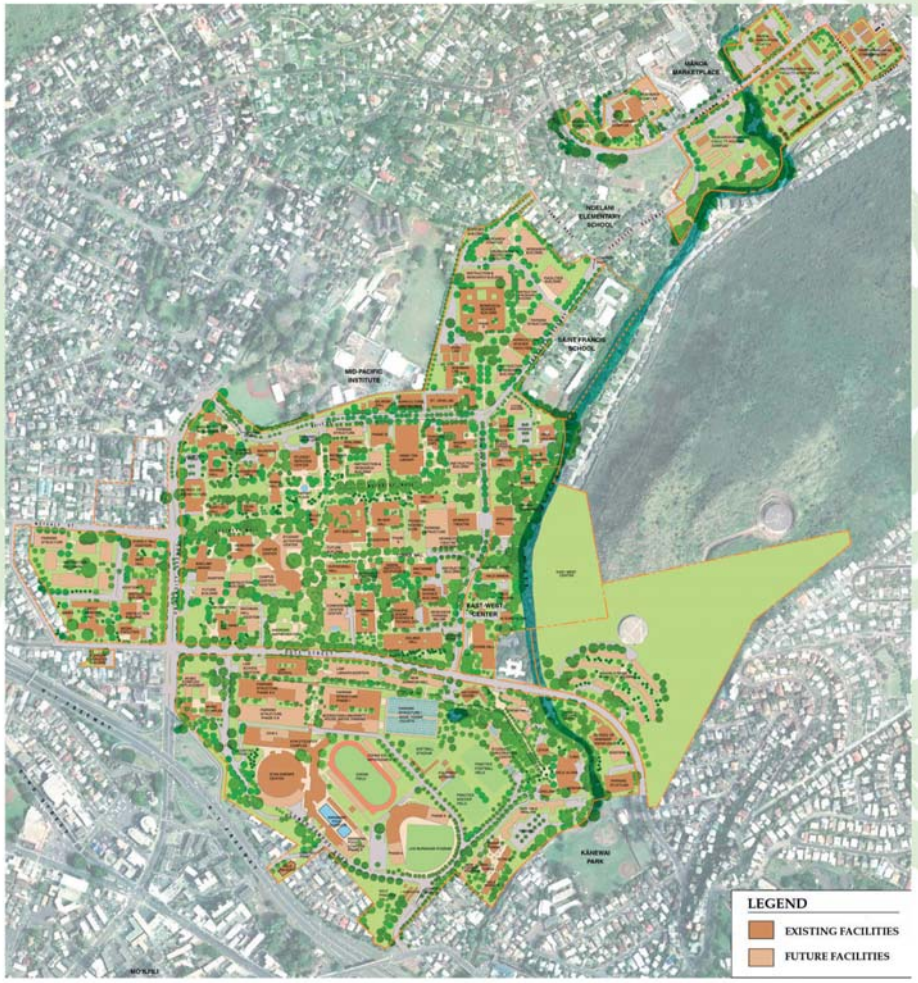
SUSTAINABILITY AND DESIGN GUIDELINES

Some guidelines proposed to assist administrators, design consultants, campus client groups and review committees are presented in the Sustainability Guidelines and Design Guidelines section of the report. The guidelines address building design, sustainability, landscape and graphics. These guidelines incorporate "best practices", national standards as well as campus specific design criteria. They are not meant to be exhaustive and it is anticipated that in the planning period, standards (especially best practices and national standards) will continue to change and be updated. The guidelines are not intended to be prescriptive but are to assist project teams in their efforts to achieve the goals of the LRDP. The guidelines do not supersede County, State and national codes.



Prepared for the
University of Hawai'i at Mānoa
by Group 70 International, Inc.
November 2007

2007 UHM LRDP



UNIVERSITY OF HAWAI'I



Prepared for the
University of Hawai'i at Mānoa
by Group 70 International, Inc.
November 2007

APPENDIX B. NEIGHBORHOOD BOARD MEETING MATERIALS

GROUP 70
INTERNATIONAL

June 29, 2009

Mr. David Tanoue, Director
City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, HI 96813

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

Linda C. Miki
AIA

George I. Atta
AICP

Charles Y. Kaneshiro
AIA, LEED AP

Jeffrey H. Overton
AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

SUBJECT: Notarized Verification of Mail-Out for Notification of a Presentation to Neighborhood Boards for University of Hawai'i, Mānoa Campus, Long Range Development Plan, Plan Review Use

Dear Mr. Tanoue:

I, George I. Atta, hereby certify that notification of a Presentation to Neighborhood Board No. 5 Diamond Head/Kapahulu/St. Louis Heights, Neighborhood Board No. 7 Mānoa, and Neighborhood Board No. 8 McCully/Moili'ili for University of Hawai'i, Mānoa Campus, Long Range Development Plan, Plan Review Use was mailed out by Group 70 International, Inc. on Friday, June 26, 2009 to the attached mailing list, necessary to satisfy the notification requirements for a Presentation to Neighborhood Board as noted in the City and County of Honolulu, Department of Planning and Permitting Plan Review Use Instructions.

As indicated by the following pages, we mailed out to all adjoining property owners and lessees of the perimeter of the subject property.

Please contact me at (808) 523-5866 if you have any questions regarding the attached documents.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP, LEED AP
Principal, Chief Community Planner

Enclosure:
1. Notification Letter
2. Affidavit: Notification of Adjoining Property Owners
3. List of Recipients

GROUP 70
INTERNATIONAL

June 26, 2009

Presentation of a Plan Review Use Application for the University of Hawai'i (UH), Mānoa Campus, Long Range Development Plan (LRDP) to Neighborhood Boards.
TMK: 2-8-7:29; 2-8-15:1; 2-8-23:3, 10, 11, 12, 13 & 16; 2-8-26:14; 2-8-29:1, 30, 31; 2-9-2:12; 2-9-4:5, 7; 2-9-23:1, 26, 27; 2-9-26: 1, 2,3, 37; 2-9-27: 54; 2-9-13: 54; and 3-3-56: Portion of 1

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
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AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

Dear Neighbor,

The University of Hawai'i, Mānoa Campus is seeking approval of a Plan Review Use Application for the 2007 UHLRDP. Future buildings and projects that are on the Capital Improvements Program (CIP) and/or are anticipated for development within the next 5-10 years are covered by this PRU Application.

The applicant will present the current plans for the UHLRDP PRU Application to various Neighborhood Boards. We would like to invite you to attend our presentation. The date, time, and location of the meetings are as follows:

MĀNOA NEIGHBORHOOD BOARD NO. 7

Date: Wednesday, July 1, 2009
Time: 7:00 p.m.
Location: University of Hawai'i at Mānoa, School of Architecture Auditorium
2410 Campus Road, Room 205
Honolulu, HI 96822

(Located on the koko head side of University Avenue between Metcalf Street and Sea View Avenue)

DIAMOND HEAD/KAPAHULU/ST. LOUIS HEIGHTS NEIGHBORHOOD BOARD NO. 5

Date: Thursday, July 9, 2009
Time: 7:00 p.m.
Location: Ala Wai Golf Course Clubhouse, 2nd Floor
404 Kapahulu Avenue
Honolulu, HI 96815

MCCULLY/MOILI'ILI NEIGHBORHOOD BOARD NO. 8 (PENDING)

Date: Thursday, August 6, 2009
Time: 6:30 p.m.
Location: Washington Middle School Cafeteria
1633 S. King Street
Honolulu, HI 96826

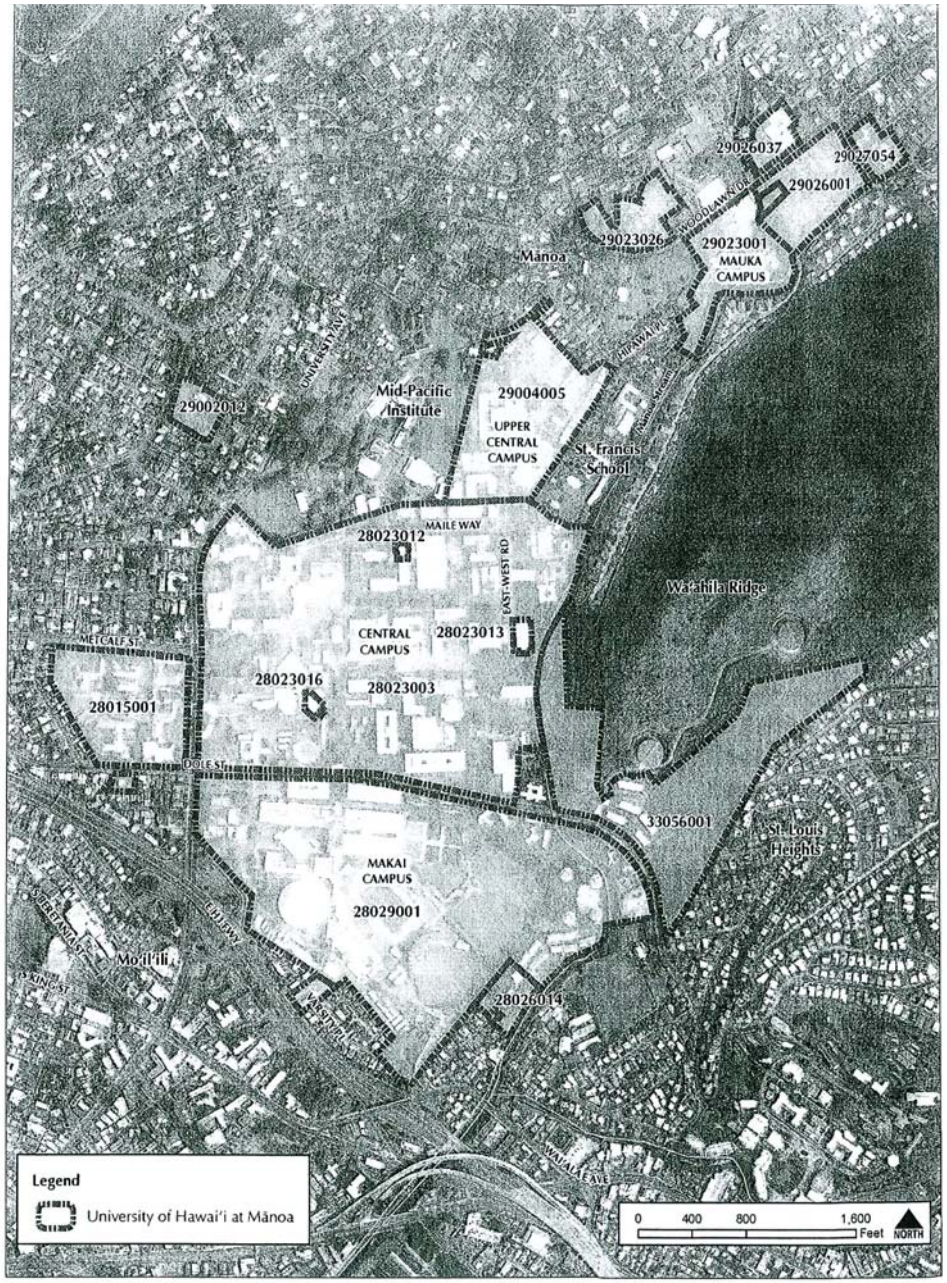
We hope to see you at the meeting. Please contact me at (808) 523-5866 if you have any questions.

Sincerely,
GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP, LEED AP
Principal, Chief Community Planner

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com



STATE OF HAWAII)
) ss.
COUNTY OF HONOLULU)

On this 29th day of **June 2009**, before me appeared **GEORGE I. ATTA**, to me personally known, who, being by me duly sworn, did say that **he** is a **Principal** of **Group 70 International, Inc.**, and the verification of mail-out for Public Notification of the Department of Planning and Permitting's acceptance of the plan review use applications was acknowledged and signed by said **GEORGE I. ATTA**.

L.S.

Margie A. F. Lee
Notary Public: Margie A.F. Lee

My Commission Expires: March 20, 2013

L.S.

NOTARY PUBLIC CERTIFICATION
Margie A. F. Lee First Judicial Circuit
Doc. Description: Notarized Verification of Mail-Out for Notification - Presentations to Neighborhoods for UH-Manoa, LRDP, PRU
No. of Pages: 14 Date of Doc. 6/29/09
Margie A.F. Lee 6/29/09
Notary Signature Date

KAKESAKO,MICHAEL M
1079 LEHUA ST
PEARL CITY, HI 96782

DASSAH,HARRY
111 HIDDEN GLEN CT
VACAVILLE, CA 95688

HASSELFELD,BONNIE K TR
1123 SANDWOOD PL
SAN PEDRO, CA 90731

SONODA,JACK S TRUST EST
1123 SANDWOOD PL
SAN PEDRO, CA 90731

TSUDA,HELLENNE H
1170 HUNAKAI ST
HONOLULU, HI 96816

CHUNG,RICHARD K S TRUST
127 NENUE STREET
HONOLULU, HI 96821

CHUN,SYLVIANNE/G C LEE TRS
1355 AKALANI LP
KAILUA, HI 96734

NAGAMINE,MACK Y TR EST
1369 HONOKAHUA ST
HONOLULU, HI 96825

OUR REDEEMER LUTHERAN CHUR
1404 UNIVERSITY AVENUE
HONOLULU, HI 96822

YOUNG MEN'S CHRISTIAN ASSN
1441 PALI HWY
HONOLULU, HI 96813

NELSON,WALTER D
1498 HUSTED AVE
SAN JOSE, CA 95125

MCHENRY,ROBERT W JR
1510 BERTRAM ST
HONOLULU, HI 96816

MAAG,FRIEDRICH F
1522 BERTRAM ST
HONOLULU, HI 96816

BURTON,WALTER P TR EST
1528 BERTRAM ST
HONOLULU, HI 96816

COLE,ANDREW L
1534 BERTRAM ST
HONOLULU, HI 96816

YOUNG,ANDREW W Y TR
1536 KALAEPOHAKU PL
HONOLULU, HI 96816

SHON,WARREN A
1540 BERTRAM ST
HONOLULU, HI 96816

MIYASAKI,SHUICHI
1552 BERTRAM ST
HONOLULU, HI 96816

LIU,GEORGE Z
1558 BERTRAM ST
HONOLULU, HI 96816

ALBERT,HENRIK H
1564 BERTRAM ST
HONOLULU, HI 96816

CHRISTOPHERSON,JOLENE TR
1570 BERTRAM ST
HONOLULU, HI 96815

FOWLER,TERENCE P TR
1576 BERTRAM ST
HONOLULU, HI 96816

INAMINE,GARY S
1578 ST LOUIS DR
HONOLULU, HI 96816

PORTEUS,BARBARA D TRUST
1582 ST LOUIS DR
HONOLULU, HI 96816

HATAKEYAMA,ROY S TR
1598 HOOHULU ST
PEARL CITY, HI 96782

BODDEN,JUNE N
1600 ST LOUIS DR
HONOLULU, HI 96816

WONG,CHARLOTTE N C
1604 BERTRAM ST
HONOLULU, HI 96816

KIMBALL,DAVID N
1606 ST LOUIS DR
HONOLULU, HI 96816

KADOWAKI,JAY R TR
1609 ST LOUIS DR
HONOLULU, HI 96816

SHOMA,LEIGHTON K
1610 BERTRAM ST
HONOLULU, HI 96816

CHENG,MOON NIN TRS
1614 BERTRAN ST
HONOLULU, HI 96816

KAWAMOTO,KENNETH K TRUST
1620 BERTRAM ST
HONOLULU, HI 96816

ROMEROSO,FAMILY TR
1626 CALERA CREEK HTS
MILPITAS, CA 95035

KAWAMOTO,HIROSHI TR
1660 WAXWING AVE
SUNNYVALE, CA 94087

NAKAMURA,LISA K TR
1705 MARQUES ST
HONOLULU, HI 96822

SUGIMURA,FUKIKO
1717 MOTT-SMITH DR 511
HONOLULU, HI 96822

HONPA HONGWANJI MISSION HI
1727 PALI HIGHWAY
HONOLULU, HI 96813

HONPA HONGWANJI MISSION HI
1727 PALI HIGHWAY
HONOLULU, HI 96813

HONPA HONGWANJI MISSION HI
1727 PALI HIGHWAY
HONOLULU, HI 96813

FUJIKAWA,THOMAS T TR
1751 ALA NOE WY
HONOLULU, HI 96819

LEE CLM LTD PARTNERSHIP
1876 ST LOUIS DR
HONOLULU, HI 96816

MARR,MICHAEL A
1882 ST LOUIS DR
HONOLULU, HI 96816

NISHITANI,HITOMI
1886 ST LOUIS DR
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LAM,TOMMY C TR
1901 KEEAUMOKU ST
HONOLULU, HI 96822

KANAGAWA,SUSAN M
1914 UNIVERSITY AVE
HONOLULU, HI 96822

WESLEY FNDTN AT THE U H
1918 UNIVERSITY AVENUE
HONOLULU, HI 96822

WESLEY FNDTN AT THE U H
1918 UNIVERSITY AVENUE
HONOLULU, HI 96822

YAMASHITA,MASAO/MISAO TR EST
1935 VANCOUVER DR
HONOLULU, HI 96822

MORISAKO,HENRY/DOROTHY TR
1941 W CHANTICLEER RD
ANAHEIM, CA 92804

LAU,HENRY AND NINA TRUST
1995 LAUKAHI ST
HONOLULU, HI 96821

WATER BUFFALO LLC
201 WILSHIRE BLVD STE A28
SANTA MONICA, CA 90401

LBMK INVESTMENT LLC
2032 ST LOUIS DR
HONOLULU, HI 96816

HAWAII BAPTIST CONVENTION
2042 VANCOUVER DR
HONOLULU, HI 96822

HAWAII PACIFIC BAPTIST CONV
2042 VANCOUVER DR
HONOLULU, HI 96822

LYUM ENTERPRISES INC
212 MERCHANT ST301
HONOLULU, HI 96813

FUJII,MELVIN M TR
2128 OAHU AVE
HONOLULU, HI 96822

MASUDA,CHIEKO TRUST
2129/A KAALA WAY
HONOLULU, HI 96822

ARAKAKI,GEORGE Y TR
2130 HUNNEWELL ST
HONOLULU, HI 96822

SUYEOKA,CHIYENO TRUST
2130 UNIVERSITY AVE
HONOLULU, HI 96822

KIM,JAMES C Y TRUST
2131 HUNNEWELL ST
HONOLULU, HI 96822

RESIDENT
2134 HUNNEWELL STREET
HONOLULU, HI 96822

LEONG,H Y T TRUST
2137 OAHU AVE
HONOLULU, HI 96822

WONG,CLARENCE P TR
2140 HUNNEWELL ST
HONOLULU, HI 96822

DOLD,PAUL M
2156 LANIHULI DR
HONOLULU, HI 96822

HONOLULU HOLINESS CHURCH
2207 OAHU AVE
HONOLULU, HI 96822

LAU,BEN F TRUST
2212 METCALF ST
HONOLULU, HI 96822

NOSAKA,TERUO TRUST
2216 HOONANEA STREET
HONOLULU, HI 96822

FUJIMOTO,BURT
2216 METCALF ST
HONOLULU, HI 96816

NG,MILLY YOUNG
222 SO VINEYARD ST #404
HONOLULU, HI 96813

WONG,DORIS C TR
2220 HOONANEA ST
HONOLULU, HI 96822

KUSUHARA,GRACE S
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HONOLULU, HI 96822

CHONG,MARCIA M H TR
2225 HUNNEWELL PL
HONOLULU, HI 96822

HALL,GAYLIEN S TR
2225 KAMEHAMEHA AVE
HONOLULU, HI 96822

SUGIHARA,CLARENCE Y TRUST
2227 OAHU AVE
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NAKANELUA,MELVIN K
2228 HOONANEA STREET
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LAM,JEREMY M S
2230 KAMEHAMEHA AVE
HONOLULU, HI 96822

KUSUHARA,TADASHI TR
2230 METCALF ST
HONOLULU, HI 96822

ISHIDA,HARRY M TRUST
2230 OAHU AVE
HONOLULU, HI 96822

NAKANELUA,EILEEN F TR
2232 HOONANEA ST
HONOLULU, HI 96822

HAMADA,ELLEN Y TR
2234 METCALF ST
HONOLULU, HI 96822

CHOW,KAREN L
2236 OAHU AVE
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MONACO,VINCENT P
2238 HOONANEA ST
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MIYASATO,EDWARD M TR
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HONOLULU, HI 96822

BLUST,ROBERT A
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EPISCOPAL CHURCH IN HAWAII
229 QUEEN EMMA SQUARE
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FUJII,MELVIN M TR
2297 KAMEHAMEHA AVE
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NAKAMURA,ESTHER N TR
2302 HOONANEA ST
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LIANG,HENRY S Q
2304 METCALF STREET
HONOLULU, HI 96817

HEE,WAH CHING TR
2307 DOLE ST
HONOLULU, HI 96822

CHONG,FANNIE R TRUST
2308 DOLE ST
HONOLULU, HI 96822

CHUN,DANIEL L
2314 HOONANEA ST
HONOLULU, HI 96822

BILODEAU,BRUCE R
2314 MAILE WAY
HONOLULU, HI 96822

HAMADA,DONALD M
2318 HOONANEA ST
HONOLULU, HI 96822

MATSUOKA,CYNTHIA T
2319 DOLE ST
HONOLULU, HI 96822

AKAU,THELMA I TRUST
2326 METCALF ST
HONOLULU, HI 96822

OTSUKA,VINCE J
2328 HOONANEA ST
HONOLULU, HI 96822

TAKEUCHI,NEAL M
2334 HOONANEA ST
HONOLULU, HI 96822

TAKEUCHI,NEAL M
2334 HOONANEA ST
HONOLULU, HI 96822

KINEL,RICHARD W
2336 HOONANEA ST
HONOLULU, HI 96822

TOM,FONG TEU & KWAI N L TR
2341 DOLE ST
HONOLULU, HI 96822

TAKARA,FREDERICK H TR
2344 PIKAKE PL
HONOLULU, HI 96817

OBA,LETITIA TRUST
2359 DOLE ST
HONOLULU, HI 96822

MID-PACIFIC INSTITUTE
2445 KAALA ST
HONOLULU, HI 96822

MID-PACIFIC INSTITUTE
2445 KAALA ST
HONOLULU, HI 96822

TERAOKA,BOB N TR
2502 PUAENA PL
HONOLULU, HI 96822

TAKENAKA,CLIFTON K
2506 PUAENA PL
HONOLULU, HI 96822

LEW,LESTER Y T TR
2512 PUAENA PL
HONOLULU, HI 96822

WONG,LEONARD K H TR
2512 PUAENA PL
HONOLULU, HI 96822

KANESHIRO,HERBERT T TRUST
2513 MALAMA PL
HONOLULU, HI 96822

TURNER,PHILIP C TRUST EST
2519 MALAMA PL
HONOLULU, HI 96822

KOP,STEVEN K C TR
2525 MALAMA PL
HONOLULU, HI 96822

MURAYAMA,NORA K
2528 PUAENA PL
HONOLULU, HI 96822

NILSSON,HAROLD D B
2533 MALAMA PL
HONOLULU, HI 96822

TAKETA,YUKIO TR
2534 PUAENA PL
HONOLULU, HI 96822

FO,CLIFFORD K S TR
2538 PUAENA PL
HONOLULU, HI 96822

TANAKA,MILTON K TR
2541 MALAMA PL
HONOLULU, HI 96822

SHIBASAKI,THELMA Y TRUST
2542 PUAENA PLACE
HONOLULU, HI 96822

KOSAKI,RICHARD H TR
2549 MALAMA PL
HONOLULU, HI 96822

HIGA,RONALD K TRUST
2555 MALAMA PL
HONOLULU, HI 96822

HORIUCHI,GLENN T
2561 MALAMA PL
HONOLULU, HI 96822

LAM,DAVID J
2563 MALAMA PL
HONOLULU, HI 96822

KAKESAKO,MICHAEL M
2564 GREENBACK RD
MILPITAS, CA

MUKAI,RAYMOND S TR
2636 PAMOA RD
HONOLULU, HI 96822

DOI,SHERYL L TRUST
2639B PAMOA RD
HONOLULU, HI 96822

MIKAMI,STARLYN P
2645 PAMOA RD
HONOLULU, HI 96822

SAITO,GERALD H
2655 PAMOA RD
HONOLULU, HI 96822

KUSHIYAMA,ANN K Y TR
2660 PAMOA RD
HONOLULU, HI 96822

TOMA,COLEEN S
2661 PAMOA RD
HONOLULU, HI 96822

NARIYOSHI,RICHARD M TR
2664 EAST MANOA ROAD
HONOLULU, HI 96822

MURAKAMI,GRACE K TRUST
2666 PAMOA RD
HONOLULU, HI 96822

MARUBAYASHI,HANAKO TR
2667 PAMOA RD
HONOLULU, HI 96822

FUKUOKA,PORTIA M
2667A PAMOA RD
HONOLULU, HI 96822

YOKOYAMA,WESLEY T
2671 PAMOA RD
HONOLULU, HI 96822

YAMAMOTO,CEDRIC N
2671/A PAMOA RD
HONOLULU, HI 96822

NEKOTA,GEORGE T
2672 PAMOA RD
HONOLULU, HI 96822

ASAHI,THOMAS S
2677 PAMOA RD
HONOLULU, HI 96822

SHIGEMOTO,EARL T
2678 PAMOA RD
HONOLULU, HI 96822

MURAMOTO,TORU TR
2681 PAMOA RD
HONOLULU, HI 96822

IZUMOTO,LEONARD H TR
2687 PAMOA RD
HONOLULU, HI 96822

TSUHAKO,MASARU TRUST
2695 PAMOA RD
HONOLULU, HI 96822

LUKE,HOWARD K K
2696 PAMOA RD
HONOLULU, HI 96822

HIPAWAI CORPORATION
2707 HIPAWAI PL
HONOLULU, HI 96822

HIPAWAI CORPORATION
2707 HIPAWAI PL
HONOLULU, HI 96822

YAMAMOTO,AKIRA TRUST
2714 HIPAWAI PL
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SISTERS 3RD FRAN ORD MC-HAW
2715 PAMOA RD
HONOLULU, HI 96822

TAKAHASHI,KEN T
2734 HIPAWAI PL
HONOLULU, HI 96822

PROUD,JOHN G
2738 HIPAWAI PL
HONOLULU, HI 96822

YAMADA,MICHAEL S
2741 HIPAWAI PL
HONOLULU, HI 96822

BROWN,RONALD P
2749 HIPAWAI PL
HONOLULU, HI 96822

KOJIMA,ELSIE A
2760 KALELE RD
HONOLULU, HI 96826

Condo Master
2782 WOODLAWN
HONOLULU, HI 96822

NAKAMOTO,STEVEN S
2804 WAIALAE AVENUE
HONOLULU, HI 96826

OKAMURA,AYANO TR
2805 E MANOA RD
HONOLULU, HI 96822

KANOMATA,MATSUO
2814 WAIALAE RD
HONOLULU, HI 96826

HASHIMOTO,GODWIN T TR
2816 VARSITY CIR
HONOLULU, HI 96819

FOX,ROBERT E
2817 E BROADWAY
LONG BEACH, CA 90803

LEE,TOMMY M W
2818 WAIALAE AVE
HONOLULU, HI 96816

OMURA,TOSHIO
2820 DOLE STREET
HONOLULU, HI 96816

RESIDENT
2822 WAIALAE AVE
HONOLULU, HI 96826

WHALEN,JOHN J
2823 KOANIANI WAY
HONOLULU, HI 96822

YAMAMOTO,MILDRED M
2824 KOANIANI WAY
HONOLULU, HI 96822

ISOBE,TSUTOMU TR
2824 KOLOWALU ST
HONOLULU, HI 96822

YAMAMOTO,GLENN M
2826 KALAWAO ST
HONOLULU, HI 96822

ISHIHARA,YOSHIMASA TRUST
2827 KOANIANI WAY
HONOLULU, HI 96822

TAKANISHI,DARRELL M
2828 A KEAMA PL
HONOLULU, HI 96822

UEHARA,EUGENE I/SUMIKO FAMILY TR
2828 KOANINAI WAY
HONOLULU, HI 96822

TSUCHIHASHI,SONOKO
2829 KOLOWALU ST
HONOLULU, HI 96822

YOUNG,MICHAEL M J
2830 WOODLAWN DR
HONOLULU, HI 96822

HIROTA,GERALDINE F
2832 KEAMA PL
HONOLULU, HI 96822

EBISUI,AKIKO
2833 KEAMA ST
HONOLULU, HI 96822

MURASHIMA,PAUL S
2834 KOANIANI WAY
HONOLULU, HI 96822

YAMADA,JAMES M TR
2835 KOANIANI WAY
HONOLULU, HI 96822

NAKAMURA,MITSUO/CHIYOKO TRS
2840 KOANIANI WAY
HONOLULU, HI 96822

WOODLAWN MANOR
2840 WOODLAWN DR
HONOLULU, HI 96822

MITSUNAGA,WARREN T
2841 KOANIANI WAY
HONOLULU, HI 96822

LEE,WILDRICK F B TR
2846 VARSITY CIR
HONOLULU, HI 96826

LOWE,BARBARA L TR
2846 WOODLAWN DR
HONOLULU, HI 96822

CROOKES,GRAHAM V
2856 VARSITY CIR
HONOLULU, HI 96822

IKEHARA,BARNEY B TRUST
2902 KALAWAO PLACE
HONOLULU, HI 96822

WELDON,JOHN K
2903 ROBERT PL
HONOLULU, HI 96816

SAKAI,EDNA T TR
2904 VARSITY CIR
HONOLULU, HI 96817

LUM,JEFFREY M C
2904 WOODLAWN DR
HONOLULU, HI 96822

MARTIN,JAMES W TR
2905 ALPHONSE PL
HONOLULU, HI 96816

MARTIN,JAMES W TR
2905 ALPHONSE ST
HONOLULU, HI 96816

BRANTLEY,RUTH T TRUST
2908 ROBERT PL
HONOLULU, HI 96816

ONOSAKI,RAYMOND G TRUSTEE
2908 VARSITY CIR 5
HONOLULU, HI 96826

ZIA,HOYT H
2909 ALPHONSE PL
HONOLULU, HI 96816

BONER,MARY M
2909 KALEI RD
HONOLULU, HI 96826

TANIGUCHI,BESSIE S 1996 TR
2910 ALPHONSE PL
HONOLULU, HI 96816

SHIROMA,GEORGE TR
2910 EUGENE PL
HONOLULU, HI 96816

SHIROMA,GEORGE TRUST
2910 EUGENE PL
HONOLULU, HI 96816

BOW,REGINALD H Y TRUST
2911 EUGENE PL
HONOLULU, HI 96816

VIDINHA,FRANK J TRUST
2913 KALEI RD
HONOLULU, HI 96826

NAKADA,GORDON S
2914 KALEI RD
HONOLULU, HI 96825

KUNIMURA,SCOTT S
2916 EUGENE PL
HONOLULU, HI 96816

WASANO,SHIRLEY TRUST
2918 ALPHONSE PL
HONOLULU, HI 96816

FUSHIKOSHI,LAWRENCE T TR
2918 VARSITY CIR
HONOLULU, HI 96821

GOODYEAR,BRIAN S
2924 ALPHONSE PL
HONOLULU, HI 96816

PENNINGTON,HARLEY F III
2924 EUGENE PL
HONOLULU, HI 96816

LI,TSENG YEE
2925 KALEI RD
HONOLULU, HI 96826

TANAKA,MARJORIE H TR
2928 EUGENE PL
HONOLULU, HI 96816

MURATA,RICHARD K
2930 KALEI ROAD
HONOLULU, HI 96826

NG,GABRIEL O M TR
2930 ROBERT PL
HONOLULU, HI 96816

HOE,PATRICIA H W
2931 KALEI RD
HONOLULU, HI 96826

MARTIN,RICHARD W
2933 A KOALI RD
HONOLULU, HI 96826

SAKANOI,VALERIE T
2934 EUGENE PLACE
HONOLULU, HI 96816

KAGESA ENTERPRISES INC
2939 KALEI RD
HONOLULU, HI 96826

MCDONALD,KAREN Y
2940 KALEI RD
HONOLULU, HI 96826

WONG,JENNY M TR
2940 VARSITY CIR
HONOLULU, HI 96826

KAWACHIKA,NORMAN M
2943 LOWREY AVE
HONOLULU, HI 96822

HOME INVESTMENT LLC
2945A KALEI RD
HONOLULU, HI 96826

PONIMOI,DIANE A K TR
2947 KOALI RD
HONOLULU, HI 96826

MOAD,LOYAL K
2949 KALAWAO STREET
HONOLULU, HI 96822

NAKANO,ROBERT E TR
2950 KALEI RD
HONOLULU, HI 96826

JI,DO HYON
2951 KALEI RD
HONOLULU, HI 96826

TERADA,SEIJI TR
2951 KOALI RD
HONOLULU, HI 96826

UEKI,RANDY H
2953 KALEI RD # B
HONOLULU, HI 96826

NAKASONE,HARRY S TR
2954 KALEI RD
HONOLULU, HI 96826

Condo Master
2955 KALOALUIKI
HONOLULU, HI 96822

KALOALUIKI STREAMSIDE
2956 KALOALUIKI ST
HONOLULU, HI 96822

MIYAZAKI,MOMOYO TR
2956/G VARSITY CIR
HONOLULU, HI 96826

LIANG,GUOXIAN
2958 VARSITY CIR
HONOLULU, HI 96826

SANEKANE,LOIS K
2959 KALAWAO ST
PAHOA, HI 96778

CHEN,CHAO HSIUNG
2959 KALOALUIKI ST
HONOLULU, HI 96822

CHONG,ROBERT W M
2961 KALOALUIKI ST
HONOLULU, HI 96822

TERAYAMA,TED A TRS
2963 KAHALOA DR
HONOLULU, HI 96822

NEUPANE,KABI R
2964 VARSITY CIR
HONOLULU, HI 96826

KIYONAGA,LILLIAN M
2965 KALAWAO ST
HONOLULU, HI 96822

NAKAMURA,MELVIN M
2965 KALOALUIKI ST
HONOLULU, HI 96822

SASAKI,KIYOSHI/HANAYO FAMILY TR
2969 KALAWAO ST
HONOLULU, HI 96822

ISLAND TITLE EXCHANGE INC
2969 VARSITY CIR
HONOLULU, HI 96826

WARING,WILLIAM C III
2975 KALAWAO ST
HONOLULU, HI 96822

MIKAMI,ROY S TR
2979 KALAWAO ST
HONOLULU, HI 96822

KOBASHIGAWA,BENTON T
2980 KALAWAO PL
HONOLULU, HI 96822

KIMURA,CLARENCE
2981 KALAWAO PL
HONOLULU, HI 96822

CHUNG,RAYMOND W L
2985 KALAWAO STREET
HONOLULU, HI 96822

OKUMURA,LAWRENCE M
2985 KOALI RD
HONOLULU, HI 96814

OKUMURA,LAWRENCE M
2985 KOALI RD
HONOLULU, HI 96826

OKUMURA,LAWRENCE M
2985 KOALI RD
HONOLULU, HI 96814

OKUMURA,BERT T FAMILY TR
2997 KOALI RD
HONOLULU, HI 96826

YAMAMOTO,STANLEY S
3003 LANIKAULA ST
HONOLULU, HI 96822

LARSEN,JANET R
3006 LANIKAULA ST
HONOLULU, HI 96822

SATO,ALVIN H
3007 LANIKAULA ST
HONOLULU, HI 96822

NAKAMURA,KEITH M
3020 KALAWAO ST
HONOLULU, HI 96822

MORIBAYASHI,ALVIN K
3020 LANIKAULA ST
HONOLULU, HI 96822

MURAKAMI,MASAYOSHI TR
3022 HIEHIE ST
HONOLULU, HI 96822

TONAKI,ROY T TR
3024 KALAWAO ST
HONOLULU, HI 96822

INOUE,WILFRED M TR
3029 HIEHIE ST
HONOLULU, HI 96822

TAKEYAMA,MICHIKO TRUST
3030 HIEHIE ST
HONOLULU, HI 96822

TAGOMORI,MANABU TR
3035 HIEHIE ST
HONOLULU, HI 96822

LEONG,EDMUND G TRUST
308 BATES ST
HONOLULU, HI 96817

LOWE,MICHAEL H TR
3137 ALIKA AVE
HONOLULU, HI 96817

DSTREET LTD PARTNERSHIP
3227 HINANO ST
HONOLULU, HI 96815

AHN,JANE CHUNG TRUST
3250 PINAOULA ST
HONOLULU, HI 96822

INOUYE,JILLIAN TRUST
3280 PAUMA PL
HONOLULU, HI 96822

YOUNG,KUI SEE TRUST
3295 PINAO ST
HONOLULU, HI 96822

SEKI,SHINICHI TRUST
3313 MAKINI ST
HONOLULU, HI 96815

UYEUNTEN,DAVID T
3351 HUELANI DR
HONOLULU, HI 96822

KOJIMA,FUTOSHI/CHIYOKO TRUST
3510 AKAKA PL
HONOLULU, HI 96822

YIM,STANLEY G H TRUST
3510 ALA ALOALO PL
HONOLULU, HI 96818

WOODLAWN PROPERTIES LLC
3586 WOODLAWN DR
HONOLULU, HI 96822

GOO,PETER K TRUST
3725 KUMUKOA PL
HONOLULU, HI 96822

NAKADA,DONALD T TR
425 SOUTH STREET 2904
HONOLULU, HI 96818

DAIDO,MISANO DECD
4463 WAHINEKOA PL
HONOLULU, HI 96821

KAM,HERMAN T C
47-379 MAHAKEA RD
KANEOHE, HI 96744

CHURCH OF JESUS CHRIST LDS
50 EAST NORTH TEMPLE ST
SALT LAKE CITY, UT 84150

Y F MAU CHILDREN'S LLC
5278 MAKALENA ST
HONOLULU, HI 96821

MISAWA,SACHIKO
5302 MALU PL
HONOLULU, HI 96816

LINDSLEY,OGDEN R TRUST
581 KAMOKU ST 3506
HONOLULU, HI 96826

HALE,JANE T TR
60 N KUAKINI AVE 1A
HONOLULU, HI 96817

MORI,HITOYO TRUST
600 MORAGA RD # 17
MORAGA, CA 94556

CHANG,DONNA S
601 LAKESIDE DR
FULLERTON, CA 92835

NISHI,ETHEL K
6507 N 13TH DR
PHOENIX, AZ 85013

GOTO,PANSY Y
698 HAKAKA ST
HONOLULU, HI 96816

SUGIHARA,EDWIN A TR
704 N KUAKINI ST
HONOLULU, HI 96817

B P BISHOP TRUST ESTATE
745 FORT ST MALL 9TH FL
HONOLULU, HI 96813

TONG,CARL T H
745 FORT ST MALL, STE 609
HONOLULU, HI 96813

LUM YIP KEE LTD
80 N KING ST
HONOLULU, HI 96817

LUM YIP KEE LTD
80 N KING ST
HONOLULU, HI 96817

LUM,WING TEK
80 N KING ST
HONOLULU, HI 96817

LUM,WING TEK
80 N KING ST
HONOLULU, HI 96817

PUKUI,NAPOLEON K
835 AHUWALE ST
HONOLULU, HI 96821

DUNG,JOSEPH K H TRUST
837 ALEWA DR
HONOLULU, HI 96817

LARSON,CHARLES J
92-624 MEHANI ST
KAPOLEI, HI 96707

Y KAWANO LIMITED PTNSHP
935 COOLIDGE ST
HONOLULU, HI 96826

HOWARD,LOUI L W
94-1067 AWALUA ST
WAIPAHU, HI 96797

OTA,TAKEO
94-1096 KAPEHU ST
WAIPAHU, HI 96797

KAWAIAHAO CHURCH
957 PUNCHBOWL ST
HONOLULU, HI 96814

MITSUDA,ABE E
98-1855 HAPAKI ST
AIEA, HI 96701

DUNG,DAVID J
98-1861 KAAHUMANU ST UNIT B
Aiea, HI 96782

KAWAMURA,GLENN S
99-680 HALAWA DR
AIEA, HI 96701

OKIMOTO,THOMAS M/LORRAINE S F
999 WILDER AVE #1404
HONOLULU, HI 96822

CHIKAMOTO,HAROLD T
P O BOX 12199
HONOLULU, HI 96828

CHEE,BENJAMIN W L TR
P O BOX 1402
HONOLULU, HI 96807

WONG,RICHARD Q Y FAMILY TR
P O BOX 61175
HONOLULU, HI 96839

LOO,CYNTHIA H S TR
P O BOX 61220
HONOLULU, HI 96839

HELEN KAU TRUSTEE
P O BOX 61968
HONOLULU, HI 96839

KAU,HELEN TRUSTEE
P O BOX 61968
HONOLULU, HI 96839

TAMIYA,ALAN N/JANE F TRUST
P O BOX 62168
HONOLULU, HI 96839

HASHIZUME,MASAO TRUST
P.O. BOX 3708
HONOLULU, HI 96811

HIPAWAI CORPORATION
PO BOX 61968
HONOLULU, HI 96839

MANOA SHOPPING CENTER INC
PO BOX 62156
HONOLULU, HI 96839

MATSUSHIMA,CHARLES/DORIS TR
PO BOX 895
KEALAKEKUA, HI 96750

B P BISHOP TRUST ESTATE
745 Fort Street Mall, 9th Fl.
HONOLULU, HI 96813

Dianne Murata
Purchasing Division
City and County of Honolulu
530 South King Street, Room 115
Honolulu, HI 96813

APPENDIX C. UNIVERSITY OF HAWAI'I AT MĀNOA – EXISTING BUILDINGS

University of Hawai'i at Mānoa – Existing Buildings

Campus	Building Number	Name	GSF
UHM	N/A	Infrastructure	N/A
UHM	1002	Hawaii Hall	36,489
UHM	1005	Magoon Headhouse	4,749
UHM	1007	Army ROTC Building	5,178
UHM	1008	MAGOON 4-H (PEPS)	960
UHM	1009	MAGOON Greenhouse 12	1,747
UHM	1010	MAGOON NREM SOIL LAB	6,593
UHM	1012	IFA Manoa	55,400
UHM	1013	Fruit Fly Laboratory	810
UHM	1014	Saunders Hall	126,738
UHM	1015	Gartley Hall	24,493
UHM	1016	Architecture Building	58,000
UHM	1017	Shidler College of Business	129,143
UHM	1019	George Hall	47,761
UHM	1020	Queen Liliuokalani Center For Student Services	103,000
UHM	1024	Bachman Annex #6 (University Relations)	1,768
UHM	1030	Dean Hall	18,768
UHM	1031	PEACESAT	3,206
UHM	1032	Small Animal Care Facility	5,242
UHM	1033	MAGOONGREENHOUSE 4	5,952
UHM	1037	Building 37 (ITS Building)	3,653
UHM	1039	Wist Hall	24,591
UHM	1040	Wist Hall Annex #1	5,548
UHM	1046	Krauss Hall & PR Bldg 1	19,870
UHM	1047	Sakamaki Hall	87,206
UHM	1048	Tropical Energy House	1,802
UHM	1049	Art Building	157,462
UHM	1057	Crawford Hall	24,662
UHM	1062	Miller Hall	19,273
UHM	1064	University Elementary School (Portable-New 1)	20,099
UHM	1068	Castle Memorial Hall	28,484
UHM	1069	Caretakers Cottage (Castle Memorial)	1,678
UHM	1071	University High School #1	11,184
UHM	1076	Korean Studies, Center for	16,569
UHM	1080	Castle Annex	3,307
UHM	1081	Everly Hall	20,625
UHM	1088	Agricultural Engineering Institute	15,689
UHM	1089	Gilmore Hall	73,180
UHM	1090	Sherman Laboratory	49,042
UHM	1091	Music Building Complex (Orvis)	49,970
UHM	1093	Music building - 3 units	10,361
UHM	1094	University High School #2	9,560
UHM	1098	Marine Sciences Building	95,500
UHM	1107	Bachman Hall	28,070
UHM	1110	Physical Education/Athletic Complex (HPER)	119,200
UHM	1111	Food Sci&Tech Bld (Fd Prcsng Lab)	9,281
UHM	1112	Dance Building	4,216
UHM	1115	Les Murakami Stadium (Baseball)	81,244
UHM	1121	Pacific Bioscience Research Center (PBRC)	16,294
UHM	1124	Administrative Services Building #1	13,733
UHM	1125	Kuykendall Annex - CTAHR	1,773
UHM	1126	Bilger Hall	74,906
UHM	1129	Henke Hall	24,686

Campus	Building Number	Name	GSF
UHM	1131	Kamakakuokalana Ctr for Haw Studies	22,000
UHM	1133	Sinclair Library	117,797
UHM	1135	Mid Pac Potting House	259
UHM	1138	CRCH Refrigeration Lab	1,566
UHM	1142	Law School	53,190
UHM	1143	Law Library	33,245
UHM	1151	University High School #3	27,241
UHM	1158	Keller Hall	49,143
UHM	1159	Physical Science Building	42,873
UHM	1160	Watanabe Hall	66,167
UHM	1162	Pacific Ocean Science & Technology (POST)	225,000
UHM	1163	Holmes Hall	88,546
UHM	1164	Edmondson Hall	43,480
UHM	1165	Hawaii Institute of Geophysics	126,708
UHM	1167	Webster Hall	59,559
UHM	1168	Spalding Hall	33,012
UHM	1169	Pope Laboratory (incl Greenhouse)	35,808
UHM	1170	Lab School Lockers (University High School Loc	2,436
UHM	1172	Biomedical Sciences Building	184,592
UHM	1175	Moore Hall	110,940
UHM	1177	Snyder Hall	18,030
UHM	1183	Kennedy Theatre	47,302
UHM	1185	College Hill	10,220
UHM	1187	Multipurpose Bldg. (Univ. High)	12,664
UHM	1190	University Health Services	10,792
UHM	1192	Kuykendall Hall	86,492
UHM	1193	Physical Plant Building	4,302
UHM	1194	Maintenance Shop	15,120
UHM	1195	Maintenance Warehouse	25,445
UHM	1198	St. John Laboratory Complex	125,796
UHM	1200	Environmental Protection Facility	2,856
UHM	1210	Agricultural Science Facility	110,786
UHM	1212	Andrews Amphitheatre	10,800
UHM	1214	Communication Vault (Lower Campus Road)	475
UHM	1002A	Hawaii Hall, Mechanical Building	2,880
UHM	1003A	Cottage #1	1,155
UHM	1003C	Cottage #3	1,155
UHM	1003D	Cottage #4	1,155
UHM	1004B	Thrift Shop	1,081
UHM	1005A	Magoon Greenhouse 5	3,016
UHM	1005B	Magoon Greenhouse 6	3,600
UHM	1005C	Magoon Greenhouse 7	8,311
UHM	1008A	Magoon GREENHOUSE 10 (PEPS)	2,892
UHM	1008B	MAGOON Greenhouse 11 (PEPS)	2,892
UHM	1008C	MAGOON Plant Pathology Field Laboratory	1,828
UHM	1010A	MAGOON STORAGE SHED	675
UHM	1010B	MAGOON GREENHOUSE 8	3,000
UHM	1010C	MAGOON GREENHOUSE 9	2,892
UHM	1011A	University of Hawaii Press Editorial	1,400
UHM	1011B	University of Hawaii Press Marketing and Journa	1,882
UHM	1011C	University of Hawaii Press International Sales	1,994
UHM	1011D	University of Hawaii Press Administration	1,860
UHM	1011E	University of Hawaii Press Business Annex	1,743
UHM	1011F	University of Hawaii Press Production	1,889

Campus	Building Number	Name	GSF
UHM	1011G	University of Hawaii Press Business	1,286
UHM	1011H	PBRC-Biochem Lab	1,761
UHM	1013A	Fruit Fly Laboratory (USDA) #1	3,870
UHM	1013B	Fruit Fly Laboratory (USDA) #2	3,870
UHM	1013C	Fruit Fly Laboratory (USDA) #4	2,518
UHM	1013D	Fruit Fly Laboratory (USDA) #3	2,619
UHM	1013E	Fruit Fly Laboratory (USDA) #5	1,368
UHM	1024C	Bachman Annex #2 (Alumni & Treasury)	1,768
UHM	1025A	Maile Way #1 - Capsule	118
UHM	1025B	Maile Way #2 - Relocatable	1,741
UHM	1031A	TRIO Project	3,206
UHM	1031C	Duplicating Services	4,767
UHM	1031D	Ka Leo Board of Publications	2,146
UHM	1031E	Ka Leo Press Room	3,402
UHM	1034A	MAGOON GREENHOUSE 3	2,700
UHM	1034B	MAGOON GREENHOUSE 2	2,700
UHM	1034C	MAGOOM GREENHSOUDE 1	3,064
UHM	1038A	University Avenue #1	1,741
UHM	1038B	University Avenue #2	1,741
UHM	1038C	University Avenue #3	1,757
UHM	1038D	University Avenue #4	1,540
UHM	1046B	Krauss Hall PRI Building #1	19,870
UHM	1046C	Krauss Hall PRI Building #2	3,600
UHM	1046D	Krauss Hall PRI Building #3 - Physics ANITA La	2,340
UHM	1046T	Krauss Annex #9 - Environmental Center	1,540
UHM	1046U	Krauss Annex #7 - CTAHR	1,500
UHM	1064A	University Elementary School (Portable-New 2)	1,440
UHM	1064B	University Elementary School (Portable-New 3)	1,440
UHM	1064C	University Elementary School (Portable-New 4)	1,440
UHM	1064D	UH Lab School Port	1,440
UHM	1076A	Korean Studies Pavillion, Center for	900
UHM	1077A	Building #77 A	4,000
UHM	1077B	Building #77 B (Globalization Research Center)	4,000
UHM	1092F	Lunalilo Freeway Portable #1	1,757
UHM	1092I	Lunalilo Freeway Portable #2	1,773
UHM	1103A	Bachman Annex #9	1,700
UHM	1103B	Bachman Annex #10	1,680
UHM	1103C	Bachman Annex #11	1,738
UHM	1103D	Bachman Annex #12	1,754
UHM	1103E	Bachman Annex #13	1,840
UHM	1108A	Air Force ROTC #1	2,025
UHM	1108B	Air Force ROTC #2	1,781
UHM	1108G	Athletic Lettermans Club	2,160
UHM	1108P	Makai Campus	1,894
UHM	1108Q	Army ROTC #3	1,400
UHM	1108R	Makai Campus #13	1,894
UHM	1108S	Makai Campus #14	1,610
UHM	1108T	Makai Campus #15	1,610
UHM	1108U	Makai Campus #16	1,540
UHM	1109	Softball Stadium	20,000
UHM	1113	Kahanamoku Pool	40,507
UHM	1115A	HECO Substation	4,500
UHM	1116	Ching Athletic Complex - Equipment Storage Fa	4,160
UHM	1116A	Ching Athletic Complex - Restroom Facililties	1,500
UHM	1116B	Softball Field - Restroom Facilities	735

Campus	Building Number	Name	GSF
UHM	1001	Parking Structure	331,000
UHM	1055	Campus Center	121,000
UHM	1056	Hemenway Hall	34,861
UHM	1114	Hale Anuenue	19,631
UHM	1130	Johnson Hall A	22,921
UHM	1156	Johnson Hall B	26,830
UHM	1161	Gateway House	75,283
UHM	1188	Auxiliary Services	24,336
UHM	1189	Hale Kahawai	37,578
UHM	1196	Hale Laulima	38,446
UHM	1201	Paradise Palms Cafe	13,400
UHM	1211	New Parking Structure - Dole Street	145,800
UHM	1001A	Parking Structure -Phase II	735,000
UHM	1120A	Hale Wainani F Tower	67,700
UHM	1120B	Hale Wainani G Tower	28,500
UHM	1120C	Hale Wainani H Tower	19,360
UHM	1120D	Hale Wainani I Tower	48,052
UHM	1122A	Hale Aloha, Ilima Tower	71,315
UHM	1122B	Hale Aloha, Lehua Tower	71,381
UHM	1122C	Hale Aloha, Mokihana Tower	71,315
UHM	1122D	Hale Aloha, Lokelani Tower	71,381
UHM	1122E	Hale Aloha Cafeteria	19,875
UHM	1123A	Hale Noelani Tower A	34,100
UHM	1123B	Hale Noelani Tower B	29,800
UHM	1123C	Hale Noelani Tower C	27,500
UHM	1123D	Hale Noelani Tower D	16,400
UHM	1123E	Hale Noelani Tower E	32,400
UHM	1132A	Motor Pool, Pre-Fab Building	6,000
UHM	1132B	Motor Pool Service Station (gas pumps)	225
UHM	1132C	Motor Pool - Auto Maint/Storage	1,400
UHM	1132D	Transportation Services Extension	3,960
UHM	1132E	Transportation Services Office	1,400
UHM	1154A	Waahila Faculty Housing Buildling A	16,096
UHM	1154B	Waahila Faculty Housing Buildling B	16,096
UHM	1154C	Waahila Faculty Housing Buildling C	16,096
UHM	1154D	Waahila Faculty Housing Buildling D	16,096
UHM	1154E	Waahila Faculty Housing Buildling E	16,096
UHM	1158A	Vending Machine Kiosk	256
UHM	9620A1	Kauiokahaloa Nui Fac. Apt A - Bldg 1	7,930
UHM	9620A2	Kauiokahaloa Nui Fac Apt A - Bldg 2	7,930
UHM	9620A3	Kauiokahaloa Nui Fac Apt A - Bldg 3	7,930
UHM	9620A4	Kauiokahaloa Nui Fac Apt A - Bldg 4	7,930
UHM	9620A5	Kauiokahaloa Nui Fac Apt A - Bldg 5	7,930

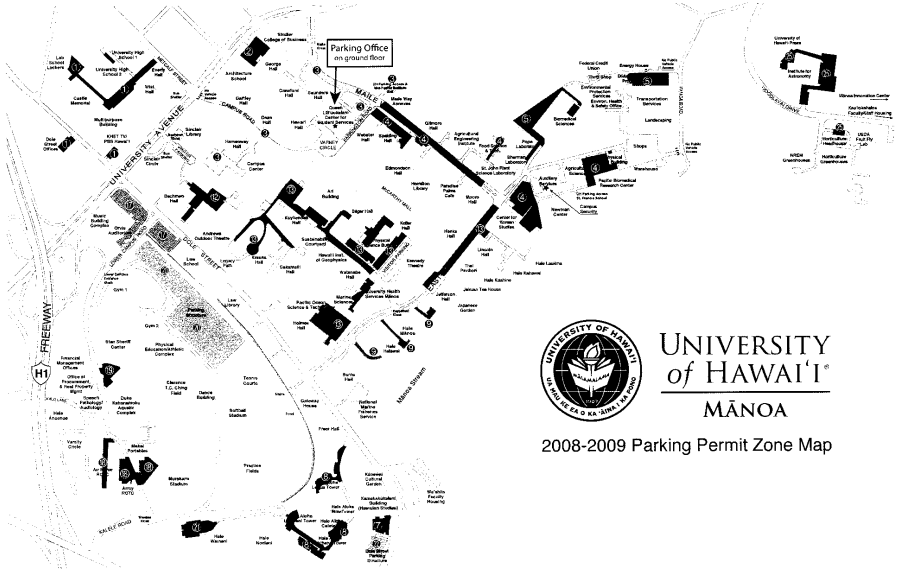
Campus	Building Number	Name	GSF
UHM	9620A6	Kauiokahaloa Nui Fac Apt A - Bldg 6	7,930
UHM	9620A7	Kauiokahaloa Nui Fac Apt A - Bldg 7	7,930
UHM	9620A8	Kauiokahaloa Nui Fac Apt A - Bldg 8	7,930
UHM	9620A9	Kauiokahaloa Nui Fac Apt A - Bldg 9	7,930
UHM	9620AB	Kauiokahaloa Nui Fac Apt A - Bldg 10	7,930
UHM	9620B1	Kauiokahaloa Nui Fac Apt B - Bldg 1	11,827
UHM	9620B2	Kauiokahaloa Nui Fac Apt B - Bldg 2	11,827
UHM	9620C	Kauiokahaloa Nui Fac Apt C	6,202
UHM	9620D1	Kauiokahaloa Iki Condo D - Bldg 1	5,632
UHM	9620D2	Kauiokahaloa Iki Condo D - Bldg 2	5,632
UHM	9620D3	Kauiokahaloa Iki Condo D - Bldg 3	5,632
UHM	9620D4	Kauiokahaloa Iki Condo D - Bldg 4	5,632
UHM	9620D5	Kauiokahaloa Iki Condo D - Bldg 5	5,632
UHM	9620D6	Kauiokahaloa Iki Condo D - Bldg 6	5,632
UHM	9620DH	Kauiokahaloa Iki Condo DH	10,240
UHM	9620FM	Kauiokahaloa Nui Fac Mgrs Office	5,107
UHM	9620H1	Kauiokahaloa Nui Fac Apt AH - Bldg 1	7,930
UHM	9620H2	Kauiokahaloa Nui Fac Apt AH - Bldg 2	7,930
UHM	9620H3	Kauiokahaloa Nui Fac Apt AH - Bldg 3	7,930
UHM	9620H4	Kauiokahaloa Nui Fac Apt AH - Bldg 4	7,930

Summary of GSF

UH Mānoa	8,183,113

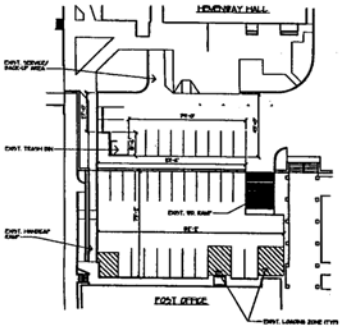
APPENDIX D. PARKING PLANS
(2008-2009 PARKING PERMIT ZONE MAP)

Zone 3



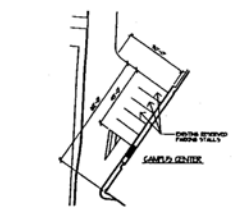
UNIVERSITY of HAWAI'I
MĀNOA

2008-2009 Parking Permit Zone Map



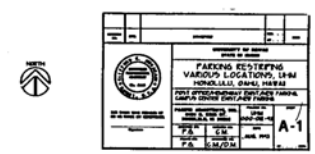
POST OFFICE/HEMENWAY EXIST. PARKING

36 stalls
A & B

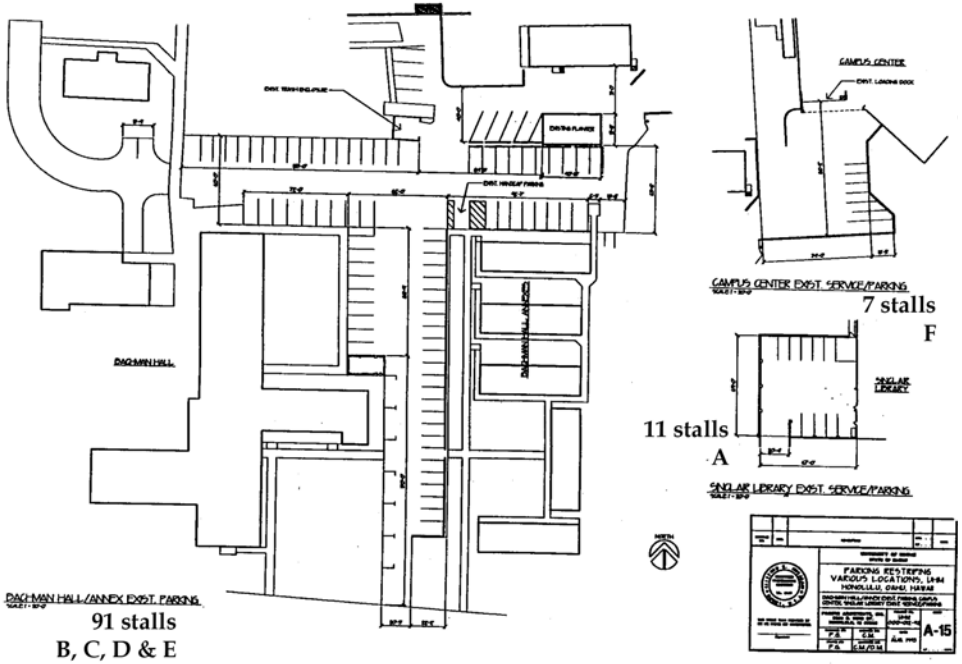


CAMPUS CENTER EXIST. PARKING

6 stalls



Zone 12

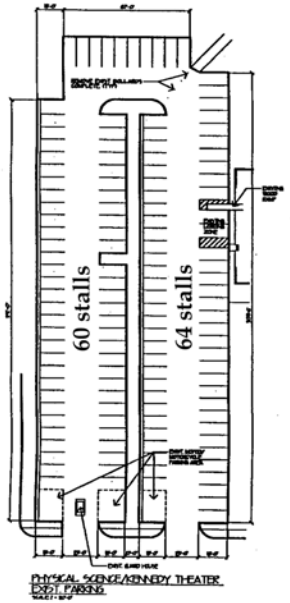


91 stalls
B, C, D & E

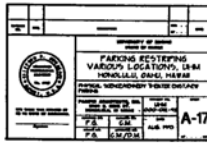
7 stalls
F

11 stalls
A

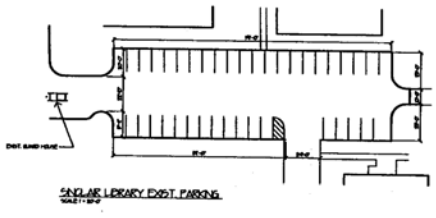
Zone 13



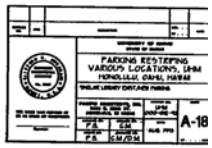
134 stalls
A-Overflow



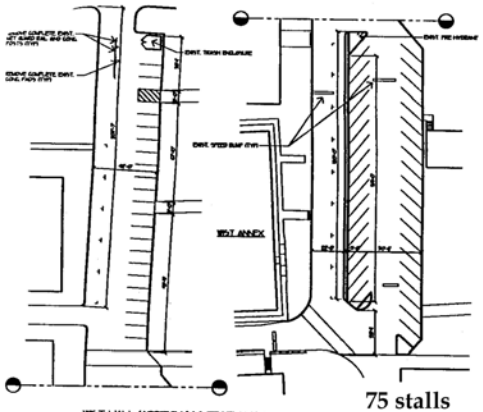
Zone 14



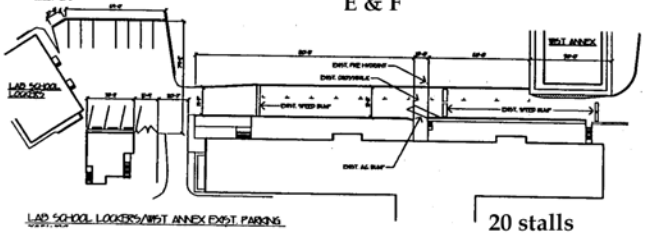
40 stalls
Visitor



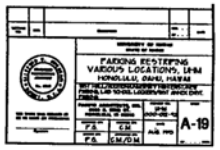
Zone 1



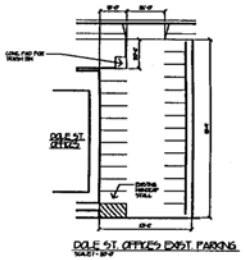
75 stalls
E & F



20 stalls
C &D

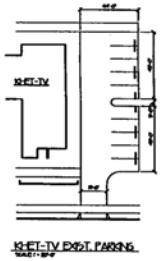


Zone 1

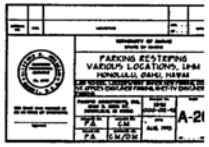


DOLE ST. OFFICES EXIST. PARKING

25 stalls
A

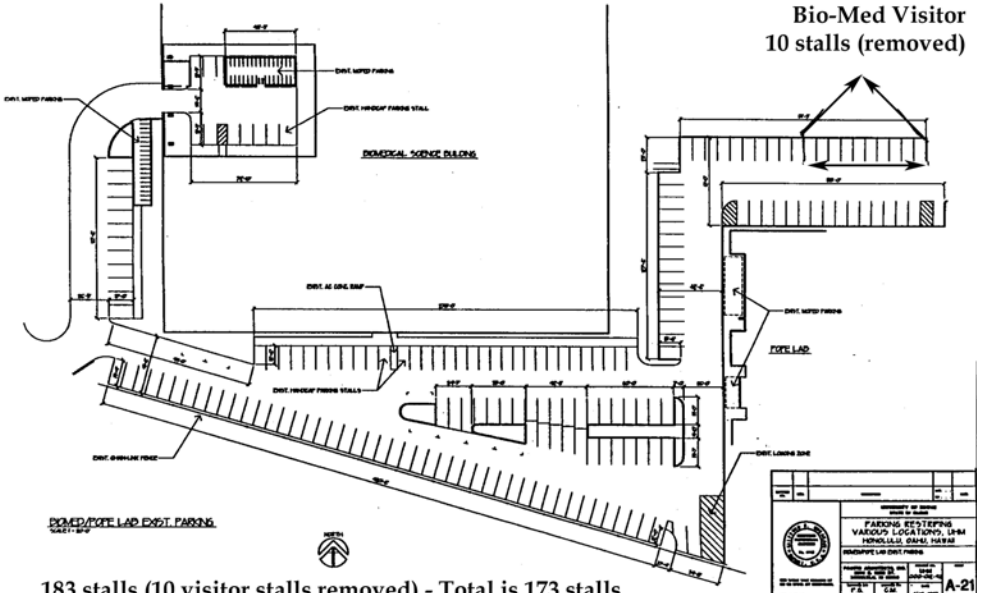


10 stalls
B



Zone 5

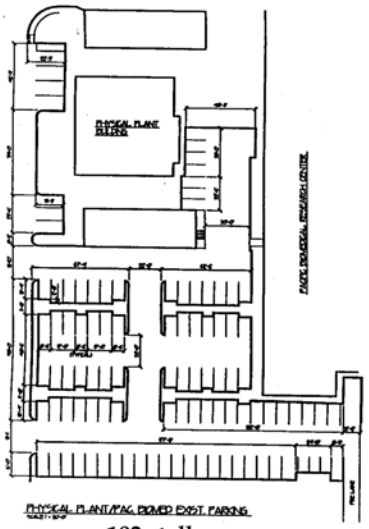
Bio-Med Visitor
10 stalls (removed)



BIOMED/POPE LAB EXIST. PARKING

183 stalls (10 visitor stalls removed) - Total is 173 stalls
A, B, C, D & E

Zone 4

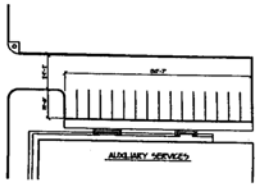


PHYSICAL PLANT/PAC. BIOMED EXIST. PARKING

102 stalls

5G & 23 G

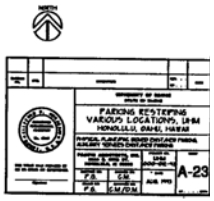
Zone 23



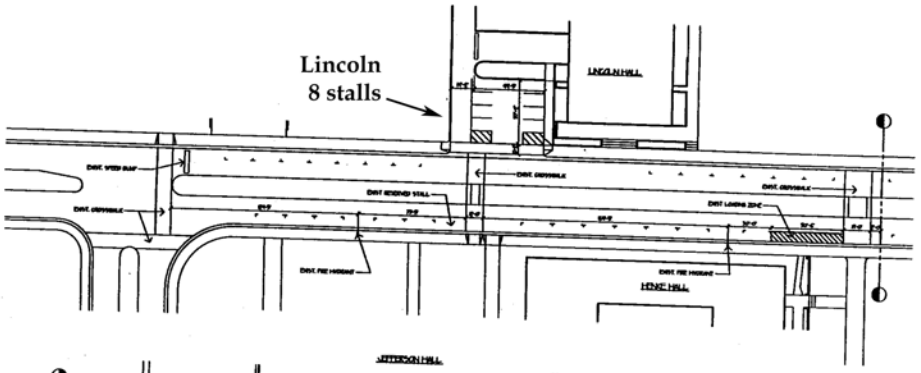
AUXILIARY SERVICES EXIST. PARKING

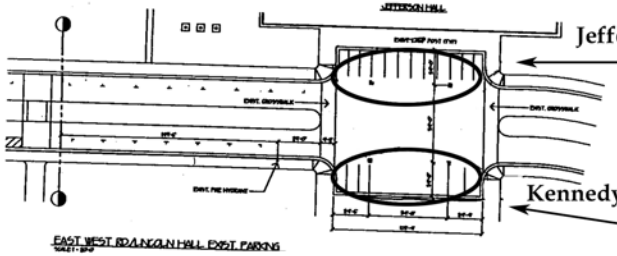
6 stalls

F



Zone 13

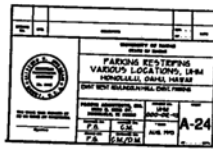




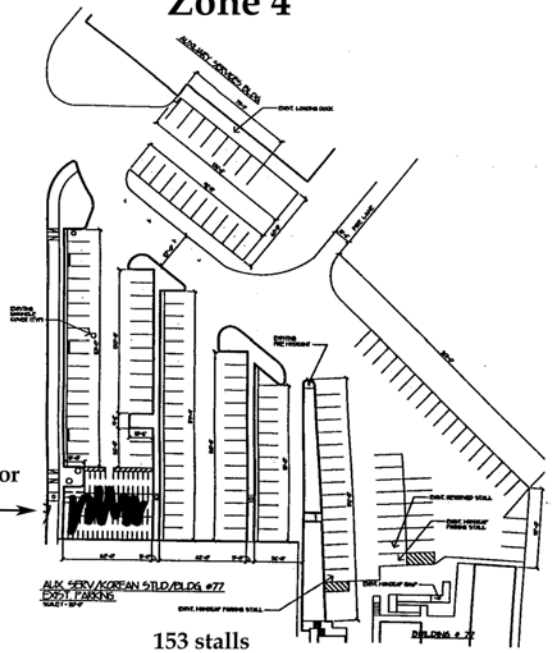
EAST WEST RD/LINCOLN HALL EXIST. PARKING

38 stalls

6B & 6C

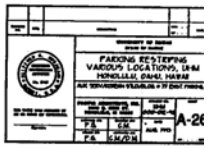


Zone 4

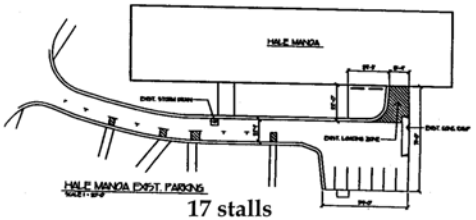


Korean Studies Visitor
9 stalls →

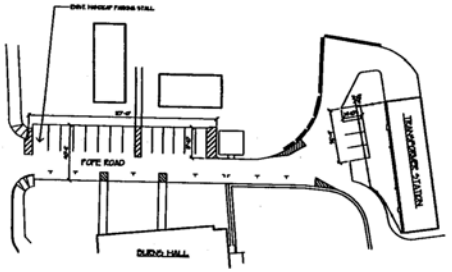
153 stalls
6D, 6F & 6G



Zone 9

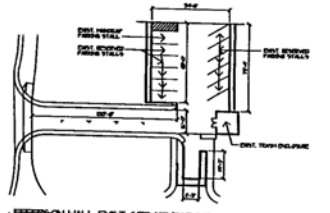


17 stalls
B

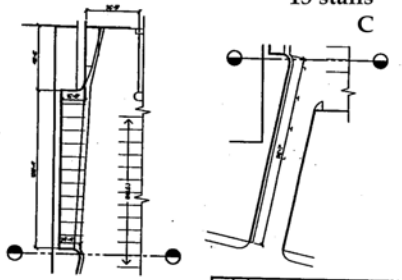


BURNS HALL/EAST WEST SUBSTATION
EXIST. PARKING

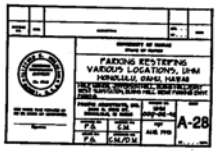
27 stalls
A



15 stalls
C

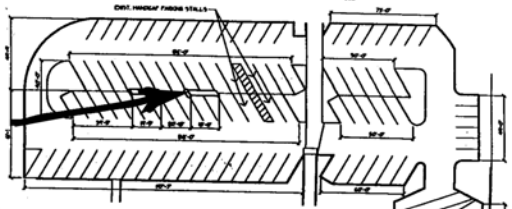


16 stalls
(Rear)



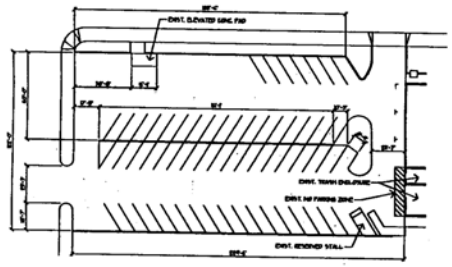
Zone 17

Music Visitor
10 stalls



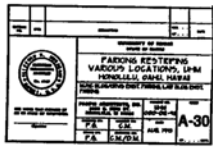
MUSIC BLDG/CRVD EXIST. PARKING

109 stalls (10 stalls removed) - Total 99 stalls
A & B

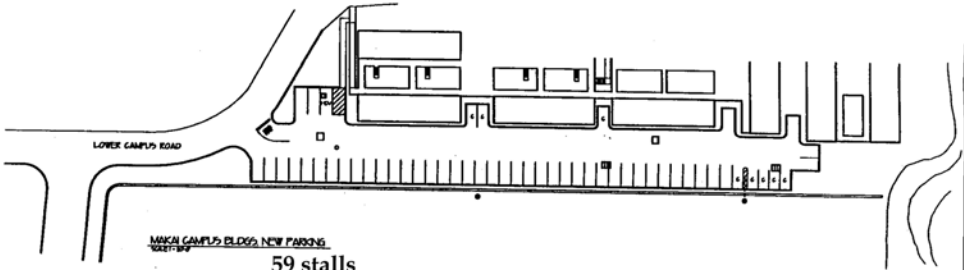


LAW BLDG EXIST PARKING

66 stalls (marked)
C

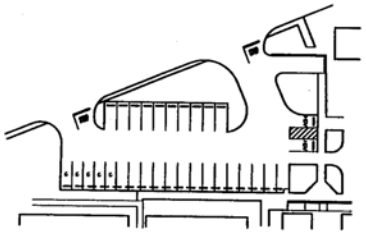


Zone 18



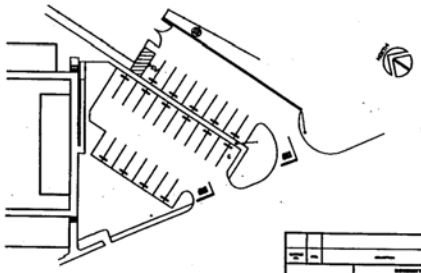
MAKAI CAMPUS BLDGS NEW PARKING

59 stalls
B



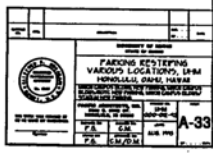
MAKAI CAMPUS BLDGS/ROTC
NEW PARKING

32 stalls
A

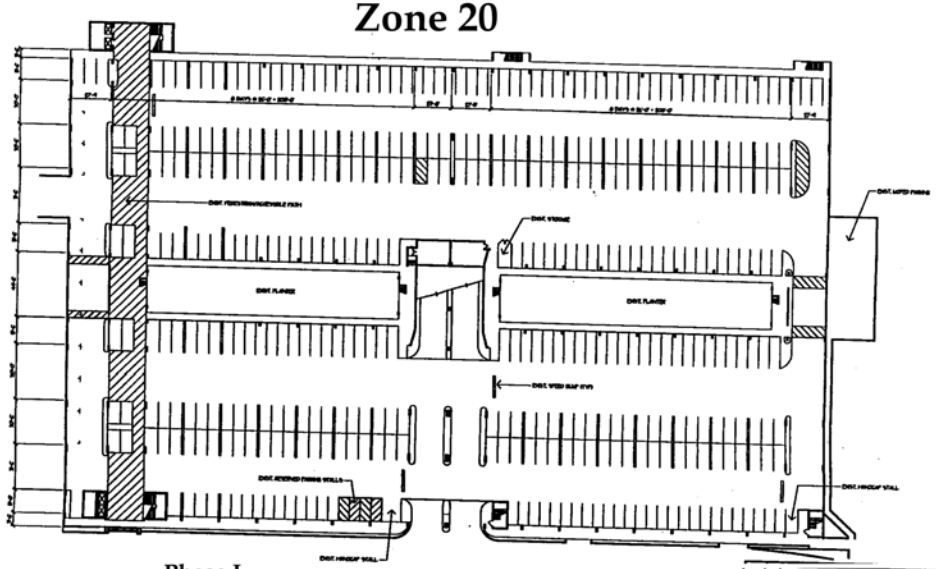


MAKAI CAMPUS BLDGS/STADIUM
NEW PARKING

30 stalls
C



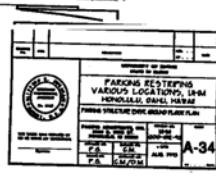
Zone 20



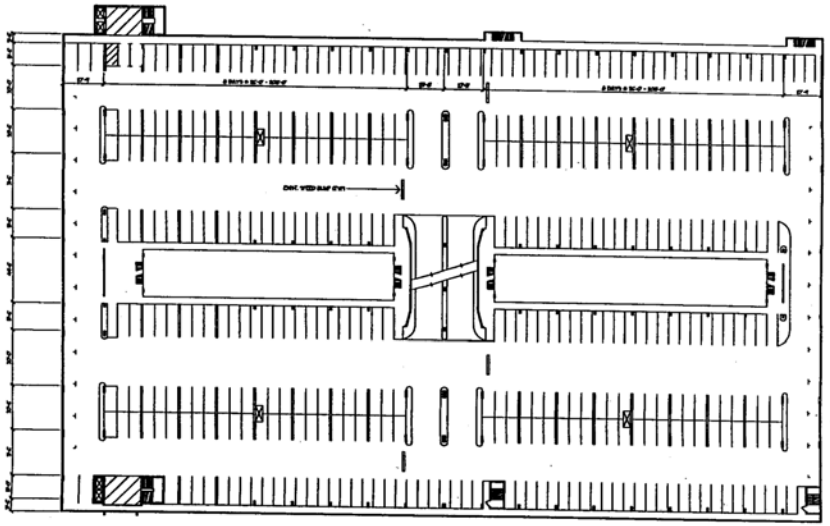
Phase I

PARKING STRUCTURE EAST, GROUND FLOOR PLAN

418 stalls



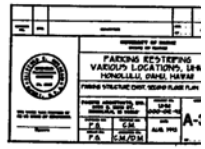
Zone 20



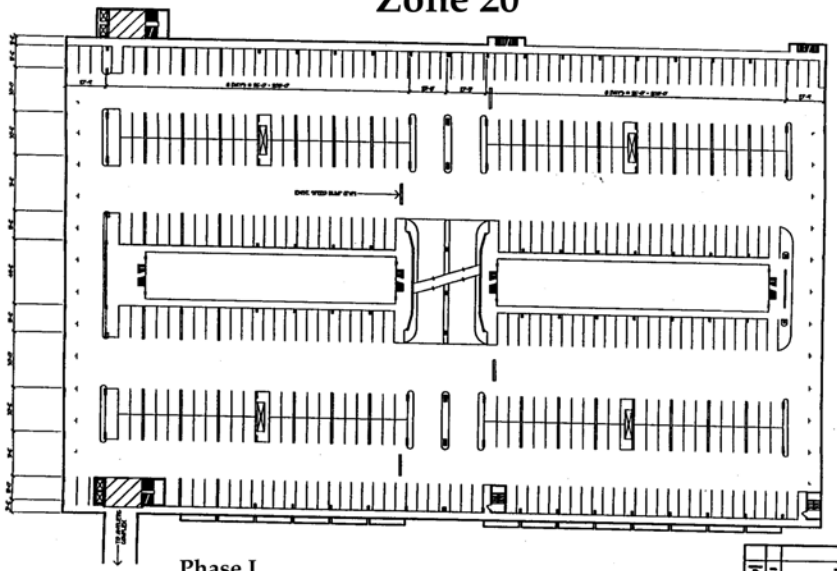
Phase I

PARKING STRUCTURE EAST, SECOND FLOOR PLAN

433 stalls



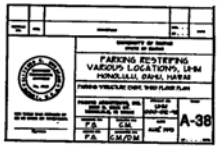
Zone 20



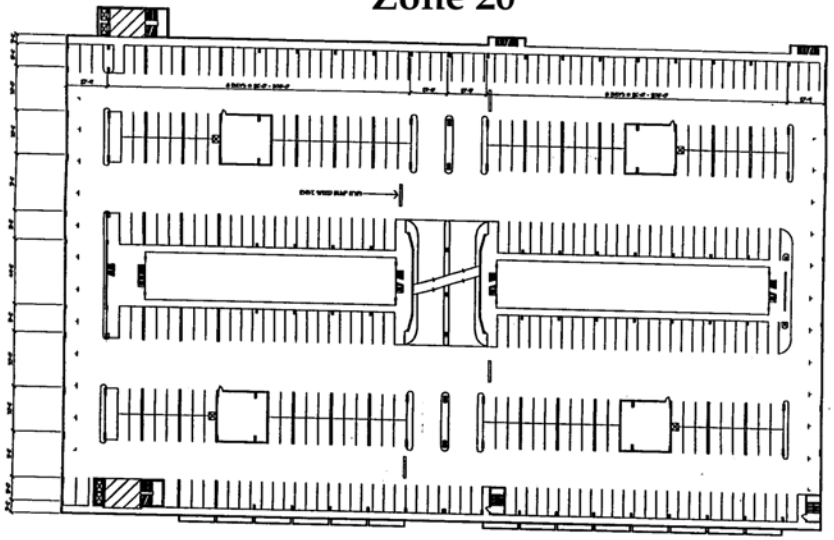
Phase I

PARKING STRUCTURE EXIST. THIRD FLOOR PLAN

425 stalls



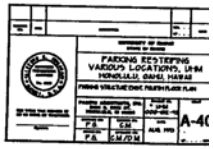
Zone 20



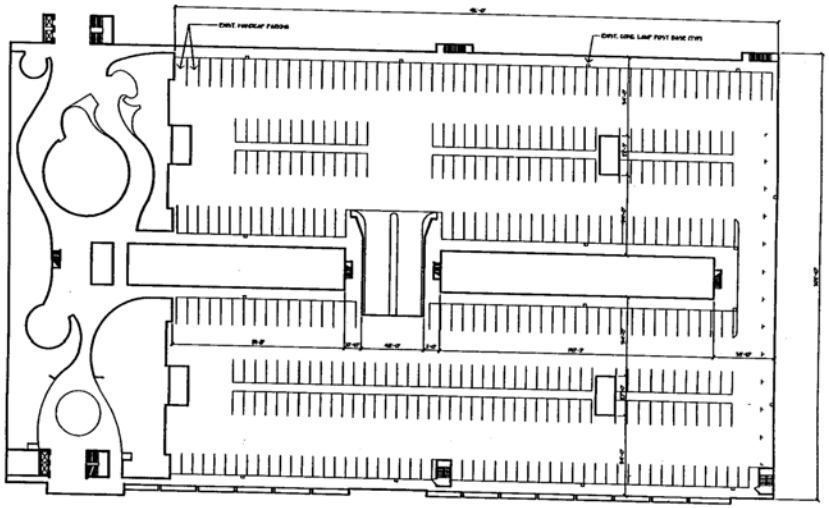
Phase I

PARKING STRUCTURE EXIST. FOURTH FLOOR PLAN

701 stalls



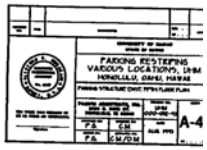
Zone 20



Phase I

PARKING STRUCTURE EXIST. FIFTH FLOOR PLAN

362 stalls



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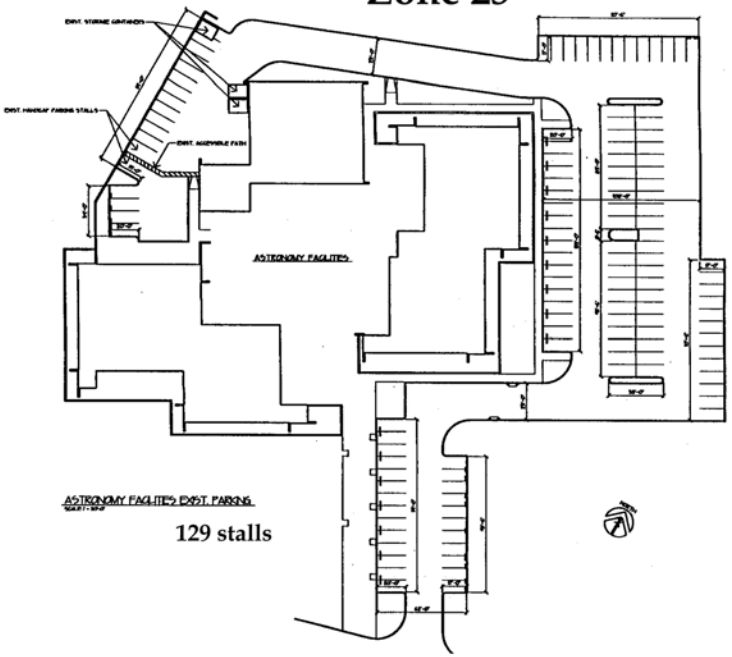
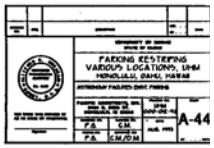


ASTRONOMY FACILITIES EXIST. PARKING

129 stalls



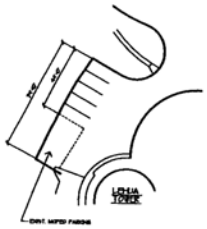
Zone 8



GATEWAY EXIST. PARKING

2 stalls

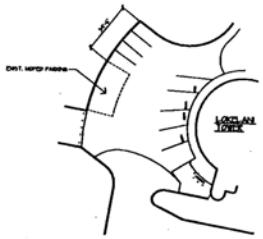
A



LEHUA EXIST. PARKING

5 stalls

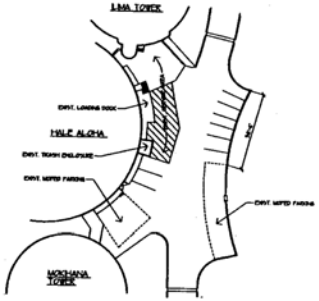
C



LOKELANI EXIST. PARKING

9 stalls

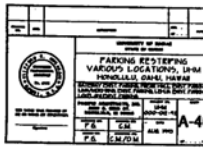
D



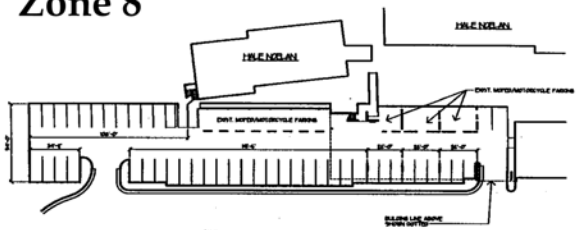
LIMA/MOKIHANA EXIST. PARKING

9 stalls

B



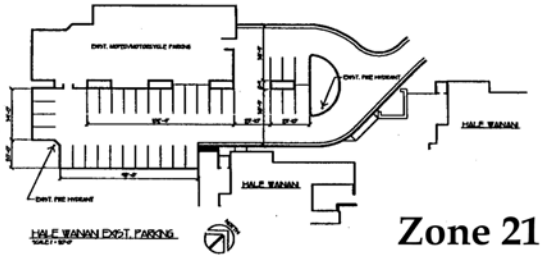
Zone 8



HALE NOELANI EXIST. PARKING

45 stalls

E



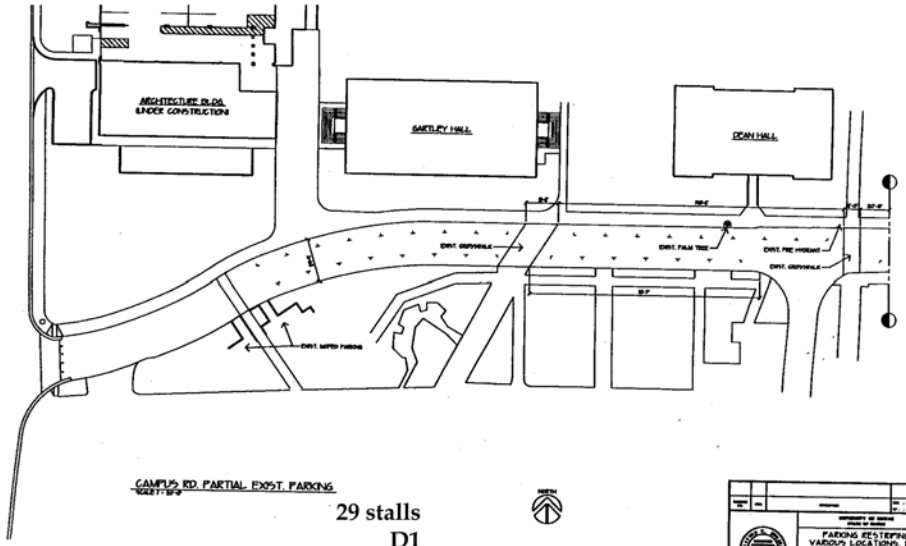
HALE WAINANI EXIST. PARKING

Zone 21

33 stalls (16 stalls new) - Total is 49 stalls

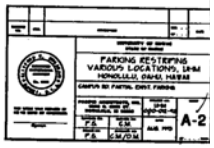


Zone 3

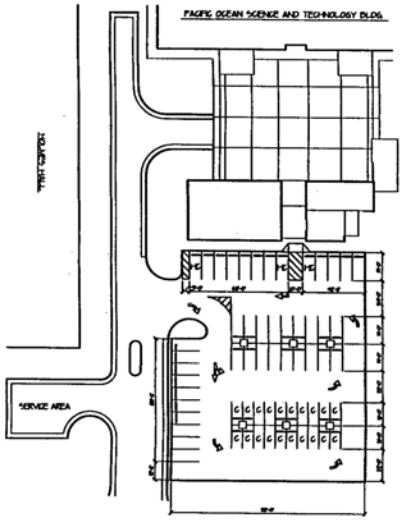


29 stalls

D1



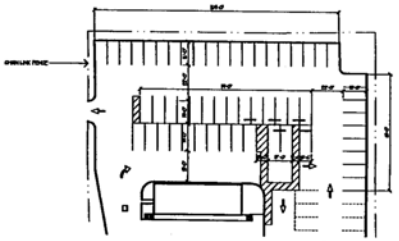
Zone 13



Post PACIFIC OCEAN SCIENCE AND TECHNOLOGY EXIST. PARKING

62 stalls

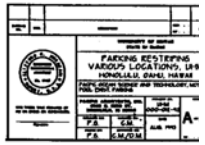
Zone 5



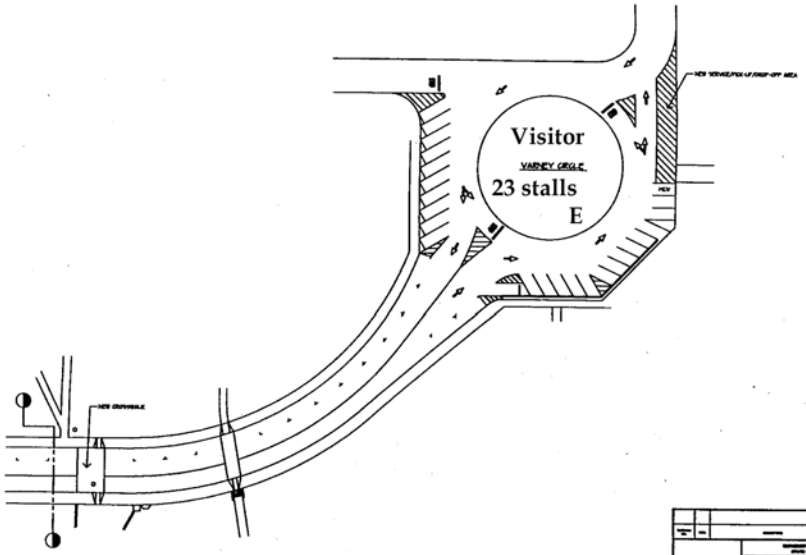
Transportation

MOTOR POOL EXIST. PARKING

56 stalls

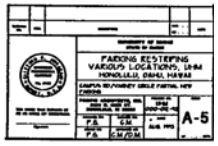


Zone 3

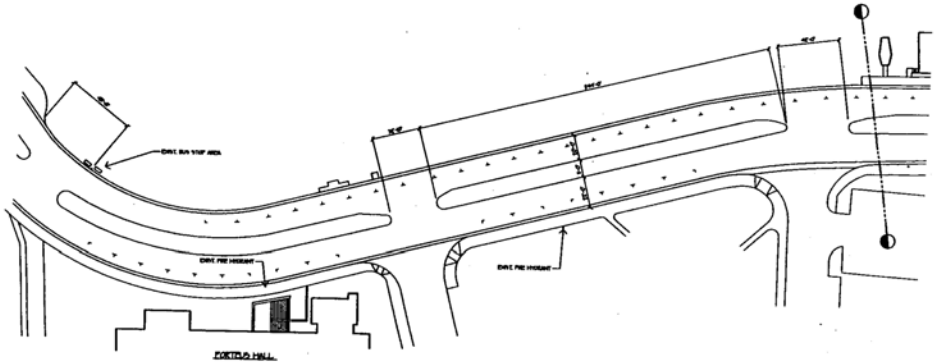


CAMPUS RD PARTIAL NEW PARKING

10 stalls
D2

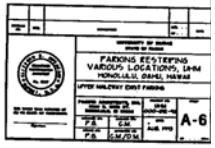


Zone 3

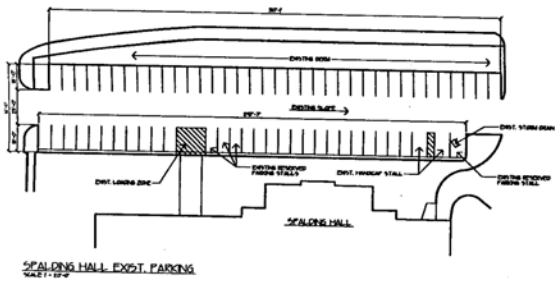


MALEWAY PARTIAL EXIST. PARKING

37 stalls
F



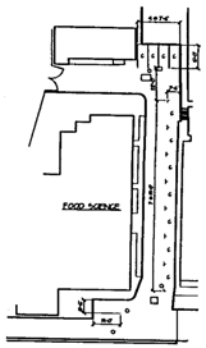
Zone 4



SPALDING HALL EXIST. PARKING

67 stalls

A

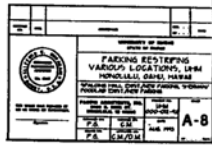


SHERMAN/FOOD LAB NEW PARKING

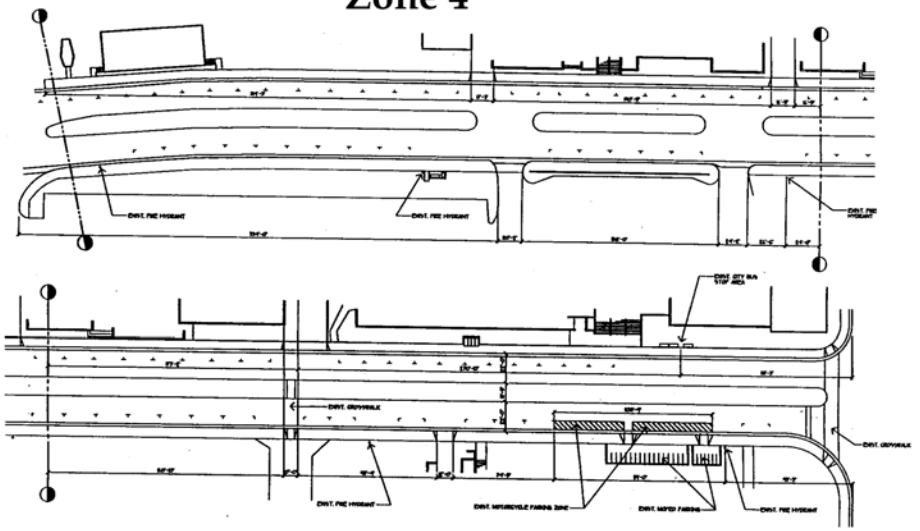
12 stalls

C





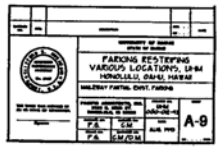
Zone 4



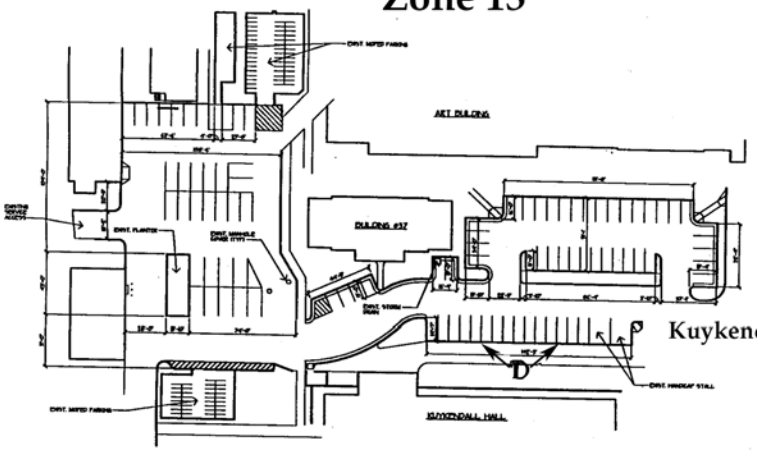
MALEWAY PARTIAL EXIST. PARKING

69 stalls

B



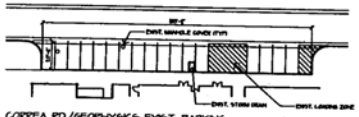
Zone 13



Kuykendall Visitor
17 stalls
D

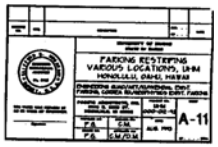
ENGINEERING QUAD/ART/KUYKENDALL EXIST. PARKING

74 stalls
B, C & E

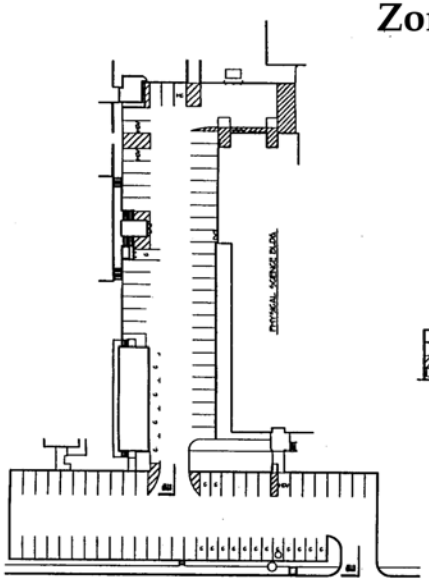


COOKE A RD./GEOPHYSICS EXIST. PARKING

17 stalls
F

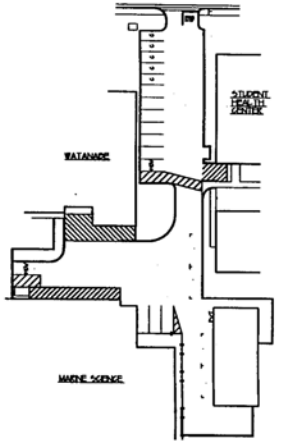


Zone 13



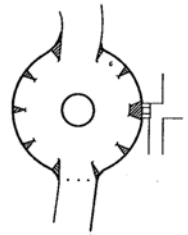
PHYSICAL SCIENCE NEW PARKING

97 stalls
G & H



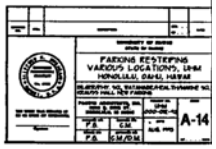
WATANABE/HEALTH/MARINE SCIENCE NEW PARKING

20 stalls
I & J



KRAUSS HALL NEW PARKING

8 stalls
A



UHM ACTUAL PARKING STALL COUNT
July 2009

PERMIT PARKING	ZONE	LOCATION	# STALLS
CENTRAL	1	COLLEGE OF ED (C,D,E & F)	95
		COMMUNITY COLLEGE (A)	25
		PUBLIC TELEVISION (B)	10
		SUBTOTAL	**130**
	2	ARCHITECTURE BUILDING	136
		SUBTOTAL	**136**
	3	MAILE WAY TO FARR RD (F)	37
		MID-PAC	19
		POST OFFICE/ HEMENWAY HALL (A & B))	36
		CAMPUS CENTER (C)	6
		QUEEN LILI'UOKALANI BUILDING	23
		CIRCLE TO SINCLAIR (D1)	29
		CIRCLE TO SINCLAIR (D2)	10
		SUBTOTAL	**160**
	4	MAILE WAY-FARRINGTON RD. TO EAST-WEST ROAD (B)	69
		SPALDING HALL (A)	67
		FACILITIES MANAGEMENT (5G)	56
		KOREAN STUDIES (6D, 6F & 6G)	153
		AG ENGINEERING BLDG (23G)	46
		SHERMAN LAB (C)	12
		SUBTOTAL	**403**
	5	BIO-MED (A,B,C,D & E)	173
		TRANSPORTATION	56
		SUBTOTAL	**229**
	9	BURNS HALL (A)	27
		HALE MANOA (B)	17
		JEFFERSON HALL (C)	15
		BURNS HALL- DIA HEAD (REAR)	16
		SUBTOTAL	**75**
	12	SINCLAIR (A)	11
		BACHMAN HALL (B,C,D & E)	91
		CAMPUS CENTER (F)	7
		SUBTOTAL	**109**

UHM ACTUAL PARKING STALL COUNT
July 2009

PERMIT PARKING	ZONE	LOCATION	# STALLS
	13	STUDENT HEALTH (I & J)	20
		PHYSICAL SCIENCE (F, G & H)	114
		ART BUILDING (B,C & E)	74
		KUYKENDAL (K)	14
		SUMMER SESSION (A)	8
		KENNEDY (A OVERFLOW)	60
		EAST-WEST RD (6B & 6C)	38
		LINCOLN HALL (6)	8
		POST	62
		SUBTOTAL	**398**
	17	MUSIC BUILDING (A & B)	99
		LAW SCHOOL (C)	66
		SUBTOTAL	**165**
	23	AUXILIARY SERVICES (F)	16
		SUBTOTAL	**16**
		TOTAL	**1,821**
MAKAI	7	HAWAIIAN STUDIES	26
		SUBTOTAL	**26**
	18	ROTC-MAUKA (A)	32
		ROTC-MAKAI (B)	54
		BASEBALL STADIUM ©	30
		SUBTOTAL	**116**
	19	SPECIAL EVENTS LD DOCK	14
		SUBTOTAL	**14**
	25	ASTRONOMY	129
		SUBTOTAL	**129**
	Klum	KLUM GYM GRAVEL	20
		SUBTOTAL	**20**
	20	PARKING STRUCTURE PHASE I	1,600
		SUBTOTAL	**1,600**

UHM ACTUAL PARKING STALL COUNT
July 2009

PERMIT PARKING	**ZONE**	**LOCATION**	**# STALLS**
	20	PARKING STRUCTURE PHASE IIA	800
		SUBTOTAL	**800**
	22	DOLE STREET STRUCTURE	100
		SUBTOTAL	**100**
	8	HALE ALOHA, HALE NOELANI	70
		(A,B, C, D, E & F)	
	21	HALE WAINANI	49
		SUBTOTAL	**119**
		TOTAL	**2,924**
		PERMIT GRAND TOTAL	**4,745**
DAILY PARKING			
CENTRAL		CREDIT UNION	10
		MUSIC BUILDING	10
		KUYKENDAL (D)	17
		BIO-MED	10
		KOREAN STUDIES	9
		ARCHITECTURE BUILDING	11
		VARNEY CIRCLE (E)	23
	10	VISITOR-KENNEDY	64
	14	VISITOR-SINCLAR	40
		JEFFERSON HALL	12
		KENNEDY THEATER	7
		FACILITIES MGT.	4
		TOTAL	**217**
MAKAI	20	DAILY-PARKING PHASE I	439
	20	DAILY-PARKING PHASE IIA	100
	22	DAILY-PARKING DOLE STREET	176
		PPMO/ACCOUNTING	6
		TOTAL	**721**
		DAILY GRAND TOTAL	**938**
		TOTAL ACTUAL STALLS	**5,683**

APPENDIX E. ARCHAEOLOGICAL LITERATURE REVIEW AND FIELD INSPECTION REPORT

Archaeological Literature Review and Field Inspection Report for the University of Hawai‘i at Mānoa Long Range Development Plan Project Mānoa [Waikīkī] Ahupua‘a, Kona District, O‘ahu Island

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

Prepared for

Group 70 International

Prepared by

David W. Shideler, M.A.

and

Hallett H. Hammatt, Ph.D.

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Kailua, Hawai‘i

(Job Code: MANOA 15)

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Management Summary

Reference	Archaeological Literature Review and Field Inspection Report for the University of Hawai‘i at Mānoa Long Range Development Plan Project, Mānoa Ahupua‘a, Kona District, O‘ahu Island, TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004
Date	May 2008
Project Number (s)	Cultural Surveys Hawai‘i (CSH) Job Code MANOA 15
Investigation Permit Number	The field inspection was conducted under archaeological permit number 08-14 issued by the Hawai‘i State Historic Preservation Division (SHPD), Department of Land and Natural Resources (DLNR), per Hawai‘i Administrative Rules (HAR) Chapter 13-282.
Project Location	The Mānoa Campus occupies some 304 acres of land in lower Mānoa Valley, bounded by the Mānoa, St. Louis Heights, Mō‘ili‘ili and McCully communities. Its principal physical borders are the Mānoa residential community on the *mauka* (inland) side, the Wa‘ahila Ridge on the Koko Head side, the H-1 Interstate Highway on the *makai* (seaward) side, and the lower Mānoa and McCully residential communities on the ‘Ewa (west) side. The project area is depicted on a USGS topographic map, Honolulu 1998 quadrangle (see Figure 1)
Land Jurisdiction	State of Hawai‘i
Agencies	SHPD and the University of Hawai‘i (UH)
Project Description	The 2007 Long Range Development Plan (LRDP) focuses on projects that are on the Capital Improvement Program and/or are anticipated for development within the next 5-10 years. At this time, a total of at least seventeen (17) new buildings and/or building expansions are included in the LRDP (see Figure 4).
Project Acreage	Approximately 304 acres
Area of Potential Effect (APE)	The Area of Potential Effect (APE) consists of the entire approximately 304-acre campus.
Historic Preservation Regulatory Context	This study is intended as a planning document to facilitate good stewardship of historic properties, and to streamline compliance with SHPD requirements as may attend future development.
Fieldwork Effort	CSH archaeologists Chris Monahan, Ph.D. and Jon Tulchin, B.A. conducted the fieldwork on May 14, 2008; total of 10 person hours.

Results	The following historic properties located within the boundaries of the UH campus have previously been assessed as eligible for the Hawai‘i Register of Historic Places (HRHP): 1. The historic core of the campus (State Inventory of Historic Properties [SIHP] No. 50-80-14-1352), consisting of Hawai‘i Hall, George Hall, Dean Hall, Gartley Hall, Crawford Hall, Varney Circle, Founder’s Gate, Andrew’s Outdoor Amphitheater, Wist Hall and the Pineapple Research Center. These historic structures were added to the HRHP in 1984. 2. Kānewai Cultural Garden (SIHP No. 50-80-14-4498), consisting of modern surface features (irrigation ditches feeding into taro pondfields) overlying centuries-old deposits consistent with a long history of cultivation. It is also important to state the nearby “Dole Street burials” documented by CSH (Hammatt and Shideler 1991) are reburied on the grounds of the Center for Hawaiian Studies. 3. SIHP No. 50-80-14-4191, a traditional-style presumably pre-Contact-era burial discovered during construction activities at Keller Hall (Smith and Kawachi 1991). The following historic properties located within the boundaries of the UH campus have not been previously assessed for eligibility for the HRHP: 1. Koana Cave, which has never received a site number designation, has previously yielded human skeletal remains (accessioned by the Bishop Museum in the 1960s), and probably contains as yet undiscovered historically-significant cultural materials consistent with habitation and / or gardening. 2. Hipawai Heiau, designated by McAllister (1933) as “Site 63,” reported as “torn down” earlier by Thrum; CSH archaeologists may have identified a remnant section of stone wall associated with this *heiau* located just outside the boundaries of the UH property. In addition to the aforementioned historic properties located on the UHM campus, two areas containing possible rockshelters were identified during the course of the subject field inspection. As explained in detail above, additional testing (controlled archaeological excavations) would be needed to more accurately determine whether these possible rockshelters contain any historically-significant cultural materials.

Recommendations	CSH also offers the following specific recommendations: 1. Alterations to, or near, the historic structures included in SIHP No. 50-80-14-1352 should be assessed by a qualified Architectural Historian. 2. Any major ground disturbance at Kānewai Lo‘i should be preceded by additional archaeological testing and / or should be conducted in association with monitoring by a qualified Archaeologist, in consultation with the Center for Hawaiian Studies. 3. Given the Keller Hall burial discovery (SIHP No. 50-80-14-4191), in particular, it is possible that as yet undiscovered burials may still be present at some locations on the UHM campus; however, it is fairly difficult to predict with any specific certainty where burials might occur. CSH recommends consultation with the SHPD on future excavation projects on the UHM campus. 4. Koana Cave should be formally assessed by a qualified Archaeologist and assigned a State Site number. Given reports of human skeletal remains from this cave, it should also be preserved and protected from those who might disturb or desecrate its contents. Archaeological testing (excavation) of the cave would have to be balanced against the possibility of encountering / discovering additional human skeletal remains. 5. No further work is recommended for the rock wall remnant that may be a portion of the Hipawai Heiau; however, should deep excavation or major development be planned for the adjacent Magoon Property, against which the wall remnant rests, archaeological monitoring or preliminary subsurface testing (excavation) might be warranted in order to ensure that no historically-significant cultural resources associated with the old *heiau* are damaged. Thrum’s comments in reference to Hipawai Heiau, made approximately 100 years ago (see Sterling and Summers 1978:286), are instructive: “…partly destroyed many years ago, then used as a place of burial.” 6. Finally, if the Wa‘ahila Ridge area is slated for major development, the two possible rockshelter areas should be subject to formal archaeological inventory, including subsurface testing (excavation), prior to any substantial ground disturbance.

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Section 1 Introduction

1.1 Project Background

At the request of Group 70 International, Inc., Cultural Surveys Hawai‘i, Inc. (CSH) prepared this Archaeological Literature Review and Field Inspection for the University of Hawai‘i at Mānoa’s Long Range Development Plan (LRDP). The project area consists of the entire approximately 304-acre campus located in Mānoa [Waikīkī] Ahupua‘a, Kona District, Hawai‘i. The project area consists entirely of State of Hawai‘i-owned land.

1.1.1 Project Location and Site Characteristics

The Mānoa Campus (hereafter “the campus”) occupies some 304 acres on land in lower Mānoa Valley, bounded by the Mānoa, St. Louis Heights, Mō‘ili‘ili and McCully communities (Figures 1-3). Its principal physical borders are the Mānoa residential community on the *mauka* (north) side, the Wa‘ahila Ridge on the Koko Head (east) side, the H-1 Freeway *makai* (south) side and the lower Mānoa and McCully residential communities on the ‘Ewa (west) side. Vehicular access for the campus is from the H-1 Freeway, University Avenue, Dole Street and Old Wai‘alae Road. Public transportation is primarily provided by regular bus service on King Street, University Avenue, Dole Street and Metcalf Street. The bus service includes routes through the campus via East-West Road and Maile Way. The campus is also served by direct express bus service from the outlying communities. Current enrollment is approximately 20,000 students; including faculty and staff, the daytime population of the campus is about 30,000.

1.1.2 Description of the Proposed Project

The 2007 LRDP focuses on projects that are on the Capital Improvement Program and/or are anticipated for development within the next 5-10 years (Figure 4). Proposed projects include:

- Kennedy Theatre Expansion
- Parking Structure at Kennedy Theatre
- Instruction Building at Henke Hall Site
- Campus Center Expansion to Northeast
- Law School Expansion
- I.T.S. - Bilger Hall Addition, Phase II
- Research Space - Infill South Courtyard of Biomedical Building
- Klum Gym Replacement
- Instruction Building - College of Education
- Media Facilities at KHET Site
- Parking Structure IIB/Bookstore
- Faculty Housing – Wa‘ahila Ridge or Mauka Campus
- Research Buildings – North and East of Biomedical Building
- Research Buildings - Mauka Campus
- Johnson Hall - Replacement Dormitory
- Hale Noelani - Replacement Dormitory
- School of Hawaiian Knowledge

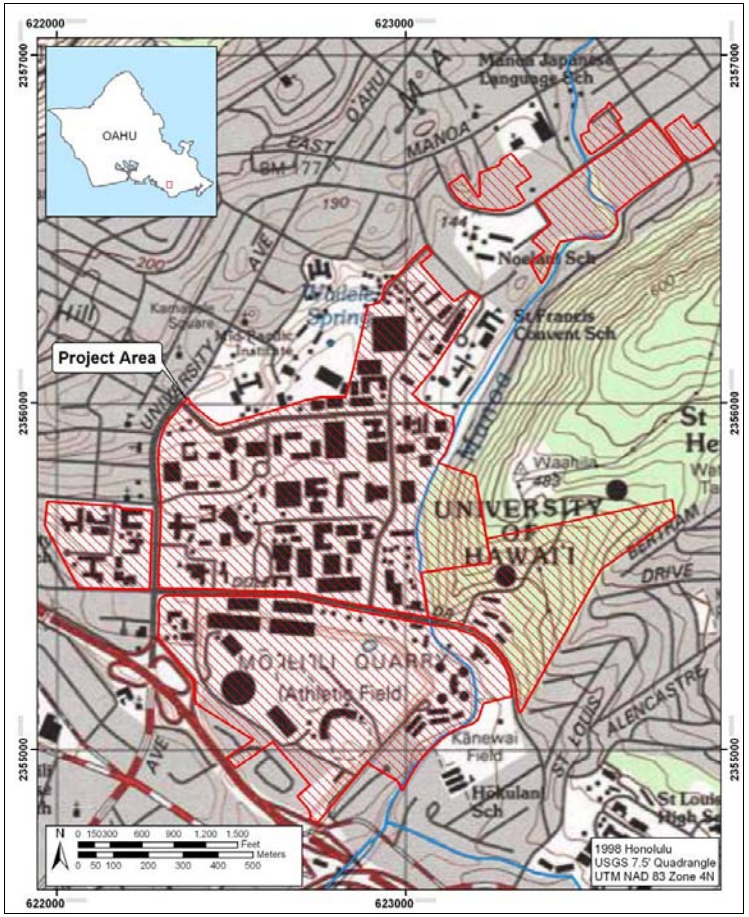
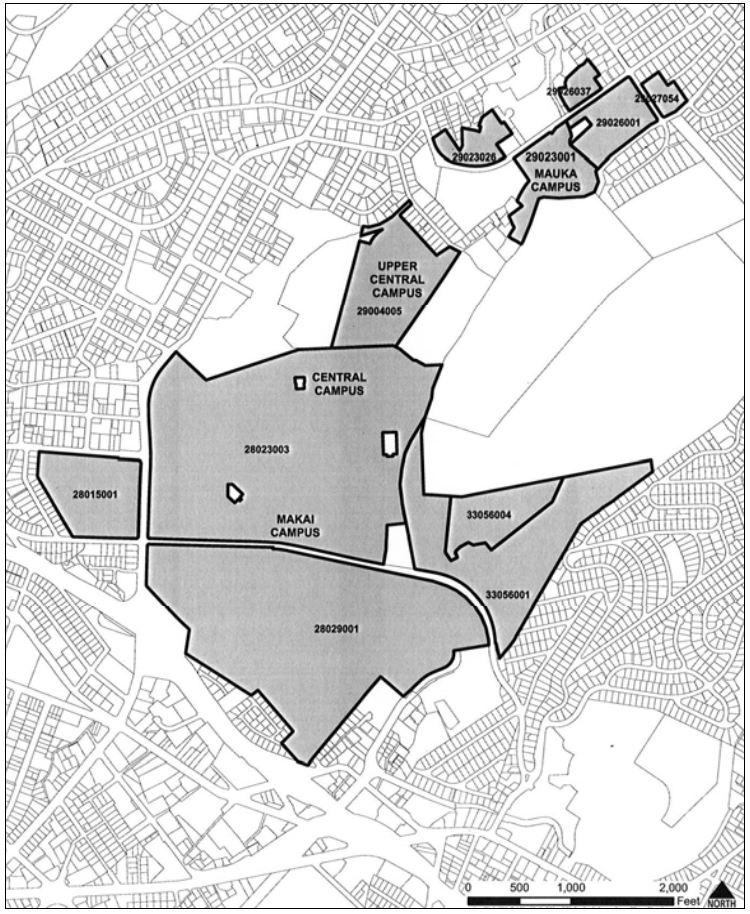


Figure 1. USGS topographic map, Honolulu 1998 quadrangle, showing University of Hawai‘i at Mānoa campus lands



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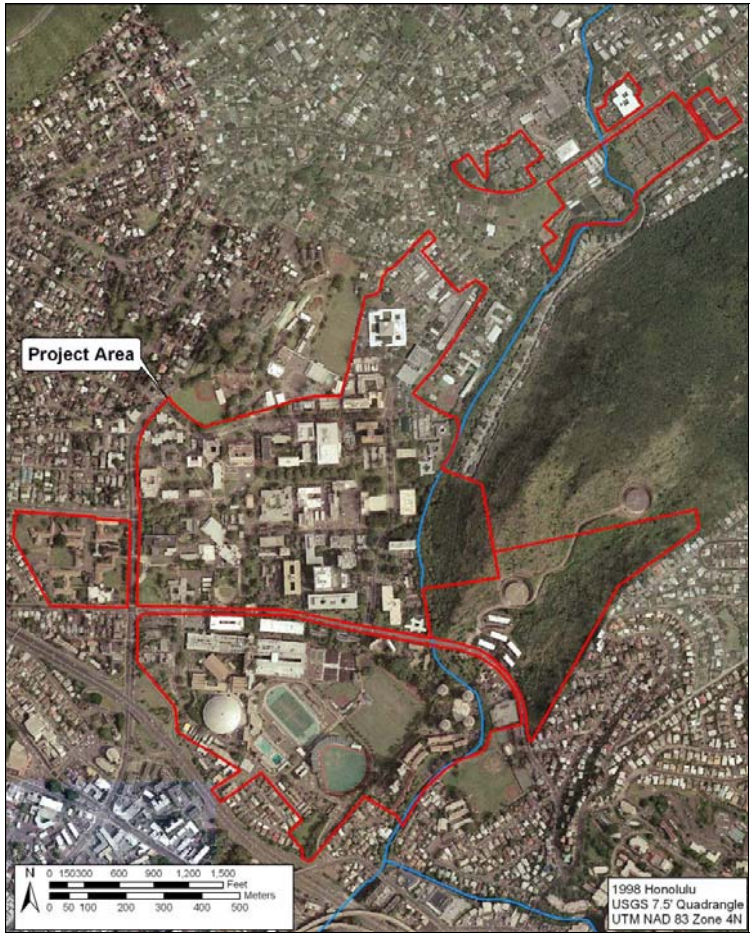

Figure 3. Aerial photograph of University of Hawai‘i at Mānoa campus lands

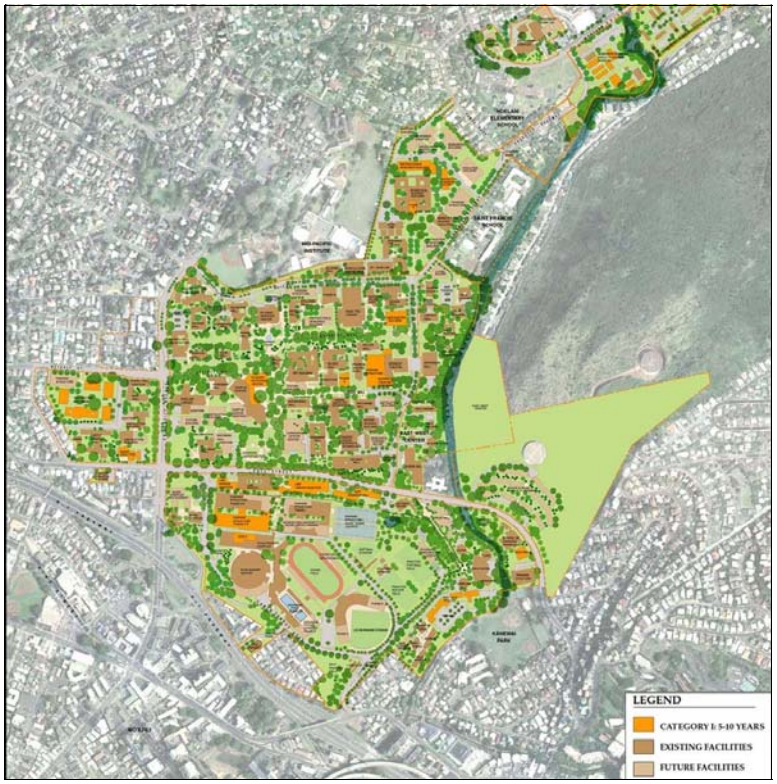

Figure 4. Long Range Development Plan 2007 Update

1.1.3 Overview of Need

These projects address current space and activity needs on campus. They are not based on any anticipated increase in enrollment over the next planning period. Enrollment declined from an all-time high of over 22,000 students in 1972 to a low of approximately 18,000 in 1987. Since then, enrollment has slowly increased reaching 20,644 students in the fall of 2007. Enrollment is projected to remain relatively stable through 2012, as indicated by a 2007 estimate by the University of Hawai‘i's Institutional Research Office. The anticipated opening of the new West O‘ahu Campus is also anticipated to reduce the pressure on undergraduate enrollment.

Rather than enrollment growth, campus development at the University of Hawai‘i-Mānoa (UHM) is now stimulated by current facility needs and the desire to provide a more complete campus community experience. Universities across the country have focused on enhanced environments for learning, working, and living. Campuses of the future envision uses and activities not unlike that of any vital urban center.

Graduate and research space needs will also continue to fuel growth on the Campus. In a pattern typical of other major universities, research and administrative support facilities are related to the availability of research funding rather than enrollment. Overall, extramural funding at Mānoa has increased by 50% over the past ten years. In 2003, the Top American Research Universities ranked UHM among the top 50 public universities in federal research funding. New laboratories, offices and library resources will continue to be required to support evolving graduate work and research activities.

While not all research and graduate education will be campus-bound, as evidenced by the John Burns School of Medicine in Kaka‘ako, telescopes atop Mauna Kea and research facilities on Coconut Island, the great majority of research and graduate student activities seek a direct relationship to the resources of the Campus. While distance learning and virtual teaching methods also promise changes to higher education, their immediate impact appears to be at the lower division and undergraduate level. Institutions such as UHM with large upper-division and graduate programs, successful professional schools and burgeoning research programs are anticipated to grow in-place. UHM’s challenge is to use the opportunity afforded by this growth to achieve higher levels of quality in its physical and academic environment. The 2007 Update to the LRDP will serve as guidance towards this important goal.

1.2 Scope of Work

This study was designed to address archaeological site types and locations, and allow for future work recommendations. The goal is to identify, if possible, cultural resources and historic properties and to provide recommendations related to the State of Hawai‘i’s historic review process. The agreed upon scope of work is as follows:

1. Historical research to include study of archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or adjacent to the subject property.

2. Limited field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. This assessment will identify any sensitive areas that may require further investigation or mitigation before the project proceeds.
3. Preparation of a report to include the results of the historical research and the limited fieldwork with an assessment of archaeological potential based on that research, with recommendations for further archaeological work, if appropriate. It will also provide mitigation recommendations if there are archaeologically sensitive areas that need to be taken into consideration.

1.3 Environmental Setting

1.3.1 Natural Environment

Mānoa Valley was formed during the volcanic eruptions that formed the Ko‘olau Mountains starting about 10 million years ago. This volcanic activity and the following erosion caused amphitheater-headed, deep V-shaped valleys on the southeast coast of O‘ahu, which are separated by sharp, high ridges. The Ko‘olau volcano reactivated approximately 250,000 years ago, pouring lava into the valley. This eruption built up new cones, including Pu‘u ‘Ōhi‘a (Tantalus) in the upper valley, and lower down the smaller cones of Pu‘u Kākea (Sugar Loaf), Pu‘u ‘Ualaka‘a (Round Top) and Pu‘u o Mānoa (Rocky Hill). The erupted lava cascaded down the western ridge of Mānoa Valley. This filled in the V-shaped valley, giving it a more rounded U-shaped appearance (Bouslog et al. 1994:4-5).

According to Foote et al. (1972), soils within the campus are mostly varieties of clay loam (Figure 5). The northeast portion of the campus and most of the central campus is Makiki Stony Clay Loam (MIA) with some Tantalus Silty Clay Loam (TCC) in the northwest corner. The Wa‘ahila Ridge area north of Dole Street includes a large portion of Rock Land (rRK) as well as Kaena Very Stony Clay (KanE) and Pamoa Silty Clay (PID) soils. South of Dole Street the southeastern portion of campus includes Kawaihapai Clay Loam (KIA). The quarry area that dominates the lower campus was developed to exploit a thick dense deposit of epheline-meililite (so-called “blue stone”) basalt.

A notable feature of the dominant Makiki Stony Clay is “that there are enough stones to hinder cultivation” making up 15% of the soil by volume (Foote et al. 1972:92). Basalt outcrops are common. Several of the other soil types (rRK, KanE, PID) are described as having poor “workability” owing to the very sticky, very plastic nature of the clay. The best agricultural soil appears to be the Kawaihapai Clay Loam – which rather notably lies in a very small area where the Kānewai taro *lo‘i* (probably a traditional Hawaiian gardening complex) is located.

The Mānoa sub-basin watershed covers 6,150 acres and 12 miles of stream. ‘Aihualama, Waihī, Lua‘alaea, Nāniu‘apo, Wa‘aloa, and Waiakeakua are the tributary streams in the upper valley that merge at an elevation of 400 feet into the main Mānoa Stream. Half-way down the center of the valley, the Sugar Loaf eruption has pushed the streambed to the extreme east of the

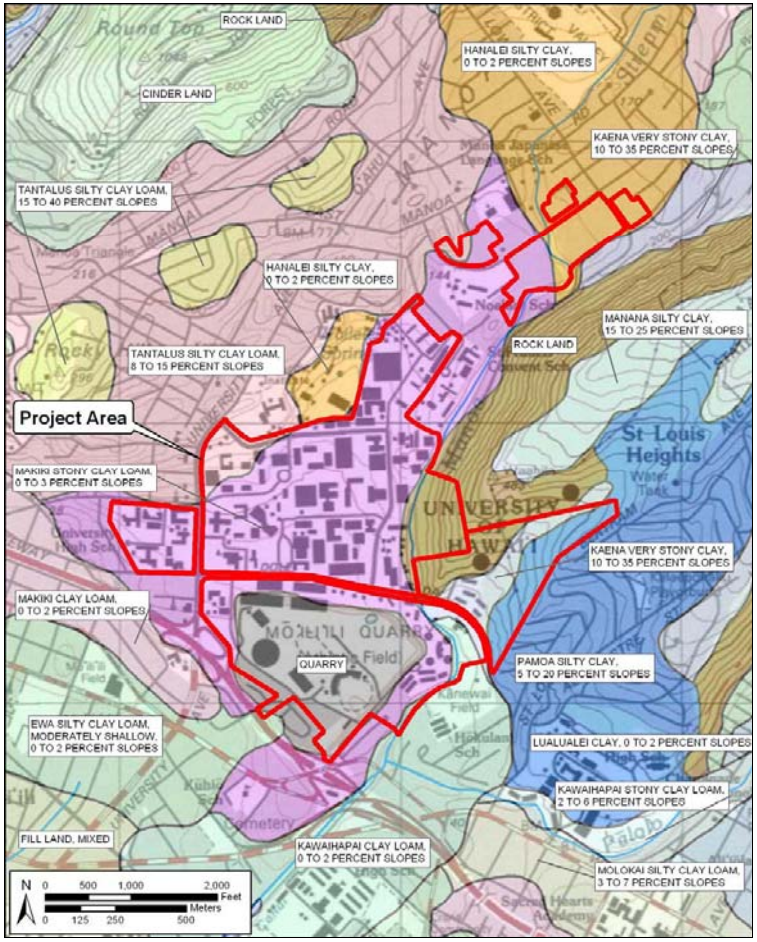

Figure 5. Soils map of University of Hawai'i at Mānoa

valley. Before the construction of the Ala Wai Canal, the lower portion of the stream, called Kālia Stream, flowed in a westerly direction, then made a wide bend to the east where it joined the Pālolo Channel in the general vicinity of the present-day Date Street near the *mauka* side of the Ala Wai Golf Course.

Annual rainfall at the head of Mānoa Valley can reach up to 160 inches per year. At the lower boundary, rainfall is only 35 inches per year. The valley is often swept with strong winds that bring rain, including *ala'eli,* the "cool wind of the land," and *kākea,* a "stormy wind" (Bouslog et al. 1994:6).

Before Hawaiian settlement, the slopes of Mānoa's ridges were probably covered with a dense forest, dominated by *'ōhi'a lehua* (*Metrosideros macropus*), *koa* (*Acacia koa*), and *loulu* (the native fan palm, *Pritchardia* spp.). The undergrowth would have included shrubs such as *naupaka kuahiwi* (*Scaevola* spp.), ferns such as *hāpu'u* (*Cibotium splendens*), *'ama'u* (*Sadleria* spp.), and *pala'ā* (also known as *palapala'ā, Sphenomeris chinesus* syn. *chusana*), and vines such as *'ie'ie* (*Freycinetia arborea*) (Bouslog et al. 1994:8). Mānoa, due to its broad, well-watered valley, was probably settled early by the Hawaiians, who probably cleared much of the lower areas near streams for wetland taro cultivation.

1.3.2 Built Environment

The history of the built environment of the campus is addressed in detail in Section 4.7 (Early Years of the University of Hawai'i at Mānoa).

Prior to the establishment of the university, and following historic-era changes in land use and ownership, the future campus was apparently a relatively dry and scruffy place: "The early Mānoa campus was covered with a tangle of *kiawe* (*Prosopis pallada*), wild lantana (*Lantana camara*) and *panini* cactus" (Kobayashi 1983:7). In 1911, "the Regents discussed what to do about seven groups of Hawaiian squatters, including one group that tilled the land, on the College's Puahia lot" (Kobayashi 1983:7). These "squatters" homes are understood to have been rather modest. The field system (largely believed to have been fallow by the twentieth century), however, appears to have been rather developed: "The area that was to become the university farm (located on what is now the area east of Hawai'i Hall) was made up of small fields, from one-tenth to one-fourth of an acre, each surrounded by loose rock walls" (Kobayashi 1983:7). Virtually no trace of these residences and fields is believed to be present.

Section 2 Methods

2.1 Field Methods

The field inspection was not intended to satisfy current standards for Archaeological Inventory Surveys in Hawai‘i; rather, the objective was to develop data on the nature, density, and distribution of previously undocumented or minimally documented historic properties within the allocated time of approximately 10 person hours for fieldwork. Fieldwork was conducted on May 14, 2008, by two CSH archaeologists, Chris Monahan, Ph.D. and Jon Tulchin, B.A. Field inspections were made of the following portions of the overall project area:

1. the Kānewai *lo‘i* (taro pondfields) and associated *'auwai* system (collectively designated State Inventory of Historic Properties [SIHP] No. 50-80-14-4498);
2. Koana Cave, a possible habitation site, from which human remains were reportedly collected in the 1950s and accessioned by the Bishop Museum in the 1960s;
3. the posited location of Hipawai Heiau (designated SIHP No. 50-80-14-63) near the southern tip of TMK: (1) 2-9-023:001 (on the so-called “Mauka Campus”), and;
4. the Wa‘ahila Ridge area, located immediately east of Mānoa Stream in the lower Mānoa Valley.

Documentation included digital photography, hand-written field notes and GPS mapping. The GPS device was a hand-held Garmin GPSMap 60csx, with 3-5 m accuracy. GPS data was then projected and overlaid on topographic and aerial maps using ESRI ArcGIS v9.1 (UTM coordinate system, NAD 83 datum).

2.2 Laboratory Methods

Given the scope of work for this project, which included only limited field inspection of surface sites, no materials were collected or recovered, and no laboratory work was undertaken.

2.3 Document Review

Numerous published and unpublished accounts, surveys, maps and photographs found in public and private collections pertaining to the University of Hawai‘i at Mānoa and Mānoa Valley were investigated by CSH. Historical documents, maps and existing archaeological information pertaining to sites in the vicinity of this project were researched at the SHPD library, CSH library and the University of Hawai‘i’s Hamilton Library.

2.4 Consultation

A substantial consultation effort was undertaken for a companion Cultural Impact Assessment (CIA) of this project. No formal consultation was undertaken for the subject Archaeological Literature Review and Field Inspection; however, we were assisted in our inspection of the Kānewai *lo‘i* by its current Director, Mr. Makahiapo Cashman, who generously provided his *mana‘o* (thoughts, opinions, beliefs) and *‘ike* (wisdom, expertise).

Section 3 Traditional Background

3.1 Mānoa Place Names and Legendary Sites

The literal meaning of the word Mānoa is “wide or vast” (Figure 6). It, along with Pauoa, Nu‘uanu and Pālolo, was one of the famous “valleys of the rainbow,” as described in the legend of “The Lady of the Moon.”

> Almost all day long the valley is open to the sun, which, looking on the luxuriant verdure and clinging mist, sends its abundant blessing of penetrating light. Rainbows upon rainbows are painted on the steep precipices at the head of the valley. There are arches of exquisite beauty, smashed fragments of scattered color, broad pillars of glorious fire blazing around green branches of ghost-like trees, great bands of opal hues lying in magnificent masses on the hillside, and lunar rainbows almost circular outlined in soft prismatic shades in the time of a full moon. (Irwin 1936:18)
>
> When showers creep down the valley one by one, rainbows also chase each other in matchless symmetry of quiet, graceful motion. Sometimes the mist in the doorway of the valley has become so ethereal that splendid arches hang in the apparently clear sky without cloud support. (Westervelt 1963a:128)

O‘ahu was conquered by the Maui chief, Kahekili, in 1783 and again by Kamehameha I in 1795. It was the custom of ruling chiefs to disregard the land allocations of their defeated rivals, and thus there is little known regarding traditional (pre-1783) land tenure on O‘ahu. Mānoa is sometimes treated as a portion of the *ahupua‘a* of Waikīkī and is sometimes treated as a distinct *ahupua‘a*. Several place names within Mānoa are located on a map of early nineteenth century trails as described by John Papa ‘Ī‘ī (Figure 7).

> Our description of the trails of the royal town is finished, but we have not yet told of the trails going to lower Waikiki, Kamoiliili, and Manoa. . . . At Kawaiahao a trail passed in front of the stone house of Kaina, late father of Kikaha. The trial went above Kalanipuu’s place, along the stream running down from Poopoo to the sea, close by Kaaihee in Makiki, to Puu o Manoa, then below Puupueo, where a trail branched off to upper Kaaipu and Kahoiwai, and another to go below Kaahulue, to Kapulena [Pu‘ulena] and Kolowalu. (‘Ī‘ī 1959:92)

Figure 8 is an outline of an 1882 map of Mānoa Valley, which shows many of the place names discussed in this report section.



Figure 6. 1929 Photograph of the Inter-Island Airway’s amphibian plane, *Hawaii*, passing over Mānoa Valley (Hawai‘i State Archives)

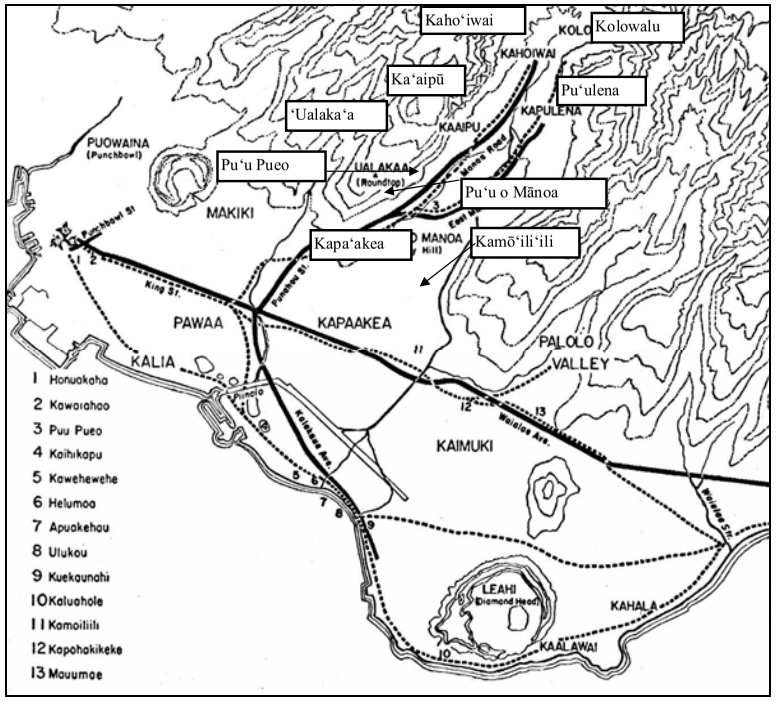

Figure 7. Early nineteenth century trails on the southwest coast of O’ahu (illustration from ‘Ī‘ī 1959:93), showing locations of some place names in Mānoa

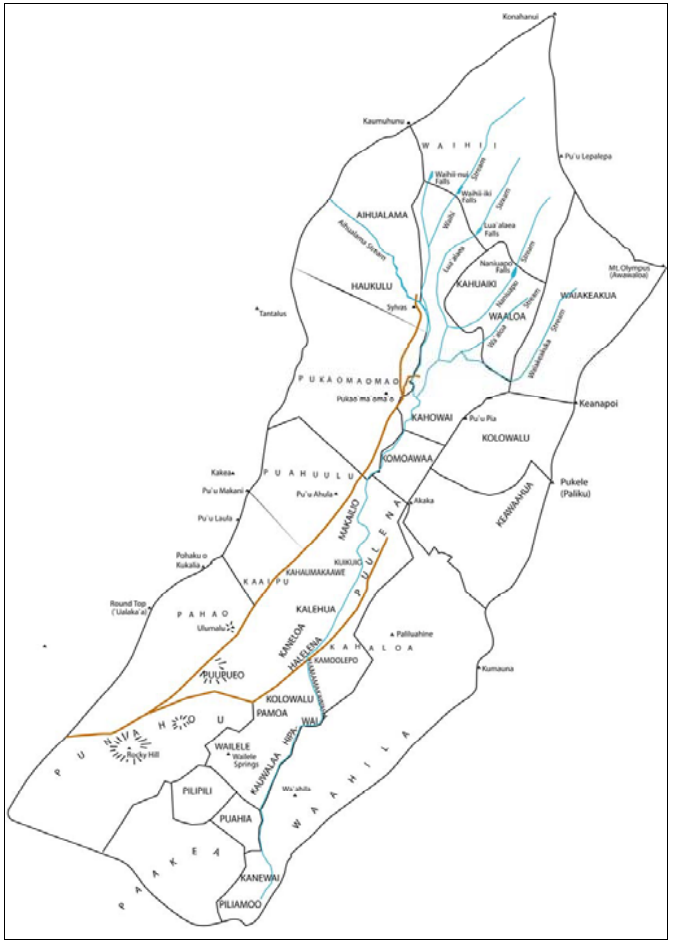

Figure 8. Outline of 1882 map by E. D. Baldwin, showing topographic points and traditional land units in Mānoa Valley

3.2 Agriculture in Mānoa Valley

Handy's (1940) description of Mānoa suggests it was once home to an extensive Hawaiian settlement supported by vast taro gardens:

> In upper Manoa the whole of the level land in the valley bottom was developed in broad taro flats. The terraces extended along Manoa Stream as far as there is a suitable land for irrigating…About 100 terraces are still being cultivated, but these do not constitute more than one tenth of the total area capable of being planted…Bennett…described the upper valley as "checquered with taro patches." (Handy 1940:77)

Mānoa was home to kings and commoners as documented in legends, land records, and early maps of Honolulu. The "Indices of Awards" lists 74 Land Commission Awards in 21 named localities at Mānoa, which suggests a substantial population. Kamehameha I was attracted to Mānoa for the cultivation of food for his army. He had one house near Roundtop:

> The places Kamehameha farmed and the houses he lived in at those farms were show places. His farmhouses in Nuuanu stood several hundred fathoms away from the right side of Kapahala, a knoll on the western side of Nuuanu Street and Hanaiakamalama House. Perhaps the location was chosen to enable him to look both inland and seaward to his food patches. Some elevated houses seem to have been for that purpose. So it was with Puupueo [Roundtop, in west Mānoa Valley], directly below Ualakaa. ('Ī'ī 1959:69)

Thrum also stated that Kamehameha often stayed in Mānoa Valley:

> It is evident that Manoa has for several generations past, been held in high esteem by Hawaiians of rank. Kamehameha I was no stranger to the valley, and it early became the favorite resort of his immediate household and followers. (Thrum 1892:113)

3.3 Legendary Associations

Mānoa is associated with many legendary accounts, a full description of which is beyond the scope of the current document. A detailed and lengthy presentation of these *mo'olelo* (oral histories) is contained in the companion CIA report for this project. What follows here is a brief abstract of the numerous legendary accounts.

3.3.1 Legends Associated with Streams, Springs and Pōhaku

Mānoa is watered by five streams that merge into the lower Mānoa Stream: 'Aihualama (*lit.* eat the fruit of the *lama* tree), Waihī (*lit.* trickling water), Nāniu'apo (*lit.* the grasped coconuts), Lua'alaea (*lit.* pit [of] red earth), and Waiakeakua (*lit.* water provided by a god). There are seven waterfalls in the back of Mānoa Valley, named Wai'ihī'iki (*lit.* small trickling water), Wai'ihī'nui (*lit.* big trickling water), Lua'aulaia, Nāniu'apo, Wa'aloa, Kahuwai'iki (*lit.* little water tender) and Waiakeakua (*lit.* water [used] by the god) (Pukui et al. 1974). Several of these waterfalls in the back of Mānoa Valley are shown in Figure 9.

There are many *mo‘olelo* (oral histories) and legendary accounts dealing with the numerous fresh-water springs (*pūnāwai*) of Mānoa. Many of these springs are directly associated with the exploits of two primary Hawaiian gods, Kāne and Kanaloa, who were together responsible for originating many of these *pūnāwai.* These springs include Kānewai (location of the current Kānewai Cultural Garden), Hualani, Wailele (Figure 10)—located near the present day athletic field of the Mid-Pacific Institute and associated with Kūka‘ō‘ō Heiau, Punahou (a.k.a. Kapunahou, Figure 11), Ka‘aipū, Wa‘aloa and Waiakeakua.

3.3.2 Legends Associated with Hills, Peaks, Ridges and Caves

There are numerous hills, mountain peaks, and caves in Mānoa Valley which have legendary associations. On the *mauka* border in the Ko‘olau Mountain range are the peaks, Pu‘u Lepalepa, Awāwaloa (“Mount Olympus”) and Kōnāhuanui. The word *lepalepa* means “to hang in fringes or tatters” (Pukui and Elbert 1986:203). Awāwaloa means “long valley or gulch” (Pukui and Elbert 1986:35, 209). Kōnāhuanui, the home of the gods Kāne and Kanaloa, is the highest peak in the Ko‘olau Mountains. The place name means “large, fat innards” and refers to a story about a giant who threw his testicles (*kona hua nui*) at a woman who escaped from him (Pukui et al. 1974:117).

Hills, peaks and caves with associated *mo‘olelo* and legendary accounts include Wa‘ahila Ridge and its six peaks: Keanapoi, Pu‘u Pia (*lit.* arrowroot hill), Pūkele (*lit*. muddy), Paliluahine, Akāka and Kumauna (these latter two are associated with “The Princess of Mānoa” (Kahala-o-Puna), Kapaliluahine and Pali Luahine (which is associated with Kamehameha I), ‘Ulumalu, Pu‘u Pueo (“Roundtop”) and Pu‘u Mānoa.

3.3.3 Other Legandary Associations

Mānoa is associated with a variety of other *mo‘olelo* and legends, including Pikoi the Rat Killer, Maluae and the Underworld, and the Woman Who Died and Came Back to Life; and famous events and people of the early historic era, including Kamehameha I (and his famous dog Poki), Ka‘ahumanu and Boki.



Figure 9. Waterfalls in the back of Mānoa Valley as seen from Kanānā (photograph from Bouslog et al. 1994:4)



Figure 10. Kua'io o Mānoa Pōhaku at Wailele Spring (from Bouslog et al. 1994:134)

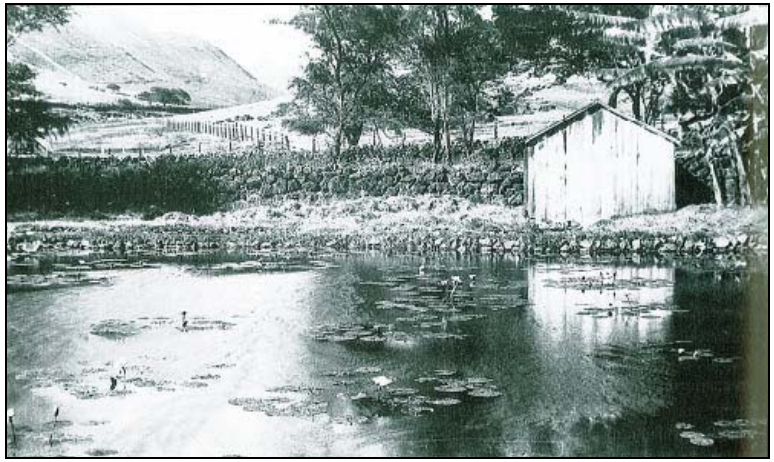

Figure 11. Kapunahou Spring (photograph from Bouslog et al. 1994:132)

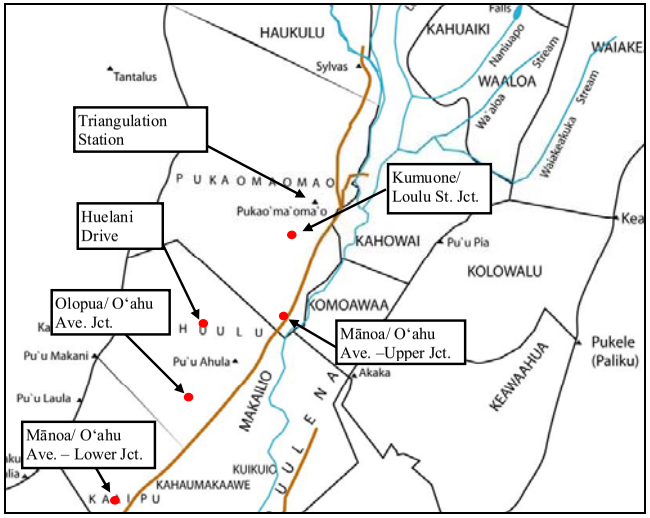

Figure 12. Possible (approximate) locations of Puka‘ōma‘oma‘o, house of Queen Ka‘ahumanu (tracing from 1882 map of Mānoa Valley, surveyed by E. D. Baldwin)

Section 4 Historical Background

In 1892, before it was urbanized, the beauty of Mānoa Valley was described:

> Manoa is both broad and low, with towering hills on both sides that join the forest clad mountain range at the head, whose summits are often hid in cloud land, gathering moisture there from to feed the springs in the various recesses that in turn supply the streams winding through the valley, or watering the vast fields of growing taro, to which industry the valley is devoted. The higher portions and foot hills also give pasturage to the stock of more than one dairy enterprise.
>
> . . .For nearly a mile the road leads by or along pasture fields with no vestige of tree or shrub other than the lantana pest and an occasional algeroba (kiawe), and passes along Round top or Ualakaa . . .
>
> At this summit of the road the whole valley opens out to view, the extensive flat area set out in taro, looking like a huge checker-board, with its symmetrical emerald squares in the middle ground, surrounded by pasture fields on the slopes at the base of the guarding hills. Here and there ‘mid sheltering trees, humble dwellings dot the scene around, while up the rugged slopes the almost endless shades of green with black worn seams of rock oft times lightened by ‘silvery thread of torrent’, forms the background to one of the most charming pictures, either in the clear sunlight, heightened as it often is by cloud shadows chasing rifts of sunshine down the mountain sides; or, as frequently, may be, to watch the drifting mist or rain sweep down one side of the valley, while the other basked in the sun, throwing over its weeping neighbor a “bow of promise” so radiant and bright that its-double, or even triple, reflection is no rarity. (Thrum 1892:110-111)

Mānoa Valley was a favored spot of the *ali‘i*, including Kamehameha I, Chief Boki (Governor of O‘ahu), Ka‘ahumanu, Ha‘alilio (an advisor to King Kamehameha III), Princess Victoria, Kana‘ina (father of King Lunalilo), Lunalilo, Ke‘elikōlani (half sister of Kamehameha IV), and later Queen Lili‘uokalani.

> The site of the various houses that once sheltered Haalilio and his retinue is pointed out just above the old Ehu homestead, known later as the ‘Charley Long’ premises and, till very recently, part and parcel of Montana’s Kaipu Diary. Rev. H. Bingham, of early Hawaiian Mission fame, is also referred to by old timers as having had a residence adjoining the Haalilio premises, though his history makes no mention thereof. (Thrum 1892:114)

4.1 Early Ownership and Use of Mānoa Valley

Mānoa was given to the Maui chief Kame‘eiamoku by Kamehameha I after his conquest of O‘ahu. After Kame‘eiamoku death, the land was inherited by his son Ulumāheihie (or Hoapili), who became the governor of Maui during the reigns of Kamehameha II and Kamehameha III. Liliha, the daughter of Hoapili, inherited the lands in 1811 and brought them with her to her marriage with the high chief Boki, governor of O‘ahu. They had a residence at Punahou in

Mānoa Valley which they often used (Bouslog et al. 1994:14-15). As noted previously, the entire floor of Mānoa Valley was a “checkerboard of taro patches.”

Boki traveled with Kamehameha II on his ill-fated trip to England. While there, Boki met John Wilkerson, a British agriculturalist who had once been a planter in the West Indies. Boki and Wilkerson traveled back to Hawai‘i on the English ship *Blonde*. In 1825, Wilkerson planted seven acres atop Punahou Hill (Pu‘u Pueo) with sugar cane, the first sugar plantation in the Hawaiian Islands.

> *I ka makahiki 1826, ua hoomaka ia ke kanu koana ma Manoa, he haole Bertiania ka mea nana i hana. O Boti a me Kekuanaoa kekahi mau alii kokua nui i ka mahi ko, a o ia paha ka hoomaka mua ana o ka wili ko ma Hawaii nei. A i ka haalele ana o ka haole, ua lilo ka wili ko ia Boti, a o Kinepu ke kanaka nana e hooponopono. Ua kukulu ia ka hale puhi ko ma loko o ke kulanakauhale o Honoluu, ma ka pa kokoke i kahi o Keolaloa Summuner ma e noho nei. He mau hana maikai keia a Boti.* (Kamakau, *Ka Nūpepa Kū‘oko‘a*, May 23, 1868)
>
> Translation:
>
> In 1826 the cultivation of sugar was begun in Manoa valley by an Englishman. Boki and Ke-ku anao‘a were interested in this project and it was perhaps the first cane cultivated to any extent in Hawaii. When the foreigner gave it up Boki bought the field and placed Kinepu in charge. A mill was set up in Honolulu in a lot near where Sumner (Keolaloa) was living. For this action Boki is to be commended. (Kamakau 1976:278)

Wilkinson died in 1826, the mill for the sugar was moved to Honolulu, and Boki lost interest in the endeavor. In 1828, he sold the sugar plantation and sugar mill (or took as partners) to four Honolulu businessmen: William French, Stephen Reynolds, John C. Jones, and John Ebbets (Kuykendall 1938:172). French encouraged Boki to turn the sugar mill into a distillery. When Ka‘ahumanu heard of this, she was outraged and took the Punahou lands away from Boki and gave them to Hiram Bingham and his wife as a base for mission work.

John Wilkerson was also the first to try to grow coffee in the islands.

> At the foothills just above Kaipu, is the reputed location of the first Coffee nursery of the islands, also the work of John Wilkinson, with plants brought by him in the Blonde, from Rio de Janeiro. All the shady recesses and glens at the head of the valley show evidences, to-day, of this early agricultural effort, but to no pecuniary or commercial advantage, for it is all neglected and overgrown. (Thrum 1892:114)

Captain John Kidwell brought a variety of pineapple to the islands called Smooth Cayenne in 1885. He conducted experiments with 31 varieties of pineapples on his farm, in the vicinity of current campus. Smooth Cayenne worked best, and this variety became the standard for the pineapple industry. The sugar cane plantation was destroyed, but some of the coffee plants were used to start coffee cultivation on the islands of Kaua‘i and Hawai‘i (Bouslog et al. 1994:15). The only remaining structures associated with this endeavor noted by Thrum in 1892 were a few filled-in cisterns and wells, and stones marking the western side of the sugar house foundation.

Prince Tute of Tahiti, who became the tutor of Kamehameha III, was also given a piece of land by Boki, in a lot adjacent to the sugar plantation. During the Māhele, he enclosed his lot with a stone wall. Tute died in 1859, but his descendants (the Sumners) continued to live in the area, which later became part of the Montano ranch, and then part of the fruit farms owned by Carlos Long (Bouslog et al. 1994:16). On the 1882 Baldwin map (see Figure 15), Ha‘alilio and Tute are shown owning two pieces of adjoining land in Kalehua and Pu‘upueo. Queen Lili‘uokalani later owned land on the old Brenig premises bordering the land of John Stevenson.

Ka‘ahumanu had a great estate in the upper valley, which included the lands of Pu‘ulena. After the deaths of Boki, Liliha, and finally Ka‘ahumanu in 1832, many of these royal lands were given to Charles Kana‘ina, the father of King William Lunalilo. Kamehameha II was also said to have maintained a summer house in Wai‘oli and Ka‘aipū. Lunalilo gave some of these lands to Kapōkini, who gave them to Ha‘alilio. When Ha‘alilio went on a diplomatic mission to England, he returned the lands to Kamehameha III (Bouslog et al. 1994:16).

An 1817 map by Otto Kotzebue (Figure 13) and an 1855 map by La Passe (Figure 14) show a dense concentration of population in Mānoa Valley. In 1836, French missionaries visited Mānoa, counting 50 houses. If each house contained five people, this would put the population at 250 Hawaiians. The general population of Honolulu and the coastal plain was about 6-7,000 people (Coulter and Serrao 1932:109), which probably represented only a small percentage of the total population of the area that existed before the Hawaiian people were decimated with war, exotic diseases, and the disruption caused by the influx of Westerners and Asians, and their influence on the economy and culture of Hawai‘i. An 1847 record lists 34 eligible landowners; only two were non-Hawaiian. An 1849 tax list includes 195 Hawaiian names, meaning the population of Mānoa was probably about 1,000.

4.2 Mid Nineteenth Century and Land Commission Awards

A total of 68 commoners were granted *kuleana* (Land Commission) awards in Mānoa *makai* of King Street, totaling 332.26 acres (Figures 15, 16 and 17; Table 1). Twenty-seven awards were less than an acre; 31 awards were less than five acres, four awards were less than 10 acres; and one award was for more than 10 acres (to Akahi, a *wahine* [female] cousin of Bernice Pauahi Bishop, in Kaipua *‘ili*, LCA 5368:1, RP 1262, 10.25 acres); five awards were for more than 30 acres (J. Stevenson [Ka‘aipū, 34.96 acres, and Nāniu‘apo, 30.17 acres], Kalaiheana, 66.59 acres, Kaunuohua, 35.40 acres, and Beckley, G. for heirs, 36.10 acres). Victoria Kamāmalu received most of Kānewai ‘Ili. C. Kana‘ina (father of King W.C. Lunalilo) received the *‘ili ‘āina* of Kolowalu and Pāmoa, and all of Kukuio and Kalehua. The largest grant went to the American Board of Commissioners for Foreign Missions who received a total of 301.68 acres; this became the campus for Punahou School (Bath and Kawachi 1990:3-5). Chief Boki gave Hiram Bingham this piece of land in 1829 (DeLeon 1978:3).

The Land Commission documents suggest that most of the agriculture and habitation at Mānoa was in the east-central part of the valley (along Mānoa Stream) between the present-day Mid Pacific Institute and the Chinese cemetery. There were a few claims and awards in the far northern part of the valley, at Punahou, and a few in the Kānewai/Kalaepōhaku area.

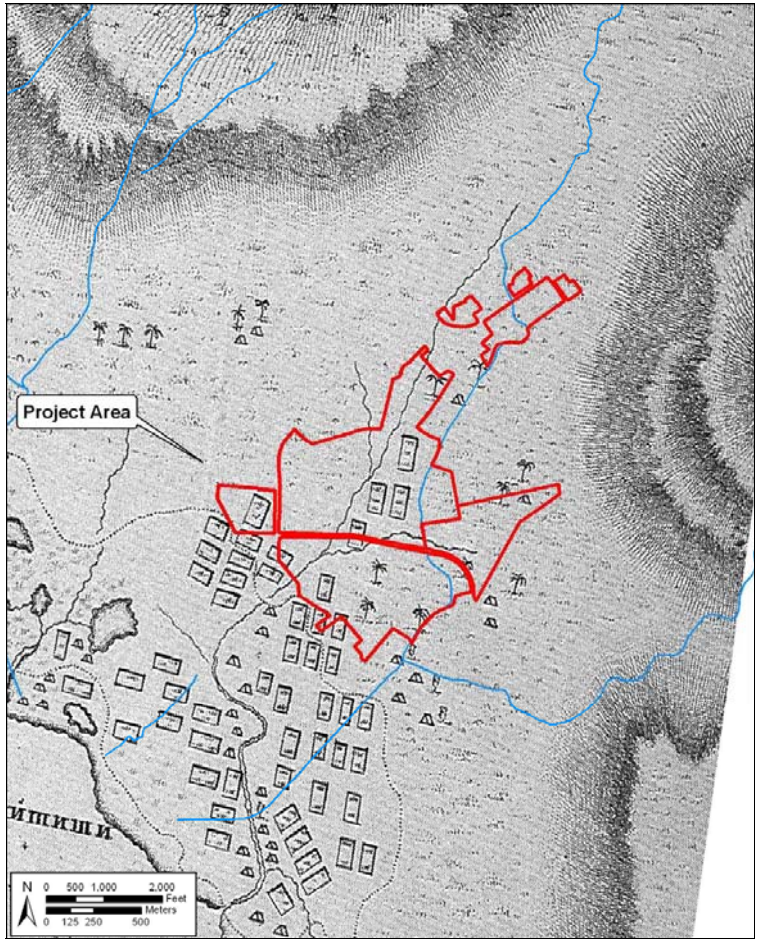

Figure 13. Kotzebue map of 1817 showing vicinity of project area (should be understood as somewhat schematic)

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

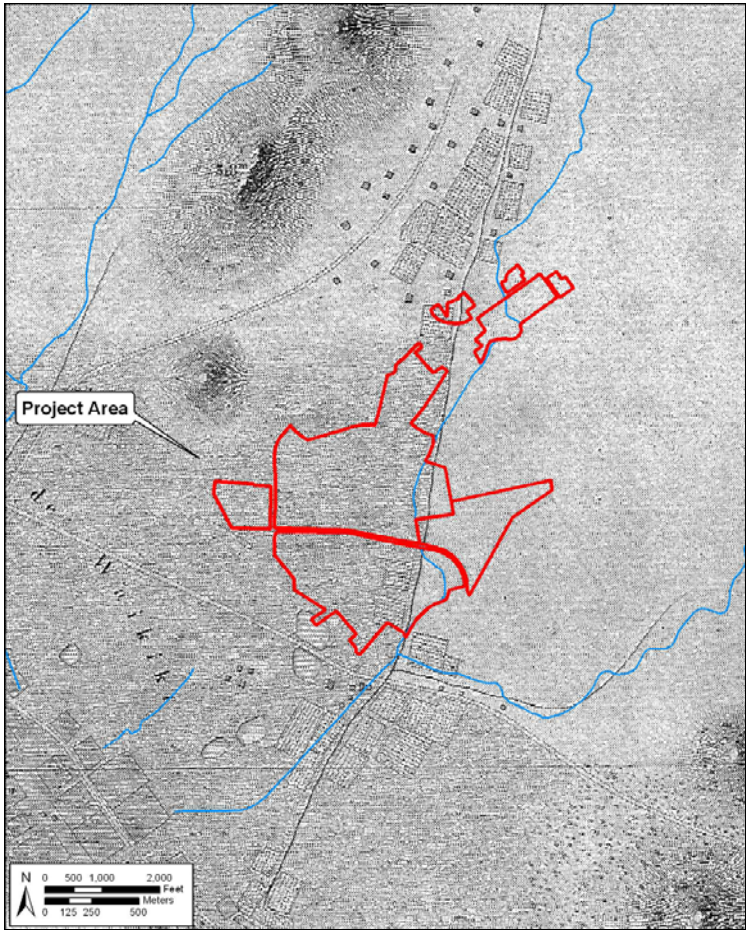

Figure 14. LaPlace map of 1855 showing vicinity of project area (should be understood as somewhat schematic

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

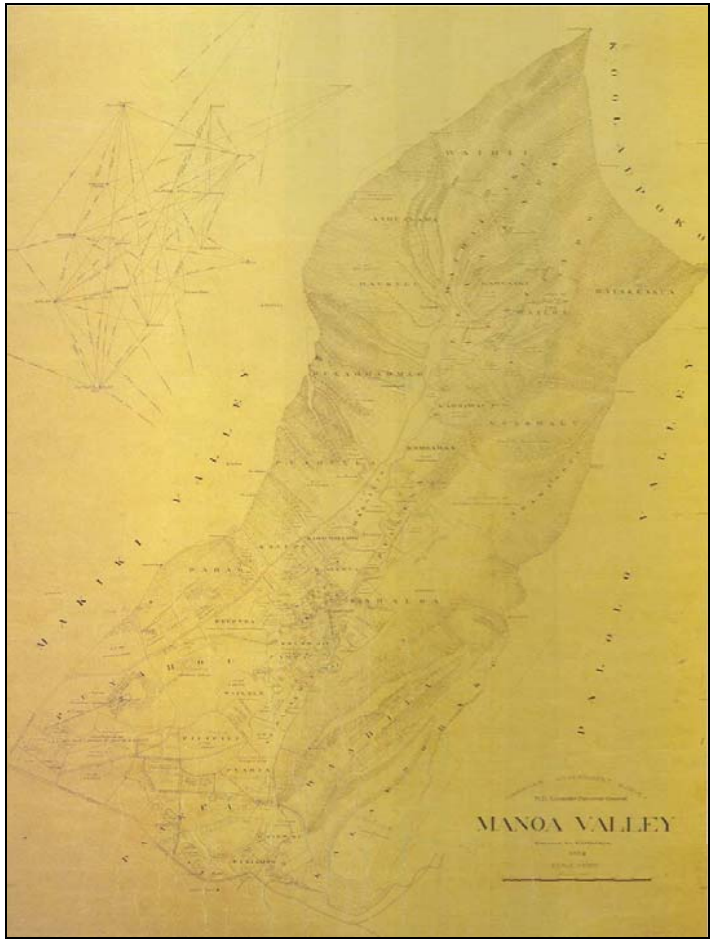

Figure 15. 1882 E. D. Baldwin map, showing Land Commission Awards and Grants in Mānoa Valley

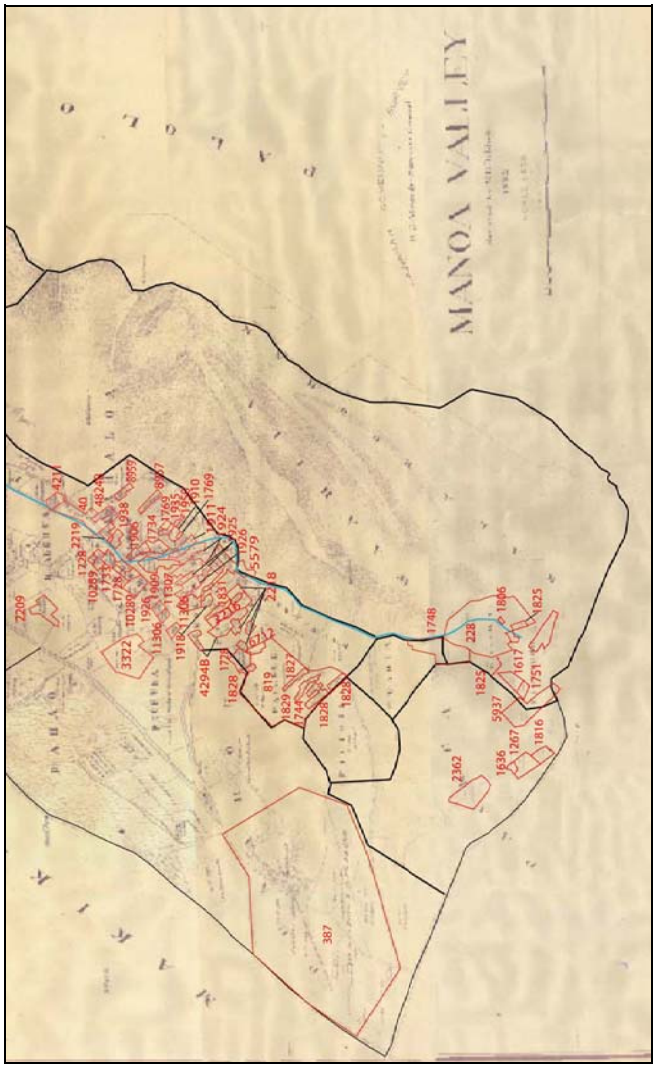

Figure 16. *Makai* portion of 1882 E. D. Baldwin map with Land Commission Awards outlined in red

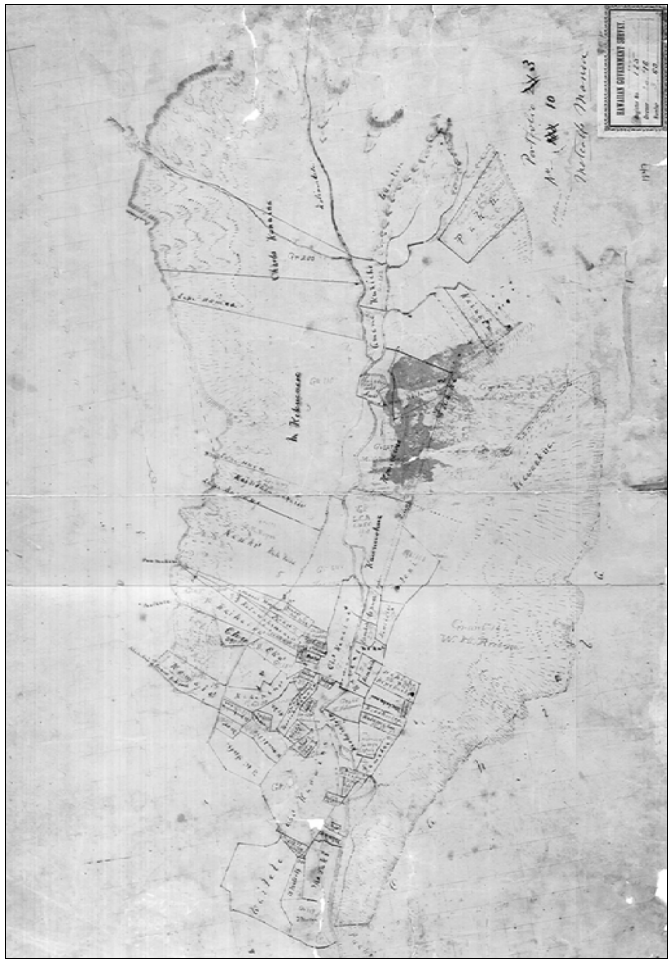

Figure 17. 1847 Hawaiian Government Survey map; surveyed by Theophilus Metcalf

Table 1. Land Commission Awards for Mānoa Ahupua'a (claims in bold were in or near UH)

Claim	Claimant	Location	Notes
17	Jones, Eli	Beretania St.	House
40	Kai, D.	Ka'ahaloa	*Māhele* Award
42	Maigret, Louis	Wailele	
228	Kaleiheana	Kānewai	Kānewai Pool
387	ABCFM (mission)	Punahou	Received from chief Boki: spring, house
707	Kaiaina		Received land from Kamehameha
819	Beckley, George	Wailele	Farm called "Kawailele"
1130			House, 2 patches, pasture
1267	Kawela	Pa'akea	3 *'āpana*: taro *lo'i;* taro *lo'i*; house
1273	Spear	King St.	
1274	Hulilau	Piliamo'o	Dry taro, 12 taro *lo'i*, *hala* trees
1356	Namaka	Piliamo'o	2 taro *lo'i*
1525	Kuaana	Piliamo'o	2 taro, house, pasture
1617	Kenao	Piliamo'o	4 taro, 1 ditch, 2 houses
1627	Keonea	Kānewai	
1636	Haole	Pa'akea	2 *'āpana:* house, fence; house, fence
1728	Kuikuikahi	Halelena, Wailele	3 'āpana: pahale; lo'i ma hale lena; taro lo'i, pasture
1733	Kaheenalu	Halelena	4 lo'i
1734	Kauhi	Hamamakahwaha, Hipawai	2 *'āpana*; house enclosed; 6 taro *lo'i*
1744	Hakuole	Wailele	5 taro *lo'i*
1748	Ono	Kānewai	Houselot
1751	Aea	Piliamo'o	3 *'āpana*: house; taro *lo'i;* taro *lo'i*
1755	Kaluaapana, Peter	Hamamakowaha	
1769	Malaihi	Hamamakawaha, Kahamama	Taro *lo'i*
1806	Hinai	Kānewai	3 taro *lo'i*
1813	Keaka, I.	Piliamo'o	2 taro *lo'i*
1816	Kaaha	Pa'akea	2 *'āpana*: 6 taro, pasture; taro *lo'i*
1825	Kuewa	Kānewai	*'Āpana* 3-4 - Pasture with 2 houses; *'āpana* 5 - taro
1827	Wahahee	Wailele	6 taro *lo'i*
1828	Ewaloa	Wailele	3 *'āpana*: taro *lo'i;* taro *lo'i,* house
1829	Hoohoku	Wailele	8 taro *lo'i*
1831	Mamala	Pāmoa	3 *'āpana*, 8 taro *lo'i*, *'auwai*, house; taro *lo'i*; house
1906	Kaumakaokea	Hamamakowaha	House at Kolowalu
1908	Kalaau	Kamo'olepo	4 lo'i
1909	Kaianui	Kolowalu	*'Auwai*, 6 taro *lo'i*, houselot
1910	Apiki	Hamamakawaha, Kolowalu	*'Auwai*, pili, taro for konohiki
1911	Naihe	Hamamakowaha	Taro, house

Claim	Claimant	Location	Notes
1918	Kamahiai	Kolowalu	2 ‘āpana: pahale; 6 lo‘i
1920	Paaluhi	Pu‘ulena	3 taro *lo‘i*, pasture, house
1921	Moku	Kahawai	9 taro *lo‘i*, *kula*, house
1922	Nawaanui	Kali‘i	13 *lo‘i*, sweet potato
1923	Kekua	Kaho‘iwai	6-8 *lo‘i*, *‘auwai*, house
1924	Kealohapauole	Kauala‘a	3 *‘āpana*,: 7 taro *lo‘i*; taro *lo‘i*, house on south side; pasture
1925	Paniani	Koloalu, Koloaluiki	*‘Auwai*, *pili*, pasture, 2 houses
1925	Koi	Kolowalu	*Pili*, taro, land sinking in
1926	Nanauki	Kolowalu	1 *‘āpana*: pasture, house; taro
1927	Nawaakakele	Pāmoa	12 *lo‘i*, *kula*, house
1928	Aiia	Pu‘ulena	4 taro, pasture with house
1929	Kaanaana	Pu‘ulena	*Lo‘i* for *konohiki*, *‘auwai*, pasture
1930	Kaaea	Pu‘ulena	2 *‘āpana*: taro *lo‘i*, pasture, houselot; *lo‘i* for *konohiki*
1931	Kaiwi	Pu‘ulena	9 taro, pasture, house
1935	Puuwaewae	Kamamakoaha, Hamamo	7-8 taro *lo‘i*
1937	Kahalepohaku	Pu‘ulena	6 taro *lo‘i*, pasture, house
1938	Lupe	Kamo‘olepo	2-4 taro *lo‘i*
1940	Upepe	Pu‘ulena	Taro *lo‘i*, pasture
1944	Maemae	Komoawaa	14 taro lo‘i, *kula*
1945	Kamaikaaloa	Komoawaa	6 taro *lo‘i*
1946	Makalii		16 taro *lo‘i*, *kula*, houselot
1947	Puuki	Komoawaa	6 taro *lo‘i*, *kula*, houselot
1948	Ma	Komoawaa	7 taro *lo‘i*, *kula*, houselot
1949	Kipi	Hipawai	13 taro *lo‘i*, *kula*
1950	Kalua	Hipawai	3-4 taro *lo‘i*
1951	Nui	Kaho‘iwai	Taro *lo‘i*, house
1980	Haole	Piliamo‘o	
2209	Keaulana	Kaaipuluna	*Kalo* taro & *kula*; pasture named
2216	Kaohe	Pāmoa	2 *‘āpana*: 16 taro, watercourse; house site near taro
2218	Kaawahua	Pāmoa	4 *‘āpana*: taro *lo‘i* and pasture in each
2219	Keawe	Kamo‘olepo	2 taro *lo‘i*
2209	Keaulana		*Kalo* taro & *kula*; pasture named
2362	Kaaimoa	Pa‘akea	2 taro *lo‘i*, pandanus, house
2530	Kaahu	Piliamo‘o	
3028	Kauhi	Punahou	
3322	Tute, T.	Haliimaile	Garden farm with stone wall
3906	Neki, K.	Kolowalu	Heiau of Kūka‘ō‘ō, fence; house in
4211	Kaululaau	Kaahaloa iki, Manuahi	10 taro patches & pasture in one
4294B	Kalaweaumoku	Pāmoa, Ka‘ahaloa	2 *‘āpana*

Claim	Claimant	Location	Notes
4605	Hakau, wahine	Kaho‘iwai, Kaluohau, Hokeulu, Pi‘inaio	6 *‘āpana*: 5 taro *lo‘i*; 3 taro *lo‘i*; pasture; 1 ditch; 1 ditch; 1 fish pond
5368	Akahi	Ka‘aipū	8 taro *lo‘i*
5579	Kahapapa	Hipawai	5 taro *lo‘i*, Kahawai Stream
5937	Paukuwahie	Piliamo‘o	
6450	Kaunuohua	Pu‘ulena	Loko Kūwili
6616	Nuuanu	Kānewai	
6712	Paikau	Kalena, Wailele, Pu‘ulena	3 *‘āpana*: 2 *lo‘i*, *kula* house; mountain land; 28 *lo‘i*, *kula*, house
7713	Kamamalu, Victoria	Kānewai	
8555	Kaina, M.	Maka‘īlio	4 *lo‘i*, *‘auwai*, pasture
8559	Kanaina, C.	Kukuhio, Pāmopa	2 *‘āpana*: taro; *‘ili* of Kalowalu
8957	Kuhaumea	Ka‘ahaloa	5 taro *lo‘i*, house 2 *hala* trees
8958	Kahele	Ka‘ahaloa	1 taro *lo‘i*, *kula*, house
8959	Kuamoo	Ka‘ahaloa	8 taro *lo‘i*, sweet potatoes
10289	Namokae	Halelepa (Halelena)	2 *‘āpana*: 6 taro patches, pasture
11029	Stevenson, John	Ka‘aipū, Kapo, Kukona, Kamakela	3 *‘āpana*: *pali*, pasture (22 acres); pasture, *kalo*, stream (9 acres); *kalo* (2 acres)
11306	Kalama	Halelena, Kolowalu	2 *‘āpana*
11307	Kea	Kolowalu	9 *lo‘i*, house site

4.3 The University of Hawai‘i at Mānoa Land Commission Awards

Charles S. Bouslog (in Kobayashi 1983:183) gives the following summary account of the history of Hawaiian tenure of the University of Hawai‘i at Mānoa lands:

> The grantees of land at the mahele (mostly 1848-50) have their names recorded forever in all subsequent deeds and title search leads back to the first owner. All but one of these names for campus land were Hawaiian. Names seen are Ewaloa, Kapehana, Kaumakapili, Mooiki, Ono, Poonui, Puoa, Hakuole. Charles Kanaina (the father of King Lunalilo) at mid-century was the owner of much of the Mauka Campus and of the large areas now in the Lyon Arboretum. For most of these men, it is a one-time legal enshrinement; few of the names are seen again, except in deed.
>
> I have attempted to trace the ownership changes of some of the original grants: 718, 882, 1744, 1748, 1828 (see the 1882 map).
>
> In the “Native Register” (p. 270) Ewaloa signed with his mark. There is a reference to his widow in 1876, and to an heir in 1881, when the land passed into the hands of Emma Davison. No more Ewaloa.
>
> Hakuole has modern descendants but the land is no longer theirs. For Land Grant 1744, he made his mark in the “Native Register” and testified: “I got this land in 1830…for taro land for cultivating sweet potato at Kawailele in the land of Lui Palani (Louise French), the konohiki.” This was on December 3, 1847. An heir sold to Ilikealani in 1864. The family continued in the valley. One man is listed as a Manoa taro planter in the city directory of 1888. In 1894-95 one is listed as living in Manoa. The last kuleana seems to have been sold to a Magoon in 1896.

The largest parcel in Mānoa (LCA 228, 66.59 acres) for a private individual was awarded to Kalaiheana at Kānewai. John Papa ‘Ī‘ī (Native Register; August 14, 1846) relates the following

> Kalaiheana’s land, called Kanewai, is at Waikiki. It has some leles in Mānoa . . . that was the land of Keeaumoku at Waikiki, adjoining the north side of Kalaepohaku. This land became his upon the victory of Kamehameha I at the Battle of Nuuanu, also Waialua, as was the custom of granting land to chiefs at that time.

When the *peleleu* (fleet of large canoes) came, the land passed from Ke‘eaumoku to Papa and Kalaiheana and all the *leles* were also conveyed. In Foreign Testimony, ‘Ī‘ī relates the following:

> Kanewai is its name. It borders on the sea which enters part of it. On S. and E. is land of Kalaepohoku on NE & N is land of Waihi. From NW & W round is Piliamo. On W. Keokapu has land. This land belonged to Kiaumoku father of Kaahumanu. . . . When Kiaumoku obtained it was in 1804. Claimant is his descendant.

This later account is particularly interesting because of the reference to Kānewai bordering “on the sea which enters part of it.” This corroborates the account in the *Star Bulletin* (Williams 1935) of a subterranean passage linking Kānewai and the sea, and suggests that the famous Kānewai pool lay in Kaleiheana’s LCA. The reference to LCA 228 being bordered on the northeast and north by the land of Waihī is uncertain, but may refer to springs or seeps on the nose of Wa‘ahila ridge (Waihī – “trickling water”).

Testimony relating to Keliipo’s land claim (LCA 1635, 0.43 acres) is of particular interest in that it provides the clearest picture of land use in Kānewai. The Native Register offers the following account:

> ‘Ili of Kanewai, Ahupua‘a of Waikiki. I have two lo‘i. My lo‘i on the west is bounded on the north by the lo‘i of Kalama, on the east by the Kula of Maalahia, on the south by the lo‘i of Kalama, on the west by the lo‘i of Kanemakini, one small house.

The Foreign Testimony offers the following accounts:

> This land is Kanewai, Waipio, Waititi. Kalo land only. No house or fence. Mauka is a stream dividing it from upland Waialae, Kalama [is] Konohiki; Makai Stream and wasteland; Honolulu, Kalama. Claimant had this from Kalama about 8 years ago on account of friendship and work.
>
> One taro patch and the boundaries are Mauka is the ditch; Waialae, [lands of] Kalama; the Konohiki, Makai a stream; Honolulu, Kalama the Konohiki. Acquired in 1841, he has done Friday work for the Konohiki.

The testimony for Keliipio’s land claim suggests there were a number of small *lo‘i* (irrigated plots) in the area north of Mānoa Stream and south of the *‘auwai* (irrigation ditch), which were cultivated by different people with a number of *lo‘i* belonging to the *konohiki* (overseer) named Kalama.

The land claim of Nu‘uanu (LCA 6616:1, 0.96 acres) lists three *lo‘i*, four coconut trees, a small sweet potato *kula* (dryland plot), and a house lot. While it is not clear whether these are all in *‘āpana* (lot) 1, it seems a virtual certainty that he claimed a *lo‘i* there.

The testimony associated with Keonea’s land application (LCA 1627) relates that “Kaleiheana gave claimant these lots” and the presence of *lo‘i* and a house lot on the property.

Figures 18 through 22 illustrate some aspects of land use changes from the 1880s to the end of the nineteenth century in and around the project area.

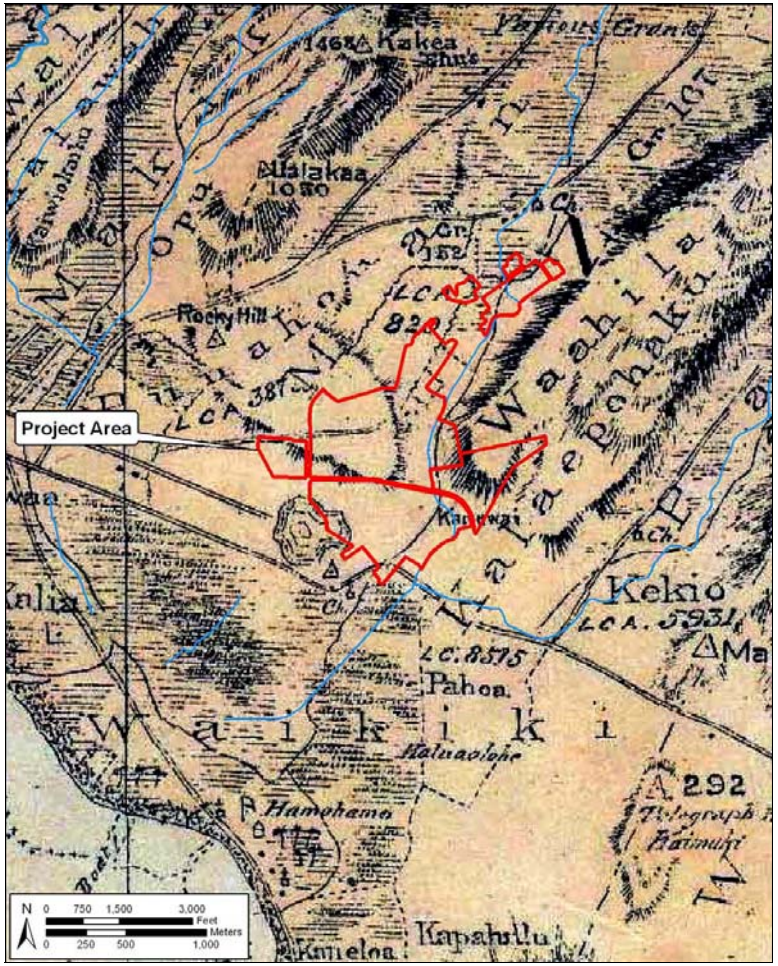

Figure 18. 1881 Oahu Island Government Survey map

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

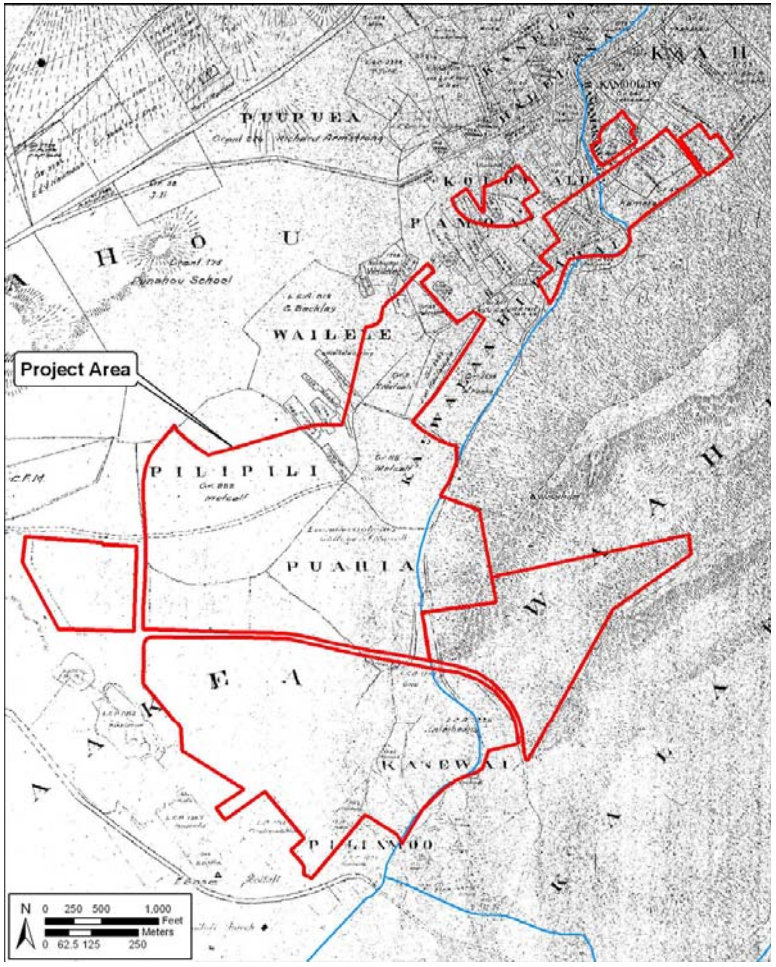

Figure 19. 1882 E. D. Baldwin map showing vicinity of project area

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

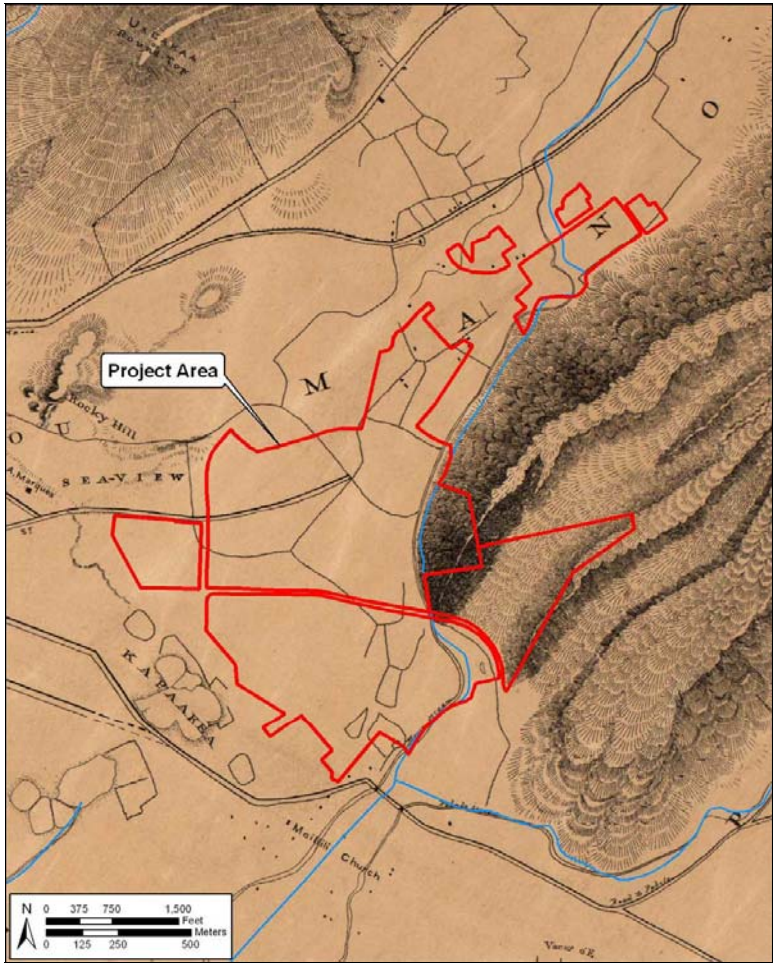

Figure 20. 1887 W. E. Wall map showing vicinity of project area

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

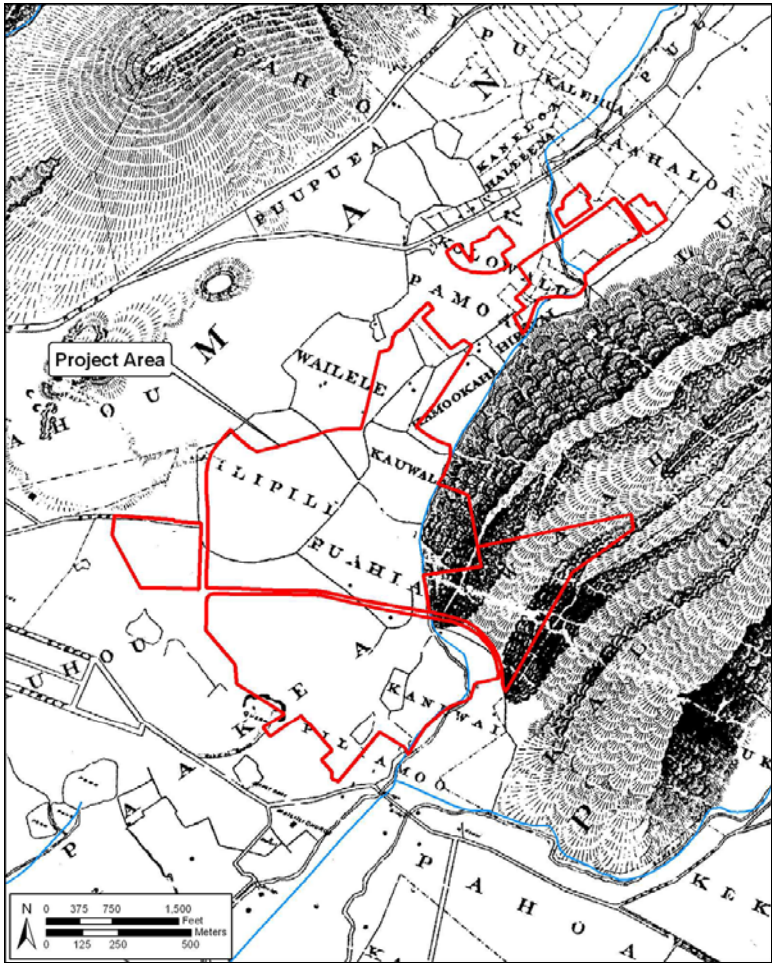

Figure 21. 1897 M.D. Monsarrat map showing vicinity of the project area

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

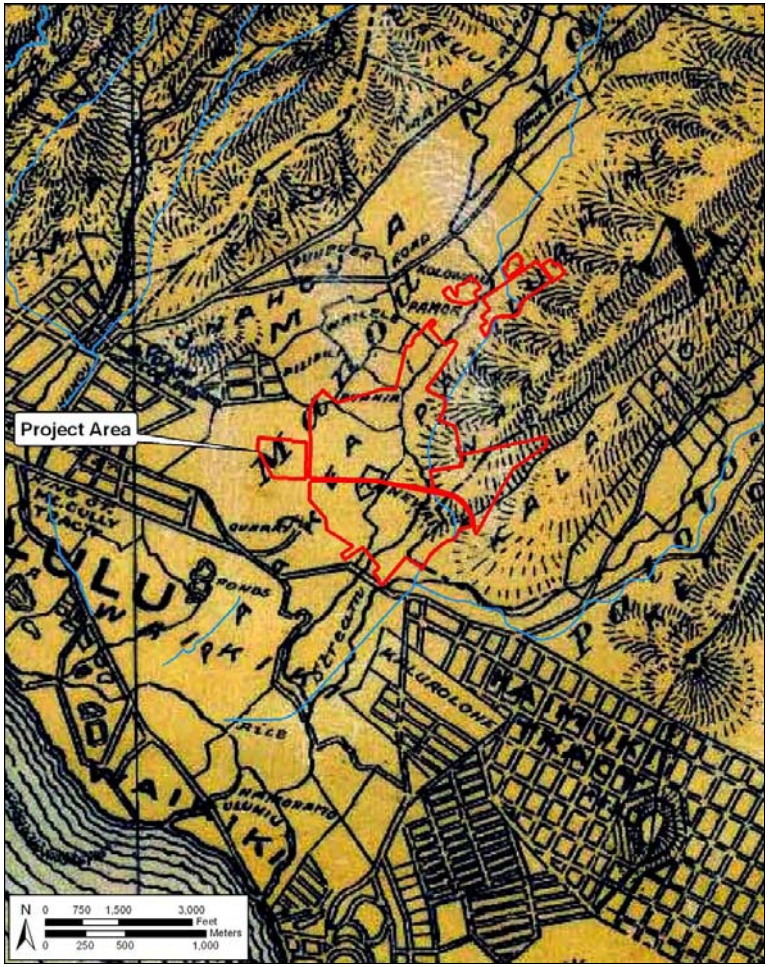

Figure 22. 1899 O'ahu Island map showing vicinity of project area

4.4 1900s to Present

Hawaiians and Chinese continued to grow taro on the floor of Mānoa Valley in the late nineteenth century (Figure 23). However, disease, out-migration to the centers of population, the loss of traditional culture, and other factors led to a decimation of the resident Hawaiian population. By the end of the century, half of the taro lands in Mānoa Valley were cultivated by Chinese. They also raised other vegetables and bananas. For a time pineapples were raised on the lower slope between Pu'u Pia and Wa'ahila Ridge (the eastern boundary of the *ahupua'a*) (Emery 1956:57).

The well watered, fertile and relatively level lands of Mānoa Valley supported extensive wet taro cultivation well into the twentieth century. Handy and Handy (1972:480) estimated that in 1931 "there were still about 100 terraces in which wet taro was planted, although these represented less than a tenth of the area that was once planted by Hawaiians."

In the early past of the nineteenth century, the Japanese began to move in to the upper valley to start truck farms, growing strawberries, vegetables, such as Japanese dry-field taro, Japanese burdock, radishes, sweet potatoes, lettuce, carrots, and soy beans, and flowers to sell to the Honolulu markets. Bananas were grown on the northeastern slopes of the valley. Several dairies were also opened in the area, including the first opened by William Harrison Rice in 1844. The result of the presence of these dairies was that many previously forested slopes were denuded by the grazing cattle (Emery 1956:57, 62).

Rice cultivation was attempted in Mānoa Valley by 1882, but the project was unsuccessful.

> Though the valley is under almost complete cultivation of taro, largely by Chinese companies, an effort was made by them in 1882 to divert it to the growth of rice, but after two years struggle with high winds, cold rains and myriads of rice birds it was abandoned. In the spring of 1884 a north wind, with the local appellation of Kakea, visited the valley, which blasted all the taro, withered all the growing rice, moved a number of houses bodily and demolished several entirely. This is said to have terminated the rice industry of Manoa, since which time its fields have been devoted to taro, as it had been for many preceding generations. Sweet potatoes and bananas are also cultivated in a limited measure, and some attention is being given to fruit culture . . . (Thrum 1892:116)

In the 1903-04 Honolulu City Directory, 148 names are listed, 107 haole (Caucasian), 11 Chinese, 9 Japanese, and 21 Hawaiians. In 1932, the valley had 1,000 homes (with an estimated population of 5,000), about 300 Caucasian, 173 Japanese, ten Chinese, ten Portuguese, six Hawaiian , five Puerto Rican, two Filipino and one Spanish (Coulter and Serrao 1932:109). By 1944, the population of Mānoa was 15,000. By the year 2000, Mānoa had a population of 21,112 (City and Co. of Honolulu 2000). Figures 24 through 29 show the growth of roads and residential areas during in Mānoa from the early to middle twentieth century.



Figure 23. Checkerboard taro fields on the floor of Mānoa Valley

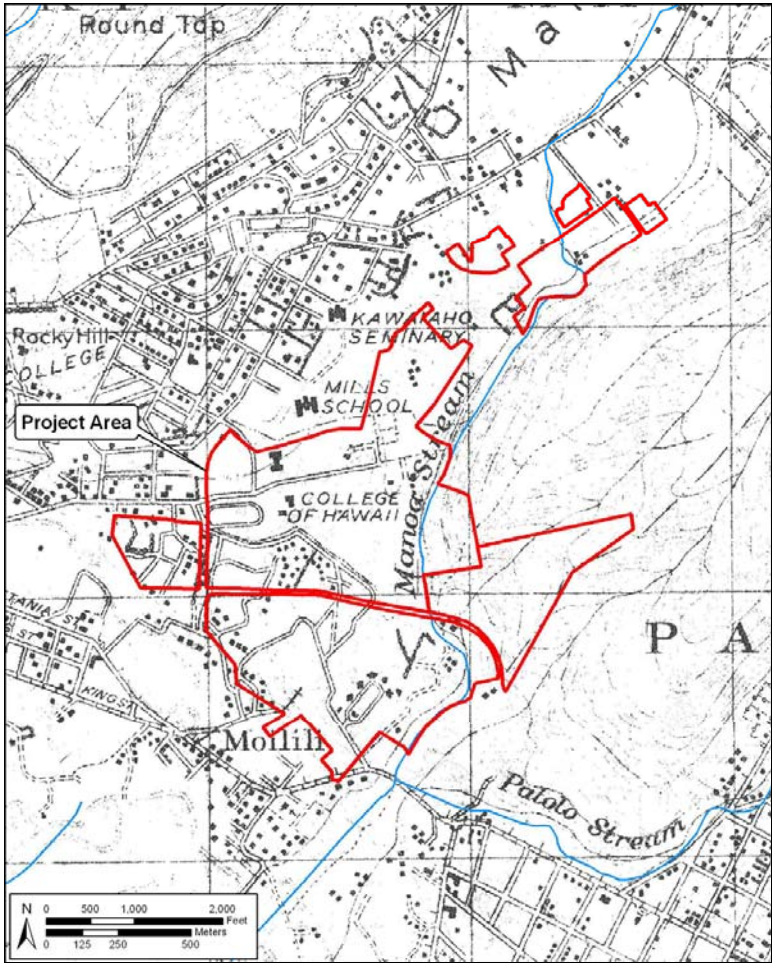

Figure 24. 1919 Fire Control map showing vicinity of project area

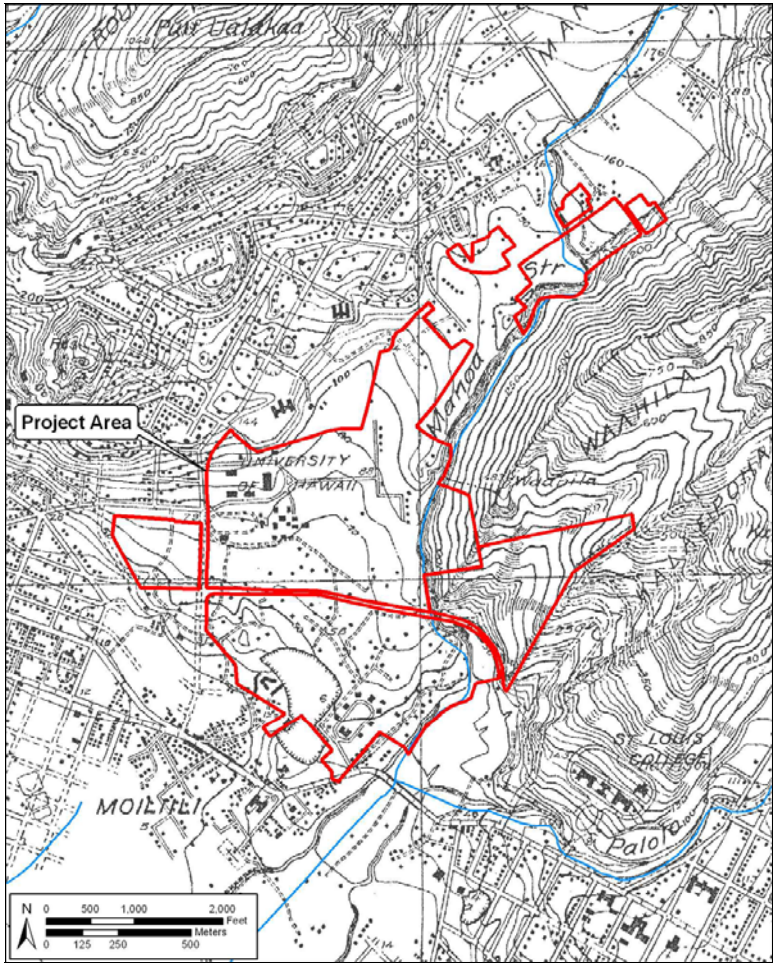

Figure 25. 1927 US Geological Survey map showing vicinity of project area

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

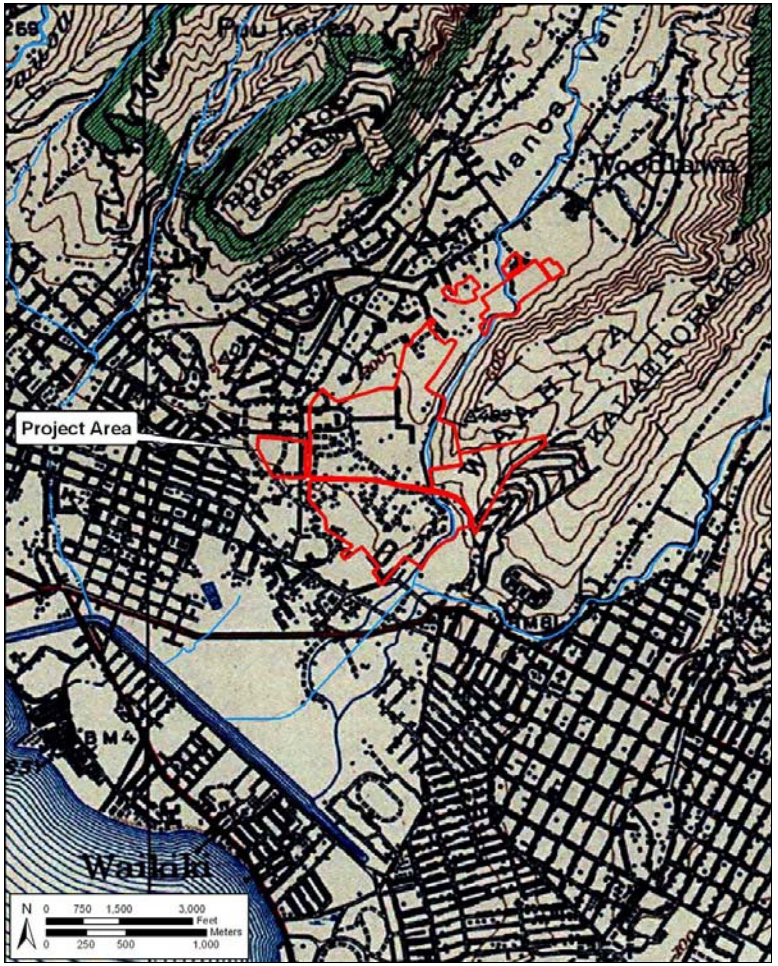

Figure 26. 1938 map showing vicinity of project area

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

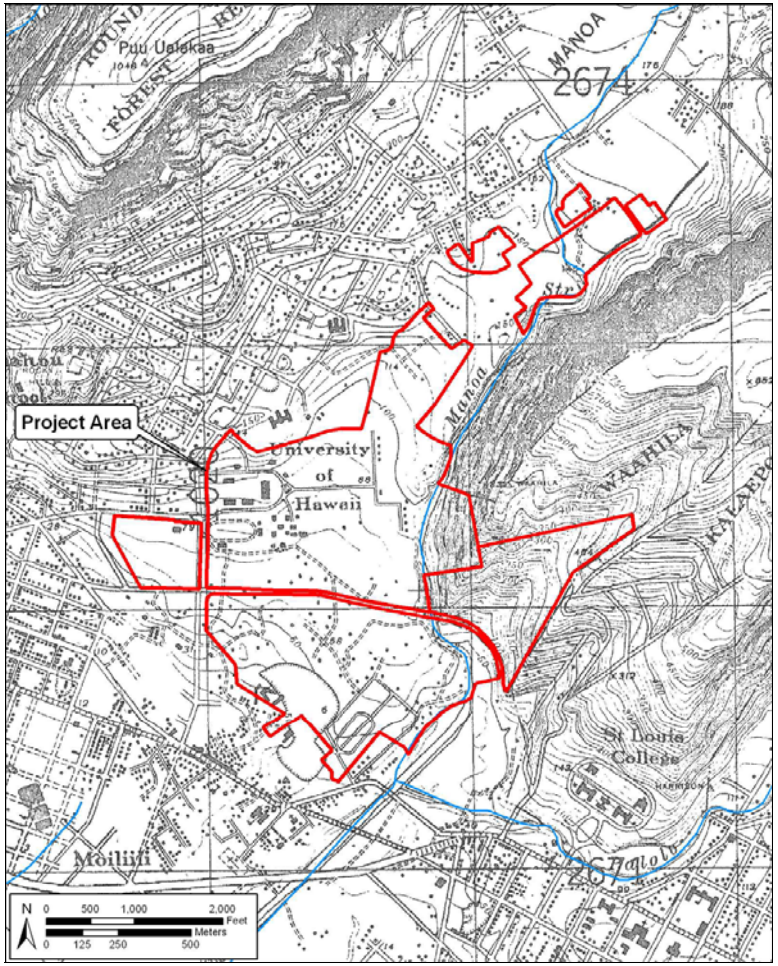

Figure 27. 1943 War Department map showing vicinity of project area

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

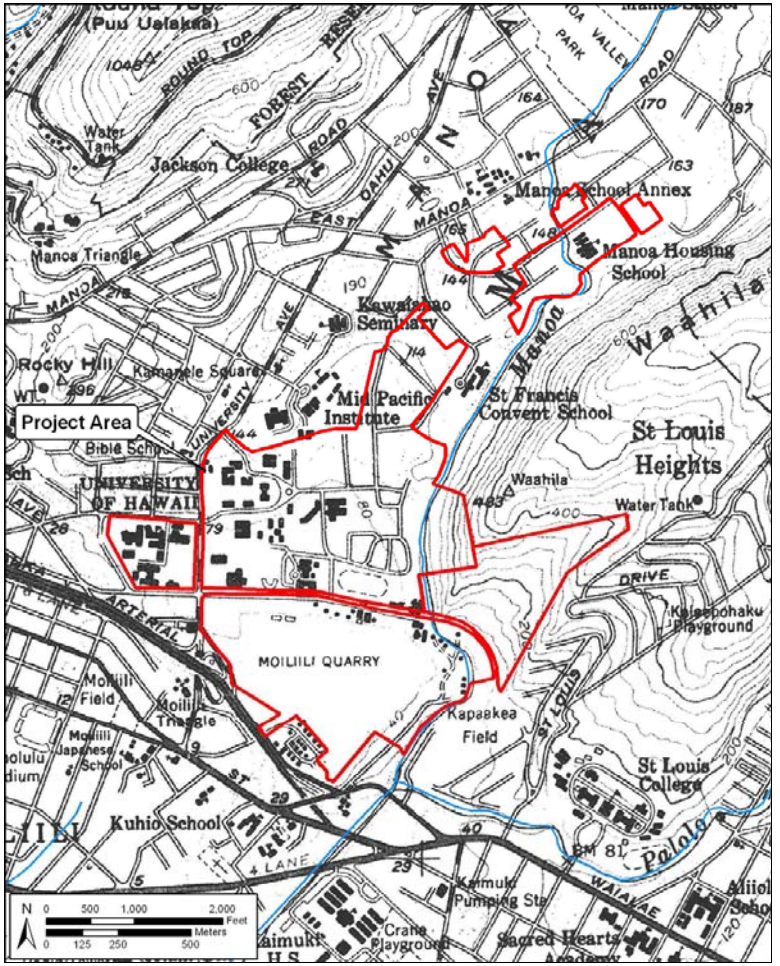

Figure 28. 1953 U. S. Geological Survey map showing vicinity of project area

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

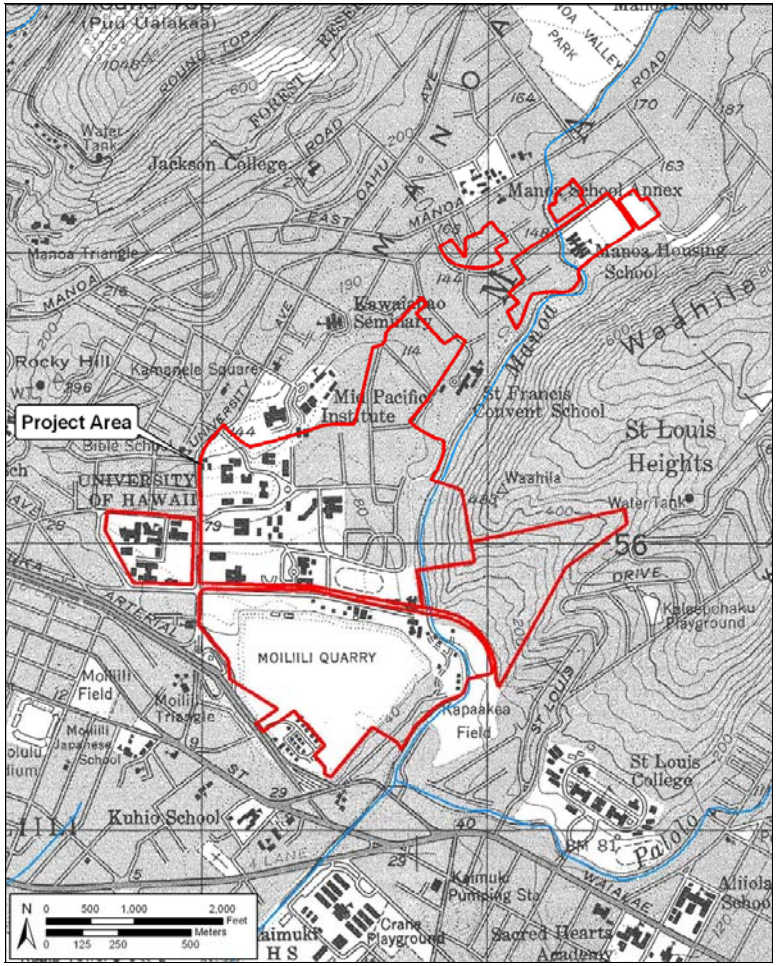

Figure 29. 1956 map showing vicinity of project area

4.5 Prominent Historic Structures

4.5.1 Mānoa Chapel and Cemetery of Kawaiaha'o Church

In 1832, the missionaries Hiram Bingham, Abraham Blatchely, Levi Chamberlain, and Elisha Loomis hiked into Mānoa Valley to look at two parcels of agricultural land that had been appropriated for the use of the Mission by Kalanimōkū, the Prime Minister of the Hawaiian Kingdom. One plot was on the western side of 'Ualaka'a in West Mānoa; the other was an acre and a half of low taro ground with thirty to forty taro patches in East Mānoa; this land was probably at the site that later became the Mānoa Chapel and the Mānoa Hawaiian Cemetery. At Ka'ahumanu's residence in Puka'ōma'oma'o, there was a "kind of village of forty of fifty huts, the houses of the chiefs, a schoolhouse and a chapel" (Diary of Elisha Loomis, cited in Bouslog et al. 1994:153). The cemetery, which may have predated the chapel, is said to have been established by Ka'ahumanu for a Christian cemetery.

In 1846, Reverend Richard Armstrong wrote: "In the beautiful valley of Mānoa, there is an encouraging state of things . . . . A substantial stone meeting house has been erected under the direction of Bro. William Harrison Rice, intended also for a school house." This stone church may have been built on land once owned by John 'Ī'ī, who had early bought fee simple land near the present junction of the upper ends of Mānoa and East Mānoa Roads. In a letter from Armstrong to the Honolulu Mission in May of 1848:

> Brother Rice has had charge of the meeting in Manoa Valley and I hope he will present an account of his labors there to the Mission. A substantial stone meeting house has been erected there under the direction of Brother Rice, intended also as a school house, and an adobe building for the same purpose at Waikiki. . . . While erecting the houses we feared they would prove too large, but during the present year they have been filled with attentive worshippers on Sabbath afternoons and, frequently, during the week. (Gulick and Hinckley 1918:235)

This building was destroyed in 1876 by a severe storm, but a wooden structure with some stone work was quickly rebuilt to replace the chapel. In 1914, the lot was granted to Kawaiaha'o Church, which managed it as an '*āpana*, or branch church. In the 1930s, a third church was built to replace the termite-eaten second church. This church, called Luakini Hou O Mānoa (The New Church of Mānoa) was dedicated in 1935. This building was a wooden structure over a lava rock foundation. The stones for this foundation may have come from Hipawai Heiau, which may have been destroyed around 1819 when Queen Ka'ahumanu broke the old *kapu*. As membership began to fail, the remaining congregation began to meet at a center on Mānoa Road instead. The old chapel was used as a baby clinic, a community center, and then as a theater. The theater proved popular, so the old building was razed and the Mānoa Valley Theater was completed in 1987. The church also has a small cemetery; the earliest grave can be dated to 1903 (Williams 1980:1).

4.5.2 Punahou School (Originally O'ahu College)

As previously noted, the Punahou lands once belonged to the High Chief Boki and his wife Liliha. They were given to Hiram Bingham in 1849 until Chief Boki's return. When Boki did not

return, Bingham retained possession. He built a small adobe and thatch house on the property as early as 1831, where he worked on a Hawaiian translation of the Bible. It was near this time that many walls were built on the property, to keep out roaming cattle, and two large stones were placed along what is now known as Punahou Street. One of these stones is still at the main gate of the school. In 1837, the idea of a school to educate the children of the missionaries was proposed in a letter (Foster 1991:17-21). The original building for the school was built in 1841 (Figure 30), and the first fifteen students began to study in the structure in 1842.

4.5.3 Sacred Heart Church at Punahou

In 1823, Kamehameha II, his wife, and entourage sailed to London. With this party was a Frenchman, named Jean Rives, a close friend of the king, and his servant, a young Hawaiian boy named Kanui. After the king and queen died in London, Rives left the party and traveled to France where he visited the Sacred Hearts Fathers in Paris. Rives left Kanui at the church and urged the fathers to send missionaries to Hawai‘i to convert the natives to Catholicism. The fathers sent three brothers in 1827, and Kanui, now known as Father Maigret, returned home in 1837.

There is some evidence that Kanui may have had a grass-thatched chapel somewhere in Mānoa Valley, but most of the converts probably traveled to the Catholic Mission on Fort Street in downtown Honolulu. Kanui died in 1842, and many of his converts may have reverted to the dominant Congregational Church. The American missionary Richard Armstrong visited the area in 1846 and noted:

> . . . in the beautiful valley of Manoa, there is an encouraging state of things. Meetings are full and interesting and some 18 papists have returned to the “old paths.” (Armstrong 1846)

In 1883, Father Clement Evrand decided to establish a permanent church in Mānoa, a wooden structure built on Wilder Avenue. In 1910, a new Gothic-styled stone church was planned on land on Wilder Avenue across from the Punahou campus. The Sacred Heart Church was completed on 1914, with stained glass windows shipped from France. In 1923, a parish hall was completed, on 1927 a parochial school was built, and in 1953 a new high school was built on Punahou School (Bouslog et al. 1994:32-33).

4.5.4 Wai‘oli Tea Room of the Salvation Army

In 1909, the Salvation Army purchased 28 acres in Mānoa on lands in Ka‘aipū once owned by Kamehameha III. On this land the Salvation Army built a home to shelter and educate needy children. In 1922, they built the Wai‘oli (meaning “happy water”) Tea Room and a bakery, so that the girls could learn “cooking, baking, and the arts of gracious living.” “High Tea” was served at Wai‘oli and later luncheons. The tea room rapidly became a focal point of the community. In 1929, a grass hut once occupied by the famed writer Robert Louis Stevenson during his visits to the islands (in 1889 and 1893) was moved from its original location at ‘Āinahau, the Waikīkī home of Princess Kai‘ulani and her parents, to the Wai‘oli Tea Room property (Bouslog et al. 1994:32).

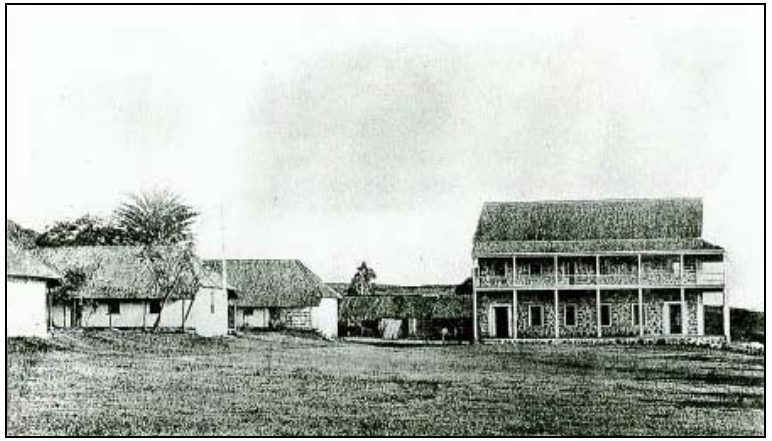

Figure 30. 1866 Photograph of Punahou School, Photograph attributed to Charles Burgess (photograph from Foster 1991:32)

4.5.5 Chinese Cemetery

The society called Lin Yee Chung was organized in 1851. The purpose was to buy burial land, to conduct Chinese funeral rites, and to arrange for the return bodies to China for final burial, if requested. In 1852, a group purchased the first lot of land in Mānoa from a Hawaiian called Moehonua. In 1854, they bought Land Grant #101, but disputes with the lot boundary delayed construction of the cemetery until 1896 (Figure 31).

In 1852, a man name Lum Ching, a practioner of the astronomy/geology study called “kum yee hok”, or geomancy (the art of divination by means of lines and figures), visited Mānoa Valley. When he climbed Akāka Peak, his instruments (including an astronomy-based compass and a light-reflecting mirror), told him he was at an:

> . . . extraordinary spot. It is the pulse of the watchful dragon of the valley. People from all directions will come from across the seas and gather here to pay homage. Birds, too, will come to sing and roost. It is a haven suitable for the living as well as the dead. The Chinese people must buy this area and keep it as sacred ground. (Thom 1985:5)



Figure 31. Entrance to Line Yee Chung Chinese Cemetery in Mānoa (photograph from Bouslog et al. 1994)

4.5.6 Lyon Arboretum

In 1919, the Hawaiian Sugar Planters' Association (HSPA) purchased the 124-acre Haukulu ‘Ili, which had once been owned by Charles Kana‘ina, father of King William Lunalilo. It was later owned by Fred Harrison, who built a country home and stable. Dr. Harold L. Lyon was the plant pathologist for the HSPA and head of the Department of Botany and Forestation for the Territory of Hawai‘i. He leased 325 adjoining acres of land from the Territory and the Bishop Estate to use as a reforestation area and as an experimental station for the growing of sugar cane varieties. The HSPA gave the 124-acre arboretum to the University of Hawai‘i in 1953 for the purpose of research, education, and public service (Bouslog et al. 1994:200-201).

Near the Lyon Arboretum, above ‘Aihualama Stream, is a cul-de-sac known as "The Pen," which became famous during the overthrow of the Queen Lili‘uokalani and the Hawaiian monarchy. In 1893, a Provisional Government was declared by several businessmen; and in 1894, they established the Republic of Hawai‘i. Revolutionists who wished to restore the monarchy soon began to stockpile weapons. One of these was Robert W. Wilcox, a former member of the government. He and his associates planned to form an army large enough to attack Honolulu, capture ‘Iolani Palace, and restore Lili‘uokalani to her throne.

The new government found out that the Royalists had a cache of weapons at the house of H.F. Bertelmann at Waikīkī Beach, and they sent a squad of government police to secure the weapons and arrest the rebels. Some of the Royalists escaped to Diamond Head where they held out for several days, but finally running low on ammunition and food they retreated into Pālolo Valley, and then finally climbed through a pass into Mānoa Valley, ending at "The Pen." Many of the rebels surrendered, and others scattered towards Pauoa Valley and on to Honolulu. Eventually all of the rebels surrendered or were rounded up.

4.6 Mō‘ili‘ili Quarry

A major feature of the lower campus is the quarry that was operated by the Honolulu Construction and Draying Company, Ltd. (HC & D; now Ameron HC & D). A quarry was established there as early as 1889 (Kobayashi 1983:169) to exploit the thick dense deposit of epheline-meililite "blue rock" basalt. HC & D leased the Bishop Estate land from W. C. Cummings starting on June 1, 1910 and enlarged operations by buying out the neighboring Mō‘ili‘ili Quarry in 1914. Although Portuguese masons worked the rock into building blocks, curbing material and tombstones, most was used for road construction base course and general aggregate. Mō‘ili‘ili residents kept track of the time by the regularity of the blasting schedule. Quarry operations ended on November 15, 1949, but the crusher continued to process rock from a Pālolo Valley quarry until 1951, when Ameron HC & D moved operations to Kapa‘a in Kailua. After extensive negotitation over price, a final order of condemnation for the approximately 95 acres of Bishop Estate land was finalized in 1953 and the University took over the area.

4.7 Early Years of the University of Hawai‘i at Mānoa

The University of Hawaii at Mānoa developed out of the 1862 U.S. Federal Morrill Act funding for "land grant" colleges. In 1907, "an act to establish the College of Agriculture and Mechanic Arts of the Territory of Hawai‘i" was passed by the Hawai‘i's Territorial Legislature and was signed into law by governor George Carter on March 25th. The regents chose the present campus loxcation in lower Mānoa on June 19, 1907. Regular classes began in September 1908 with ten students and thirteen faculty members at a temporary Young Street facility near Thomas Square. In 1911, the name of the school was changed to the "College of Hawaii" and in the following year the college moved to the present Mānoa location.

The future campus was a relatively dry and scruffy place: "The early Mānoa campus was covered with a tangle of *kiawe* trees (algarroba), wild lantana and *panini* cactus" (Kobayashi 1983:7). It appears the first structures built were a poultry shed and a dairy barn. The indications are clear that there were many stone walls and almost certainly other archaeological sites in the core area of the future campus:

> The area that was to become the university farm (located on what is now the area east of Hawaii Hall) was made up of small fields, from one-tenth to one-forth of an acre, each surrounded by loose rock walls. Each area had been farmed by individual Chinese and Hawaiian tenants. All of the rock had to be removed. There was also much rock both on the ground and buried in the soil. It took ten years to clear 22 acres. The late Dr. Frederick Krauss estimated that 5,000 cubic

> yards of stone were removed from the stone walls alone…The rock was piled in an area just east of Hawaii Hall and covered almost an acre, with rock piled five feet high. The rock was sold to builders and contractors for ten cents a wagon load. (Kobayashi 1983:7)

The reference to "5,000 cubic yards" sounds like a lot of archaeological sites! The accounts cited above indicate fairly intensive agricultural use of the area just east of (the present) Hawaii Hall. Residential use is suggested in an account that: " On May 15, 1911, the Regents discussed what to do about seven groups of Hawaiian squatters, including one group that tilled the land, on the College's Puahia lot" (Kobayashi 1983:7). It appears that all seven groups were resident in the immediate vicinity of the campus but that only one group was involved in farming on campus. They were evidently evicted the same year.

An eye witness account from Arthur L. Dean documenting conditions after June 1914 noted:

> Immediately in front of [the present] Hawaii Hall was a strip of lawn perhaps 75 feet wide. The wooden building moved up from Young Street, stained a dull brown, was the only other building on what is now the Campus. Dirt roads, which were impassable in wet weather, straggled through the grounds and disappeared among the trees and bushes in the direction of the farm. A neighboring dairyman paid a small monthly rate for the privilege of running his cows through the lands and they wandered about at all hours and places. (Kobayashi 1983:7)

Development of the campus was restricted by a lack of funding in the early years. An early donation of $1,500 for Alexander and Baldwin in 1915 allowed the college:

> To clear and grade a large area of wild campus land approximately bounded by what is now University Avenue, Campus Road [running east-west on the seaward side ofn Hawaii Hall], the Campus Center Building, and the parking lots behind Sinclair Library, converting it into the first Cooke Field…(Kobayashi 1983:7)

That the grading of this relatively small area cost $1500 1915 dollars suggests that, like the first portion of the campus to be cleared to the northeast, this area also included "much rock." While the first conceptions of a campus plan in 1909 were for major campus buildings to define an elongated east-west esplanade extending east from Hawaii Hall, by 1915 the campus had started to take on a more ad-hoc style with the H-shaped Young Engineering Quadrangle starting to be developed to the southeast (four of the five structures remain, the southwestern one having been torn down for the building of the present Campus Center) (Figure 32).

The College of Hawai'i was started with a clear focus on studies in agriculture and engineering to address local needs. In 1920, with the formal establishment of the University of Hawai'i, the vision changed to a much broader curriculum reaching out to countries of Asia and the Pacific.

In 1922, the construction of the third permanent building on campus, Gartley Hall, began the "old quad" that was subsequently expanded by construction of George Hall in 1925 and Dean Hall in 1929. The old gymnasium was built in 1928/29 (just northwest of the present Bachman Hall) and remained until 1959 when it was razed following the construction of Klum Gym. The depression years significantly slowed development. In 1930, the Normal School (today's "Wist

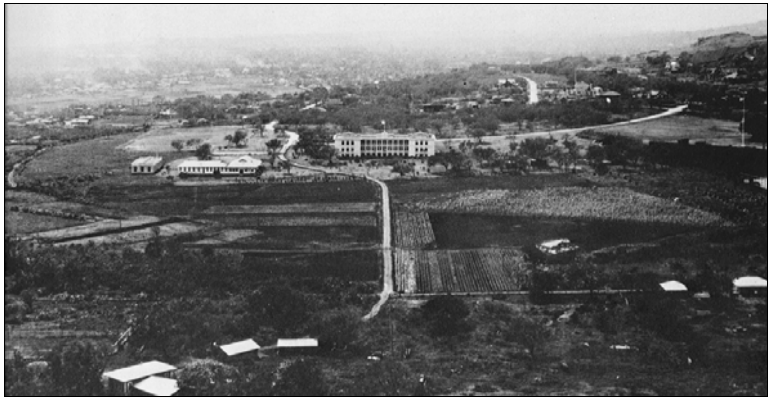

Figure 32 View of the campus in 1917 from Wa'ahila Ridge (Adapted from Kobayashi 1983:23) showing the two permanent buildings, Hawaii Hall (1912) is at center, the beginnings of the Young Engineering quad (still 4/5 intact by the present Campus Center) is at left of the relocated wooden building moved up from Young Street

Hall") was opened on the west side of present University Avenue. In 1931, with the merging of the Normal School with the Universty's School of Education (forming what was then Teachers College and what is now the College of Education), this western land became part of the University campus. The 1930s were also the time of the construction of many of the campus' most iconic structures, including Founders Gate (1933), Varney Circle Fountain (1934), Andrews Outdoor Theater (1935), George Hall (1936), Crawford Hall and Hemenway Hall (both 1938), and Miller Hall (1939) (Figures 33 through 36).

WWII brought such impacts to campus life as Hawai'i Hall becoming the U.S. Armed Forces Institute and the construction of fourteen wooden barracks up near the present Spaulding Hall. The army took over the gym, soldiers ate at the Hemingway Hall cafeteria, and bomb shelters were built. A portion of the campus was designated as a temporary military cemetery but fortunately no graves were ever dug (Kobayashi 1983:80).

The Bachman Hall administration building, designed by Honolulu architect Vladimir Ossipoff, and built in 1949, was the first permanent post-war building. A construction boom has been on-going more or less continuously ever since. The core area of the campus was expanded in 1968, when approximately 30 acres were obtained near the Mānoa Library and Mānoa Marketplace; this land was developed in 1975 for the present Astronomy Institute at 2680 Woodlawn Drive.



Figure 33. 1926 aerial photograph showing seaward end of present University Avenue ending at Metcalf St. (at extreme left), the brand new George Hall (1925) inland of Gartley Hall (1922; center), with Hawaii Hall (1912) at right and the Cooke Field Track (vicinity of present Sinclair Library) in the fore. The future Bachman Hall area is still in farm plots.



Figure 34. 1929 aerial photograph showing the western half of the present campus still in fields but University Avenue has now been extended seaward (extreme left, middle) and there has been significant clearing seaward of the Cooke Field track associated with construction of the original Gym (1928) just NW of the present Bachman Hall.



Figure 35. 1939 aerial photograph showing the campus dominated by the old quad (lower right) of Hawaii (1912), Gartley (1922) George (1925) and Dean (1929) and the new Crawford Hall (1938). The brand new Hemenway Hall (1939) is just seaward and old Gilmore Hall (1935-1973) with its two wings anchors the east end of campus at left



Figure 36. In this 1949 aerial photograph the campus is dominated by the central Hemenway Hall (1938), the old Gym and the on-going construction for Bachman Hall are near University and Dole streets, the University Farms still dominate the eastern campus

Section 5 Mānoa Previous Archaeological Research

The first recording of information regarding archaeological sites of Mānoa was by Thomas G. Thrum in his informal study of Hawaiian *heiau.* It was presented in a number of short articles in his *Hawaiian Annual* between 1892 and 1909. Thrum (1907a, b) briefly described five *heiau* in Mānoa. In the early 1930s, McAllister (1933) reprinted this information in his *Archaeology of O‘ahu.* McAllister could relocate only one of these *heiau*, Kūka‘ō‘ō Heiau, which he mapped and described in more detail.

Emma Nakuina (1907:24) also describes a *heiau*, named Kaualaa, and a sub-*heiau*, named Kauwalomalie, on the site of the Mid-Pacific Institute near Wailele Spring (possibly in the ‘*ili* of Kauwala‘a). These *heiau* were not listed by Thrum in his report on O‘ahu *heiau*, but may be mentioned in a different article by Thrum (1892:112), which lists forts built by the high *ali‘i* Kūali‘i, who built “a system of heiaus, extending from Mauoki, Puahia-luna and lalo, Kumuohia, Kaualaa, Wailele, and one or two other points between Kaualaa and Kukao‘o.”

The possible locations of these six *heiau*, and place names associated with them mentioned in their descriptions, are shown in Figure 37. This figure is a modern O‘ahu street map, with an overlay of the outline of the 1822 E.D. Baldwin map of Manoa Valley (see Figure 8). The overlay was created by lining up several major peaks (Round Top, Makani, and Wa‘ahila) plotted on both maps; however, since this is a comparison of one map created in the nineteenth century and a more exact map created in the twentieth century, the correlation between the two maps may not be exact.

5.1 Heiau of Mānoa

5.1.1 Kūka‘ō‘ō Heiau

According to legend, six *heiau* on the island of O‘ahu were built by the *menehune*, but only one, Kūka‘ō‘ō Heiau, was built for their own use (Luomala 1951:20). The *menehune* were said to have built a fort and a temple at Kūka‘ō‘ō, a place above (inland of) the hill called Pu‘u Pueo (Westervelt 1963a:131). They were driven away from their fort by the high chief Kūali‘i during his reign (sometime in the 1700s). Kūali‘i rebuilt it after his seizure of the fort.

In 1892, Thrum described this still-standing *heiau* of Kūka‘ō‘ō on the hill called ‘Ulumalu:

> A few hundred feet from the house, on a vast rock pile, still stands a walled enclosure known as the heiau of Kukaoo, now overgrown with lantana and night blooming cereus. This old heathen temple dates back many hundred years. Its erection is credited to the Menehune’s—or class of pigmies—but was rebuilt during the reign of Kualii [circa A.D. 1700s], who wrested it from them after a hard fought battle. The Menehune‘s fort was on the rock hill, Ulumalu, on the opposite side of the road, just above Kukaoo. Previous to the battle, they had control of all upper Manoa. (Thrum 1892:112)

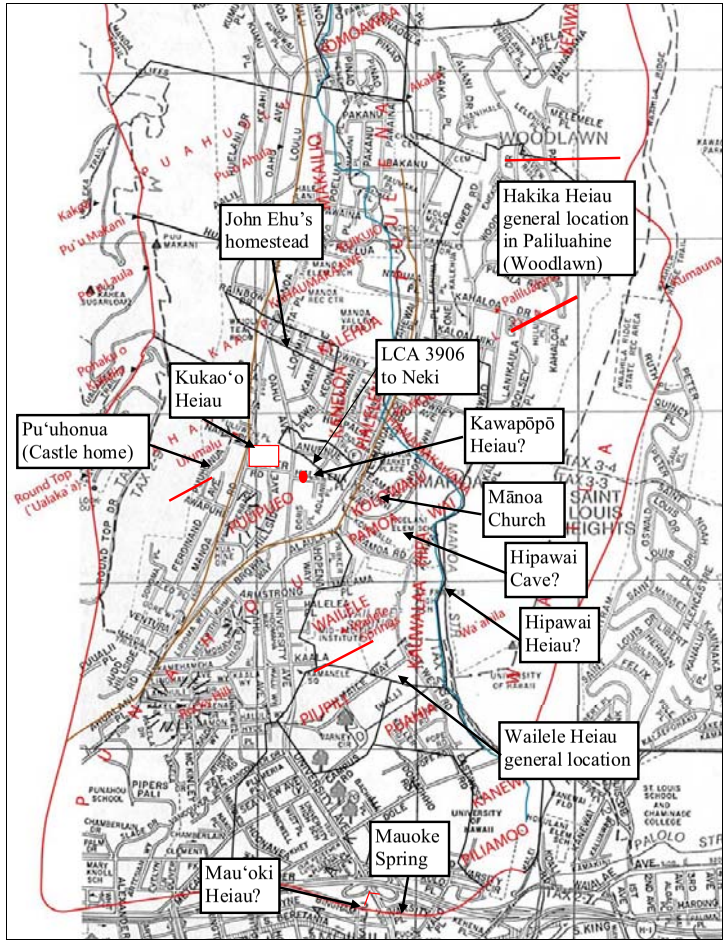

Figure 37. Overlay of 1822 E.D. Baldwin map of Mānoa Valley on modern street map, showing possible *heiau* locations

McAllister located Kūka‘ō‘ō Heiau during his inventory of O‘ahu in the early 1930s. He described it as a “small heiau 50 by 40 feet,” built on a natural elevation about 30 feet high. “There remain[s] a small inclosure and two terraces to the west” (McAllister 1933:79). He located the *heiau* on the premises of the residence of C. M. Cooke, Jr.

This *heiau,* which is still standing and located at 2859 Mānoa Road, has been recorded during several subsequent archaeological surveys (Kennedy 1991; Cleghorn and Anderson 1992; Tomonari-Tuggle 1998a). Various portions of the *heiau* have been recorded in TMK 1-2-019: 035, 036, and 043, in a large area between Mānoa and O‘ahu Roads and *mauka* of Cooper Road. In addition, a burial has also been recorded from 2859 Mānoa Road (Jourdane 1994).

Although there is no confusion over the present-day location of the *heiau*, there is some disagreement regarding the number of structures, the name of the surrounding area, and the name of the hill on which the *heiau* and/or fort was built. In Thrum’s 1892 account of Mānoa Valley, he described Mānoa Road as if he was traveling from the *makai* boundary to the upper valley. He states that Kūka‘ō‘ō Heiau was built on a rock pile, and the *menehune* fort was built “on the opposite side of the road on the rock hill, Ulumalu, just above Kukaoo.” This suggests there were actually two structures on ‘Ulumalu hill: a *heiau* on the east side of Mānoa Road and a *menehune* fort on the west side of Mānoa Road.

In the legend of Pueo Ali‘i, the king of the owls, Westervelt states that Pueo Ali‘i “was thought to be a chief leading his army along the hillside below Pu‘uhonua Temple.” In a footnote on the same page of his book, he states “This place is now the site of the Castle home” (Westervelt 1963a:131). William and George Castle built a large mansion in Mānoa in 1898 for their ailing mother Mary Tenney Castle, the widow of Samuel Northup Castle, one of the group of the eighth missionary party to Hawai‘i. They called the house Pu‘uhonua, which means “place of refuge.” It was built in a land area called Kaulumalu (Ka ‘Ulumalu) on a hill called ‘Ulumalu, at the place that would later be the end of Ferdinand Street. George Castle remembered that near the house was a “sacrificial stone and some ruins of the *heiau* to Kū‘ula and above on the hillside the Pōhaku Kū‘ula, a rock on which the watchman stood to command a view of the entire valley from mountain to sea” (Bouslog et al. 1994:88).

A hill labeled “Ulumalu” was plotted on the 1882 Baldwin map of Mānoa Valley on the west side of Mānoa Road. This map also shows that the hill was part of Grant 4166 to Mrs. Mary Castle. A *pōhaku* called Pōhaku o Kūkalia is also plotted on the 1882 Baldwin map of Mānoa Valley (see Figure 8) just *mauka* (northwest) of the hill labeled ‘Ulumalu. This may be the “sacrificial stone” that George Castle called Pōhaku Kū‘ula. The question remains if there was a fort also on ‘Ulumalu hill, or if the *heiau* ruins Castle is referring to is actually Kūka‘ō‘ō Heiau, on the east side of Mānoa Road. As mentioned previously, Westervelt refers to a structure called Pu‘uhonua Temple at the Castle residence. However, the presence of such a “temple” at the Castle residence would be inconsistent with George Castle’s reminiscences, since he refers to a sacrificial *heiau* dedicated to the war god Kū, not a *heiau* dedicated to “refuge.”

Joseph Kennedy (1991) concluded that there was only one structure, that acted as both a *heiau* and fort, and that it was located on the east side of Mānoa Road (location of Kūka‘ō‘ō Heiau). He believed that the surrounding area was called Kūka‘ō‘ō and the hill that the *heiau* was built on was called ‘Ulumalu (east side of Mānoa Road). The resolution to at least some of this

confusion may have been addressed in a 1982 article on the Castle home. In this article, the author states that the location for the house was chosen in 1898 on the western side of the valley.

> This is the *alii* (or noble’s) side of Manoa, rich in legend and folklore, known to Hawaiians as Kaulumalu (Breadfruit shade). . . . One of the Castle sons, George (1851-1932) recalled “there being a beautiful grove of breadfruit and ohia trees where native birds congregated in great numbers.” The man who planted the grove was very old and I was a boy. Sand [volcanic cinders] came down . . . and choked the trees. . . .
>
> Another son, William (1849-1935), gave the name Puuhonua to the property. *Pu‘u*—hill or protuberance, and *honua*—of earth, but also meaning a place set apart for refuge and safety. . . .
>
> The 8.16 acres had been purchased at auction on May 12, 1898, for $6,250. A government survey station on the site had already been given a name from the past, *Ulumalu*. (Robb and Vicars 1982:173-174)

These passages suggest that the specific association of the place name ‘Ulumalu with the hill on which the Castle home (west of Mānoa Road) was built may only date from the late nineteenth century; therefore, a hill on the east side of Mānoa road may well be the original (older) Pu‘u ‘Ulumalu. It seems to have been a mistake for Westervelt to call the Castle home “Pu‘uhonua Temple” or to associate it with Kūka‘ō‘ō Heiau, which was a sacrificial *heiau* dedicated to the war god Kū, and not a “place of refuge.” The name Pu‘uhonua was probably given to the house to represent that the place was a refuge for the Castle family (Stokes 1941:2). McAllister (1933:79) also showed some skepticism to the Westervelt reference for Pu‘uhonua Temple stating, “I doubt that this was a heiau.”

The *heiau* is also mentioned in Land Commission records as “LCA 3906 to K. Neki, *Heiau* of Kukao‘o, fence; house in” (see Table 1). On the 1882 Baldwin map, there is a property labeled “Gr. 638 Haalilio, see LCA 3906 W Neki.” Land Commission documents reveal the following information regarding this award:

> No. 3906, Neki, Honolulu, January 17, 1848
>
> N.R. 187-188v4
>
> To the Land Commissioners, Greetings and thanks: I, Neki hereby state my claims /at/ the land fence, mauka in Manoa, at the heiau of Kukaoo on the side below the heiau.
>
> These two fences of which I tell you were from my makuas - they expended a great deal of revenue in making these fences, and I also did, and they are mine at this time - no one else has a right to them. That is my explanation to you.
>
> I am, with thanks.
>
> NEKI

> To the Land Commissioners - House lot, also. Greetings to you and thanks: I, Neki, hereby state my claim for a house lot which is mauka in Manoa in the Land of Kaloiiki. I have two house lots at this time. That is my explanation to you.
>
> Aloha,
>
> NEKI
>
> N.T. 378v10
>
> No. 3906, Neki (from page 306), 1 September 1854
>
> Maki, sworn, I have seen his claim in Kaloiiki in Manoa of two lots with enclosures and in one piece.
>
> Mauka, Mahune’s land
> Waialae, Kaahaloa, Kalanikahua’s land
> Makai, T. Tute’s land
> Ewa, Mr. Marshall’s land.
>
> This land was given to Neki by J. Haalilio when Kaahumanu was yet alive before 1832. No objections.
>
> Kahanaumaikai, sworn, I have seen this place since 1842 to the present time. I have done farming under Neki and that place is for Neki. Mahi's statements above are true.
>
> Kana, sworn, I have known in the same way as they have stated since 1845 to the present time.
>
> [Award 3906; R.P. 6502; Kolowalu Manoa Kona; 1 ap.; 7.25 Acs]

On the overlay map (see Figure 37), this LCA seems to be in the general location over Anuenue Street rather than between Mānoa and O‘ahu Roads (where Kūka‘ō‘ō Heiau is standing). From the description, Neki says that his lot is “on the side below the heiau,” so it is possible that the *heiau* was not in this actual lot; rather the lot was *makai* of the *heiau*.

5.1.2 Kawapōpō Heiau

> Upper Manoa, on premises formerly of Haalilio; a small *heiau* said to have been torn down prior to 1850 (Thrum 1907a:45].

McAllister (1933:80) could not relocate this *heiau*.

In 1975, Margaret Luscomb (1975) conducted an inspection of the Maretzki property on 2626 Anuenue Street. This property was a portion of Grant 638 to Hana Haalilio and K. Neki (LCA 3906), Royal Patent 6502, signed by Lunalilo. The Native Testimony for this award was presented above in the discussion of Kūka‘ō‘ō Heiau. Luscomb recorded a raised platform, 7 by 6.5 m on the property. Since this structure was on Ha‘alilio’s land, Luscomb concluded that this platform might be Kawapōpō Heiau. In the description of his land, Neki says it was below Kūka‘ō‘ō Heiau; there is no mention of the name Kawapōpō or of a second *heiau*.

One problem with assigning this structure as Kawapōpō Heiau is that Ha‘alilio was granted other lands in Mānoa, before the *Māhele*, and the location given by Thrum may refer to these other lands. Thrum described the location of some of these lands as *mauka* of John Ehu’s homestead:

> The site of the various houses that once sheltered Haalilio and his retinue is pointed out just above the old Ehu homestead, known later as the ‘Charley Long’ premises and, till very recently, part and parcel of Montana’s Kaipu Diary. Rev. H. Bingham, of early Hawaiian Mission fame, is also referred to by old timers as having had a residence adjoining the Haalilio premises, though his history makes no mention thereof. (Thrum 1892:114)

On the 1882 Baldwin map, two properties (Grants 15 and 54) are shown in the *‘ili* of Ka‘aipu awarded to John Ehu (see Figure 37). If Thrum is referring to land owned by Ha‘alilio that is above John Ehu’s homestead, Kawapōpō Heiau may have been located much farther *mauka* of the structure recorded by Luscomb in LCA 3906 to Neki. This would suggest that the structure recorded by Luscomb may be part of Kūka‘ō‘ō Heiau instead. Because of Thrum’s imprecise location and the fact that McAllister could not relocate Kawapōpō Heiau, it is impossible at this time to determine whether Luscomb correctly identified the structure on the Metzinger property as Kawapōpō Heiau.

5.1.3 Hakika Heiau

> Paliluahine, east side of valley.-A round heiau of not large size. Foundations now barely traceable. (Thrum 1907a:45)

McAllister (1933:80) could not relocate this *heiau*, but according to Thrum’s description, it was on the east side of the valley, in the area called Paliluahine (near the modern-day suburb of Woodlawn). On the 1882 Baldwin map (see Figure 37), there is a peak labeled Paliluahine; therefore, the *heiau* was probably in this general location, but the specific location is not known.

5.1.4 Hipawai Heiau

Thrum described Hipawai Heiau as:

> Makai of Church, Manoa.-Of large size and pookanaka class, partly destroyed many years ago, then used as a place of burial. Remaining walls subsequently torn down. (Thrum 1907a:45)

This *heiau* was possibly described in 1823 by Levi Chamberlain, when he and other missionaries came to inspect a lot of three acres given to them by the Hawaiian government. The official report of the Sandwich Island Mission described the structure as:

> On one side of this secluded valley they visited an old *heiau* or place of worship of Kamehameha‘s time, consisting now simply of a stone wall enclosing a small area about 20 feet square. (cited in Bouslog et al. 1994:12)

In his own journal for June 6th, 1823, Levi Chamberlain described in more detail “the ruins of a moreai [heiau]” as:

> It was a regular wall built of loose stones about twenty four feet square from three to four feet high on the inside & from two and an [sic] half to three feet in thickness. On the north the outer side of the wall was much higher owing to a declivity at the foot of which were a few *kou* trees. The tall grass within and around was an evidence that it is a long time since it had been frequented for the purpose of superstitious ceremonies. It is probably fifty years since it was erected. (cited in Bouslog et al. 1994:11-12)

The Mānoa Church was built in 1846 as an ‘*āpana* (branch) of the Kawaihao‘o Church. A newspaper article says that Hipawai Heiau was torn down in 1819 and some of the stones were used to build the rock foundation of the Mānoa Congregational Church, a building which replaced the Mānoa Church in 1935. Some stones may also have been used in the Mānoa Hawaiian Cemetery. A new church was built in 1968 on nearby Huapala Street, and the old building, on 2833 E. Mānoa Road, was used to house the Mānoa Valley Theater (Williams 1980:1).

Hipawai is also the name of a cave.

> There is a large underground cavern with much of the water of Manoa passing through it under the area of Woodlawn Drive where the new (1975) astronomy building of the University is. People went down into the cavern in former times. (Mary Pukui, cited in Sterling and Summers 1978:287)

The former location of the 1846 Mānoa Church is plotted on the 1882 Baldwin map (see Figure 37). The present day location of the astronomy building of the University of Hawai‘i, and thus the possible location of Hipawai Cave, is shown on the base map of the same figure.

Hipawai Heiau was reported as *makai* of Mānoa Church. In 1968, Francis Ching recorded a rock mound, two to three feet high, 30-40 feet long, and 18 feet wide, with some remaining facing on the *makai* side. A platform was also present on the *makai* side. This *heiau* was located on the Magoon property on land donated to the University of Hawai‘i. Ching identified this structure as a possible *heiau*, but did not suggest a name for the structure. Ching also stated “I was also told that there was another site similar to the one discovered a little further makai” (Ching 1968:1).

In 1988, a field check was conducted at the St. Francis High School campus (TMK 1-2-9-04:01), which is *makai* and adjacent to the northeastern corner of the campus (Kawachi 1988a). Carol Kawachi recorded several walls and terraces in this area, but the place was heavily vegetated. An inventory of the features was not made, and no map was drawn. Kawachi also reported on a 1908-1909 military map that showed a *heiau* in the general area. She then suggested that this *heiau* could be the same as the one recorded by Ching on the Magoon property, but since Ching did not give the TMK of the parcel he investigated, it was difficult to determine the exact location of this structure. According to a Land Court Map of 1926, Magoon once owned property in several locations, including upstream of the St. Francis campus.

The exact 1908-1909 military map referred to by Kawachi could not be determined, but a 1908-1913 Corps of Engineers map (Figure 38) does show an L-shaped structure *mauka* and upstream of the St. Francis campus. This map was made before the construction of the high

school, which was founded in 1924 by the Franciscan Sisters of the Third Order. Although this structure is not labeled as a *heiau*, it may be the structure recorded by Ching, and may be Hipawai Heiau. A further confirmation of this attribution can be found on the 1822 Baldwin map (see Figure 37); the area where this L-shaped structure would be on this map (*mauka* of St. Francis High School) is in the *‘ili* named Hipawai (*lit.* water foolishness). In fact, the street just *mauka* of the high school is called Hipawai Place, which was “named for an O‘ahu land section” (Budnick 1989:43).

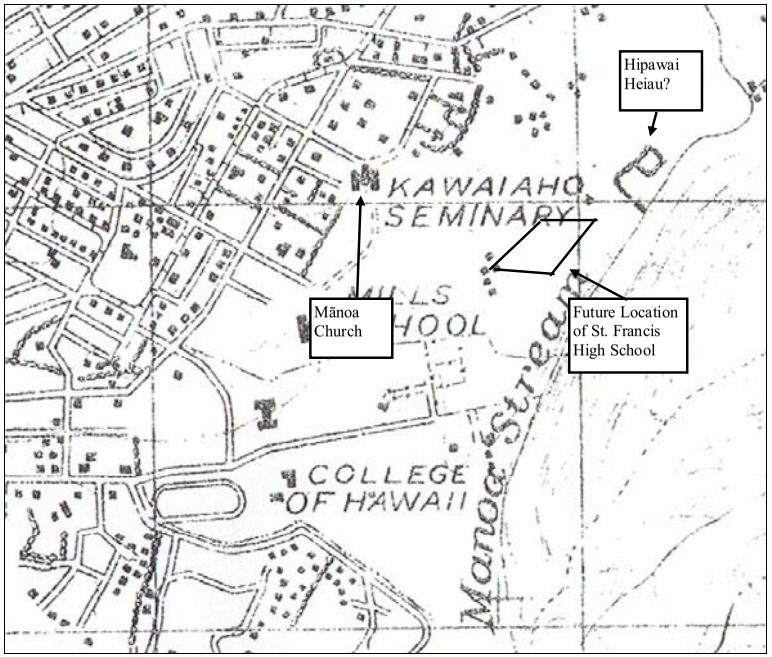

Figure 38. 1908-1913 Corps of Engineers Fire Control map, showing L-shaped structure, possibly Hipawai Heiau, on land later *mauka* of the St. Francis High School Campus

5.1.5 Mau‘oki Heiau (Kamō‘ili‘ili Heiau)

Mau‘oki was a *heiau* of the *po‘okanaka* type (large *heiau* for the paramount chief of the district or island), as discussed by Samuel Kamakau:

> There were many heiaus and *luakini* heiaus in Honolulu in the ancient days. . . . Of *heiau po‘okanaka* there were Pakaka and Kaheiki in Honolulu, and Mau‘oki, Kupalaha and Le‘ahi [Papa‘ena‘ena] at Waikiki. Mau‘oki was a *luakini heiau* built by the Menehune, a numerous race of men often spoken of in the traditions of *ka po‘e kahiko*. Kahanoniualewa [Kahano-a-Newa] is said to have brought them here; his arms were the bridge. Mau‘oki was made of stone from Kawiwi in Wai‘anae, and there were so many Menehene that each brought one stone, and Mau‘oki was completed. *Ka po‘e kahiko* called these people Menehene; it is said the came from the east. (Kamakau, *Ka Nūpepa Kū‘oko‘a* March 3, 1870; translation in Kamakau 1991c:144)

The association of the *heiau* with the high chiefs in O‘ahu is illustrated in the story of the birth of Kiha-a Pi‘ilani. Lā‘ie-lohehoe was an *ali‘i* born at Helumoa and raised at Kaluaokau in Waikīkī. She was betrothed to Pi‘ilani, the son of the *mō‘ī* (island-wide chief) of Maui and moved to his Pi‘ilani’s father’s residence at Lāhainā in Maui for her wedding. They had four children; for the birth of her fourth child, a son, she returned to O‘ahu. Samuel Kamakau reported that Kiha-a-Pi‘ilani, the son of Lā‘ie-lohehoe and Pi‘ilani of Maui, was taken to Mau‘oki Heiau after his birth at ‘Āpuakēhau in Waikīkī.

> No Kihapiilani. Ua laweia oai e ke kahuna e hanai i ka moku. O Mauoki hoi ka heiau i ku i ka moku ma ka olelo a ke kahuna. Ua hanai ia oia a nui, a ua ao ia i ke koa me na oihana, kakaolelo, me ke akamai hoi i ka oihana hana. (Kamakau, Ka Nūpepa Kū‘oko‘a, August 26, 1865)

> Kiha-a-Pi‘ilani was taken by the *kahuna* and raised at the *heiau* of Mau‘oki at Kamō‘ili‘ili [Mō‘ili‘ili]. He was raised there until he was grown and taught to be a warrior and an orator; he was skilled in those professions. (Kamakau 1991c:50)

The *heiau* was described by Thrum (1907a:44) as:

> It is said to have been of traditional Menehune construction with stones brought one by one from Kawiwi, Waianae. It was a heiau of good size, walled on three sides and open to the west that stood at the foot of the slope dividing the Manoa and Palolo valleys, Kamoiliili.

Thrum also referred to this *heiau* as the Kamō‘ili‘ili Heiau.

> Kamoiliili. Heiau and luakini [sacrificial heiau]; erected according to tradition by Menehunes with stones from Kawiwi Waianae. Torn down about 1883 by the Minister of Interior for street work. (Thrum 1907a:44)

According to Thrum, the *heiau* was in Mō‘ili‘ili, at the border of the *ahupua’a* of Mānoa and Pālolo. According to C. S. Stewart (Sterling and Summers 1978:279), Mau‘oki Heiau was located possibly at the junction of Wai‘alae Avenue and Third Street, which would place the *heiau* just south of Chaminade University in the *ahupua‘a* of Pālolo. McAllister also located the *heiau* (Site 62) in Pālolo Ahupua‘a, just *mauka* of Site 61, the Mō‘ili‘ili petroglyphs.

Dr. Richard Bordner, who was familiar with the Chaminade University area, said he believed a large agricultural *heiau* was once just north of an area of petroglyphs along Pālolo Stream. This *heiau* was on a relatively flat area on the west edge of Pālolo Stream near where there is presently a 22-caliber rifle range. Dr. Bordner’s account of the relationship of these petroglyphs and a *heiau* are consistent with McAllister’s (1933:57) description of Mau‘oki Heiau (McAllister’s Site 62), which was just *mauka* or north of the Mō‘ili‘ili petroglyphs (McAllister’s Site 61). According to Dr. Bordner, until relatively recently, there were still some large boulders in the immediate vicinity that may be remnants of this *heiau* (Hammatt et al. 2002:23). A search for this *heiau* was made during the recent Ala Wai Watershed survey, but no *heiau* or cluster of boulders was found. In a recent conversation with Dr. Bordner, he stated that he believed that the remains of the *heiau*, and the petroglyphs, have been destroyed.

All of these reports have placed Mau‘oki Heiau within the current boundaries of Pālolo Ahupua‘a, near Chaminade University. McAllister (1933) located the *heiau* just north of the petroglyphs, which seem to be definitely near Pālolo Stream; however, McAllister never personally saw the *heiau,* since it had been destroyed in 1883.

On an 1883 survey map (Figure 39) by S. E. Bishop (traced by E. Kealoha in 1958), a structure labeled “heiau” is shown near a feature labeled “Mauoke Spring,” both of which are *mauka* of “Moiliili Road” and King Street (along the present day alignment of Wai‘alae Avenue) in the *‘ili* of Pa‘akea. In a comparison of this map with the 1882 S.E. Bishop map of Mānoa Valley (see Figure 8), this location is south of the *‘ili* of Pilipili and west of the *‘ili* of Kānewai (the present day athletic field for the University of Hawai‘i at Mānoa). If the pictured *heiau* is Mau‘oki Heiau (as suggested by its proximity to “Mauoke Spring”), then Mau‘oki Heiau was actually once located much farther west than Chaminade University, near the *makai* border of Mānoa Ahupua‘a (south of the University of Hawai‘i) rather than near the *makai* border of Pālolo Ahupua‘a (south of Chaminade University).

This location seems to be near the Mō‘ili‘ili Quarry, but the correlation of the 1882 map and the modern map is probably not exact. This also means that the agricultural *heiau* noted by Dr. Bordner near the Mō‘ili‘ili petroglyphs may be a different *heiau* than the *luakini* (sacrificial) *heiau* of Mau‘oki. It is also possible that Mauoke spring was another name for Kumulae Spring, an ancient legendary pool that is associated with the extensive karst caves of Mō‘ili‘ili.

5.2 Early Archaeological Surveys of Mānoa Valley

In J. Gilbert McAllister’s island wide archaeological survey (1933), he recorded five sites in the vicinity of Mānoa including Site 61 petroglyphs, Mō‘ili‘ili, Site 62 Mau‘oki Heiau, Site 63 Hipawai Heiau, Site 64 Kūka‘ō‘ō Heiau, and Site 65, which seems to refer to the whole valley (Figure 40).

Under McAllister’s Site 65, “Mānoa Valley,” he discusses “Pu‘uhonua Heiau,” the sweet potato fields of Pu‘u Ualaka‘a, Thrum’s sacred stone, a cave on the east side of Mānoa Valley, which Westervelt (1904:2) associates with Kamehameha the Great, and the Kawapōpō and Hakika Heiau. Little new information is presented regarding the other sites.

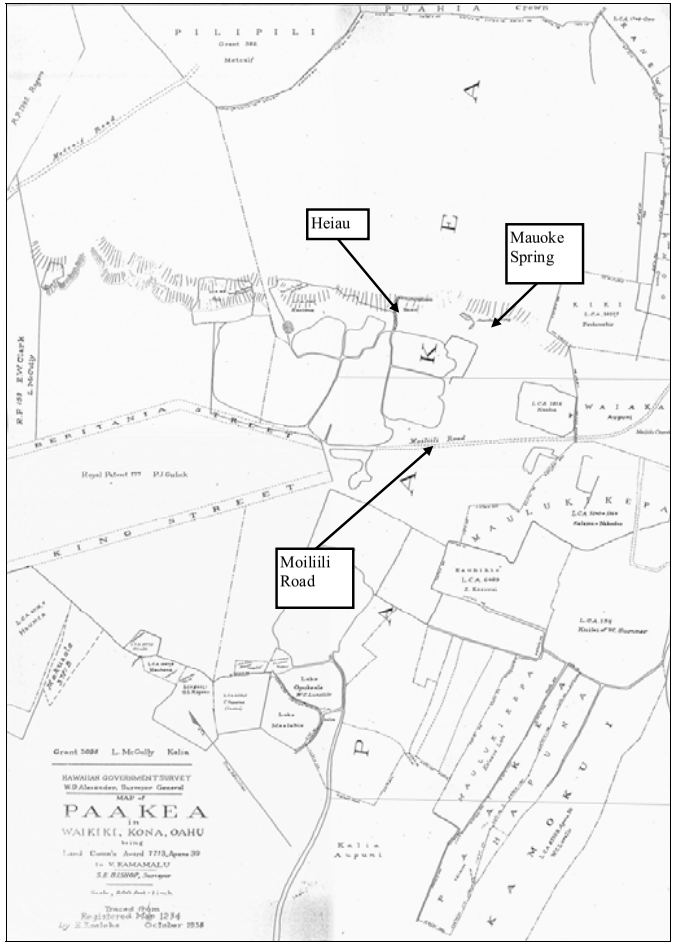

Figure 39. 1883 S.E. Bishop map of Pa'akea, showing location of a *heiau* near Mauoke Spring

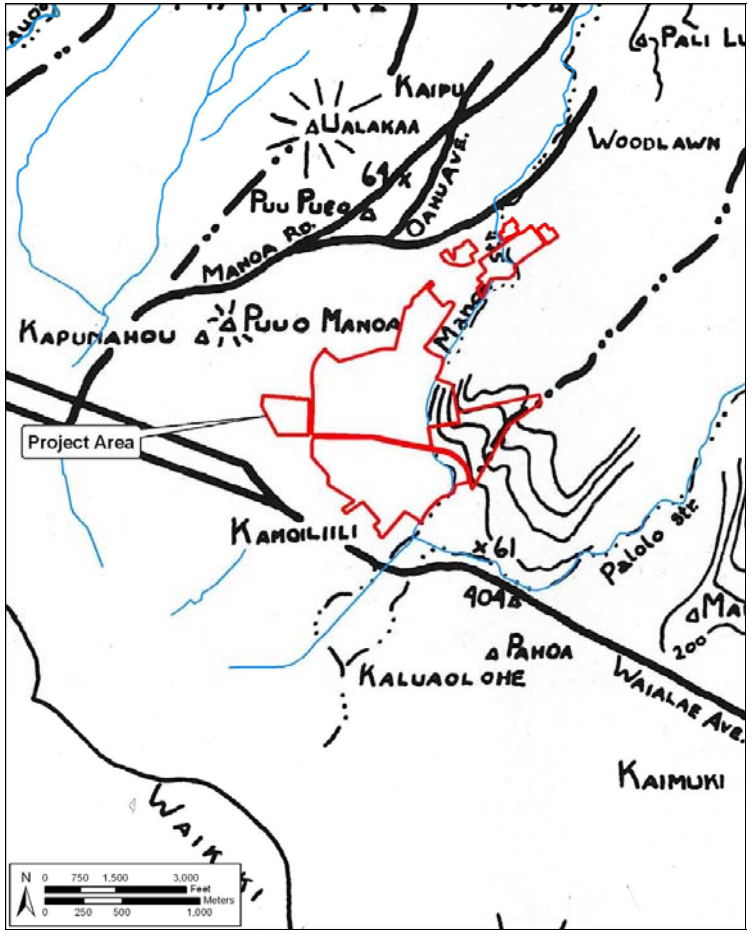

Figure 40. Project area (in red) in relationship to archaeological sites identified in Sites of O'ahu (Sterling and Summers 1978)

Until 1900, Punahou School had a small collection of Hawaiian artifacts in a glass cabinet in the Old School Hall. Some of these artifacts are shown in a circa 1900 photograph (Figure 41). In the foreground of the photograph is a carved wooden figure that may be the wooden figure found by Punahou students on Rocky Hill. Foster says this was found “on Rocky Hill” (Foster 1991:35) in one section and “in a cave on Rocky Hill, a vestige of the *heiau* that once stood in that area” (Foster 1991:128).

> Samuel Armstrong mentions exploring its caves for wooden idols and ghosts, and Thomas Gulick tells in detail how the boys, climbing the slope, once came upon a cavern between the cliffs and, by excavating, penetrated to a point where they required torches to see their way. There they discovered a little idol. It must have come from the small *heiau* that once stood on Rocky Hill. Probably it and a large wooden idol brought to Punahou from a taro patch at Waialua had both been hidden at the time the edict had gone forth to destroy all the idols. (Alexander and Dodge 1941:122)

Other early site designations in Mānoa included the Bishop Museum’s designation of the former home of Queen Ka‘ahumanu, “Pukaomaomao,” in upper Mānoa as Site 405 and the designation of a complex of agricultural terraces in extreme northern Mānoa Valley (State Site #50-80-14-3953).



Figure 41. Circa 1900 photograph of artifacts displayed at Punahou College including the wooden idol (left foreground) possibly found in a cavern in Rocky Hill

5.3 Post 1960 Surveys of Mānoa Valley

Between 1963 and 1990 there were at least thirteen other archaeological studies in the Mānoa area, which are summarized in Table 2 and plotted in Figures 42 and 43. Of particular interest is the recovery of a total of 25 presumed prehistoric burials from six other areas (Sites 3743, 4038, 4134, 4191, 4266 and the Koana Cave Site). The oldest report of burials in the Mānoa area of which we are aware concerns the discovery of human bones in a cave site located approximately 50 m *mauka* of the Dole Street burial site (4266). This cave is almost certainly the “cave called Koana” on a 1916 Podmore map (Figure 44). A neighboring resident informed us that she had taken human skeletal remains discovered in the cave to the B.P. Bishop Museum (she thought it was in 1953), and that subsequently archaeologists from the Museum had visited the cave and indicated that they felt the site had little potential. The Bishop Museum has no record of such a visit; however, they have an accession of an adult female crania (osteological catalogue #2863) dated 7/10/1964 from St. Louis Heights, O‘ahu giving a person with the same last name (different first initial) as the source. Typically a Museum archaeologist would have investigated such a discovery. A habitation or burial function of the cave is suggested by one possible translation of *ko‘ana* – “to stay or settle in one place, as people” (Pukui and Elbert 1986:157).

The five burial sites (3743, 4038, 4134, 4191 and 4266) were all interpreted as “prehistoric or early historic” (Bath and Smith 1988; Bath and Kawachi 1989; Bath and Kawachi 1990; Hammatt and Shidleler 1991; Smith and Kawachi 1989). With one exception (the Dole Street burials), there were no associated cultural materials with any of these remains, nor was there any chronological dating. The Dole Street burials were associated with three formal artifacts of traditional design and with cultural layers dated to the fifteenth century A.D. (Hammatt and Shideler 1991).

Three of the archaeological studies bear upon *heiau* at Mānoa. Luscomb (1975) may have correctly dentified the remains of Kawapōpō Heiau. Ching (1968) and Kawachi (1988a) both discuss possible identifications of a *heiau* on what appears to be two different properties located on the west side of Mānoa Stream just north of University of Hawai‘i at Mānoa. It seems highly probable that Hipawai Heiau, where human sacrifices were offered, was in the immediate vicinity of these two study areas, but whether either report indeed describes remains of this temple is not altogether clear. There appears to have been no discussion of the other two known Mānoa Heiau: Kūka‘ō‘ō Heiau (2859 Mānoa Rd.) and Hakika Heiau (near Paliluahine-Chinese Cemetery hill) since McAllister (1933). Other archaeological reports discuss minor agricultural sites or report no sites at all.

Archaeological data recovery was conducted at the Kāpapa Lo‘i ‘o Kānewai (a.k.a. Kānewai Cultural Garden) in association with construction of the University of Hawai‘i Center for Hawaiian Studies building (Liston and Burtchard 1996). The project area was located adjacent to the east bank of Mānoa Stream, immediately *makai* of the Dole St. bridge. The Kāpapa Lo‘i ‘o Kānewai, designated Site 50-80-14-4498, consisted of a 1.7-acre parcel including active cultivation of taro *lo‘i* and native Hawaiian plants. The area had been restored in the early 1980s by a group including community members, University students, and alumni. It was also noted by the Hawaiian Botanical Society that the garden was home to 69 varieties of taro, including 60

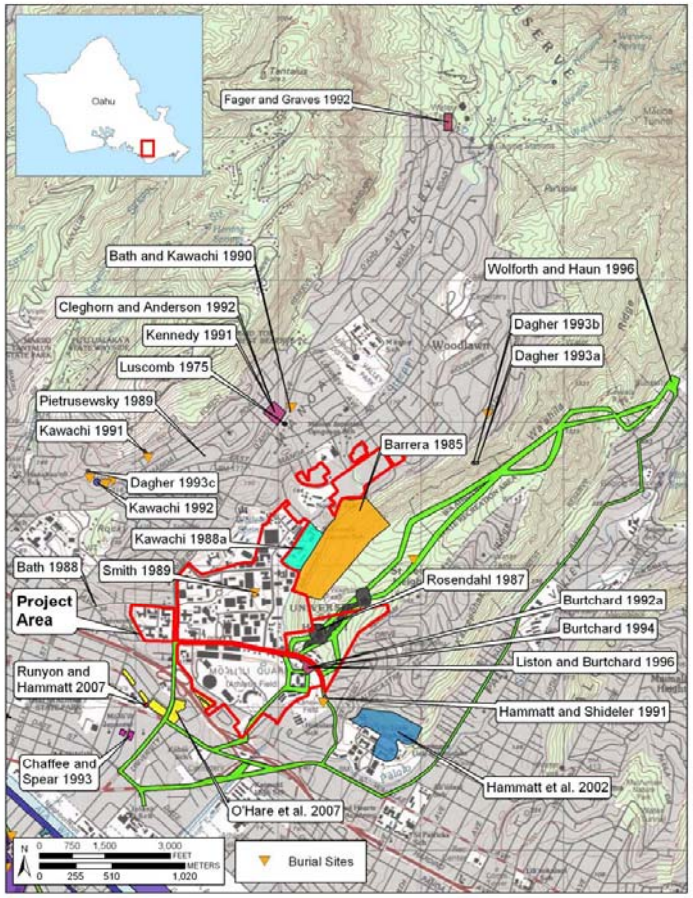

Figure 42. Previous archaeological studies in the vicinity of the project area

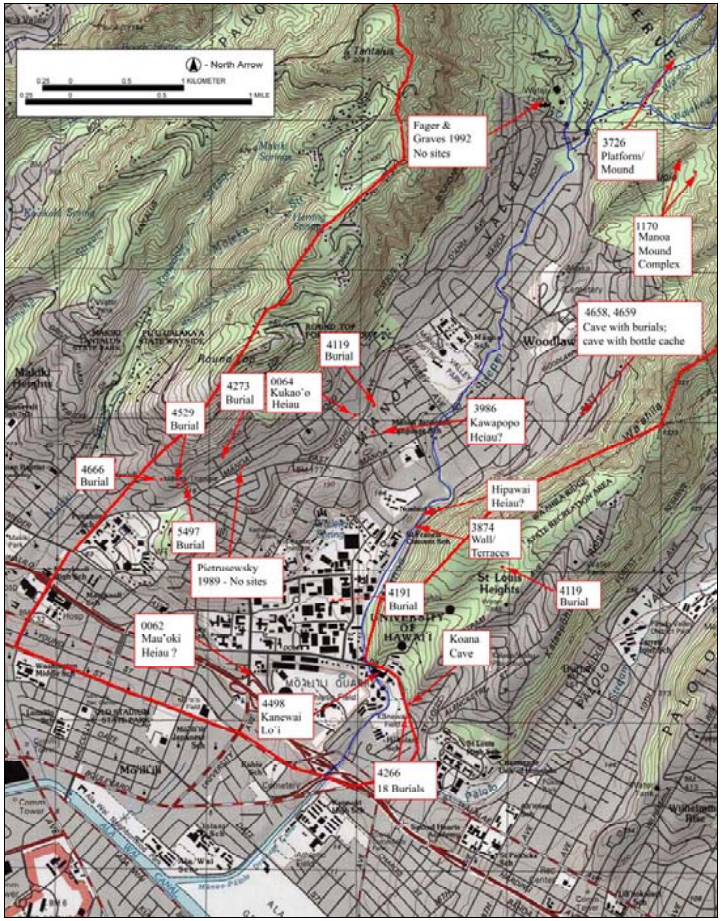

Figure 43. Previously identified archaeological sites in Mānoa Ahupua'a (project areas with no identified sites are denoted by author and year of report)

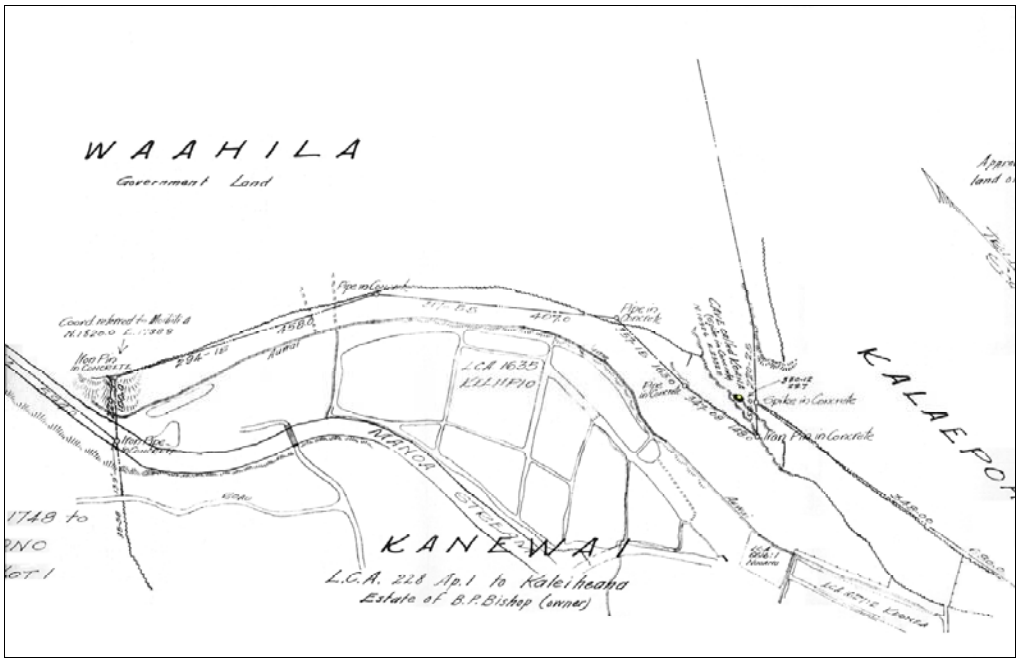

Figure 44. Podmore map (1916 or 1917) of the boundary between the *‘ili* of Waahila and Kanewai showing an *‘auwai* and a “cave called Koana.” The field sections in the center of the image represent the present-day Kānewai cultural garden

Table 2. Previous Archaeological Investigations in Mānoa Ahupua‘a

Reference	Type of Investigation	Site 50-80-14-	Findings
Thrum 1907a, b McAllister 1933	Heiau Study Island-wide Study	0063	Briefly describes Hipawai Heiau, reportedly destroyed at the time Reprints Thrum’s description
Thrum 1907a,b McAllister 1933 Kennedy 1991 Cleghorn & Anderson 1992 Jourdane 1994 Tomonari-Tuggle 1998a	Heiau Study Island-wide Survey Arch. Investigation Inventory Survey Burial Report Historical Research	0064	Thrum briefly describes Kūka‘ō‘ō Heiau (rebuilt around 1700) McAllister repeats Thrum’s description and adds new information Investigation of Kūka‘ō‘ō Heiau Inventory Survey of Kūka‘ō‘ō Heiau and Preservation Plan Inadvertent discovery of human skeletal remains at 2859 Mānoa Rd Historical background pertaining to Kūka‘ō‘ō Heiau
McAllister 1933	Island-wide Survey	0065	Designates Mānoa Valley as Site 65.
Smith 1988a	Site Description	1170	Description of previously identified Mānoa mound complex site
Smith 1988b	Site Description, Reconnaissance	3726	Inspection of Pu‘u Pia trail alignment. Description of a new site with a platform and mound.
Bath & Smith 1988	Burial Removal	3743	Burial removal from 2034 Round Top Drive
Ching 1968 Kawachi 1988b	Reconnaissance Survey Field Check	3874	Survey of sites on the Magoon Property given to the Univ. of Hawai‘i. Site (3874) probably located near St. Francis High School grounds; possibly a pre-contact agricultural *heiau*. Field check of walls and terrace facings; St. Francis High School grounds may be location of a *heiau* shown on 1909/10 military map
Soehren 1963	Field Notes	3953	Notes in B.P.B.M. files on agricultural terraces
Thrum 1907a, b Luscomb 1975	Heiau Study Inspection Report	3986	Kawapōpō Heiau Examination of site at 2626 ‘Ānuenue St., probably Kawapōpō Heiau
Bath 1988	Burial Removal	4038	Burial removal from 2030 Wilder Ave. at Circle K convenience store.
Bath & Kawachi 1990	Burial Report	4119	Inadvertent discovery of human skeletal remains on O‘ahu Avenue
Bath et al. 1988	Burial Removal	4134	Burial removal from 2030 A Makiki St. (site 50-80-14-4134)
Smith & Kawachi 1989 Douglas 1990	Burial Report	4191	Burial Removal Near Keller Hall on the campus
Hammatt and Shideler 1991	Burial Report	4266	18 human skeletal remains found on Dole Street, C14 dating, perhaps a village cemetery; includes osteological analysis.
Kawachi & Douglas	Burial Report	4273	Burial found at Lower Mānoa, 2414 Sonoma St; includes osteological analysis.

Reference	Type of Investigation	Site 50-80-14-	Findings
1991			
Burtchard 1992a	Data Recovery	4498	Letter to Tom Dye regarding test trenches at Kapapa *lo'i* Kānewai.
Burtchard 1992b	Testing		Letter report on trenching conducted to mitigate adverse effects of Hawaiian Studies Institute construction at Kapapa *lo'i* Kānewai
Burtchard 1994	Data Recovery		Paleoenvironmental samples, stratigraphic profiles at Mānoa stream.
Liston & Burtchard 1996	Site Description, Historic Literature		Prehistoric irrigation system that supported agriculture between A.D.1443-1681 at Kapapa *lo'i*, Kānewai
Tomonari-Tuggle 1998b	Historical Research, Arch. Assessment		Recommends subsurface testing or archaeological monitoring at Kānewai for the National Marine Fisheries Service Laboratory
Pietrusewsky 1992 Kawachi 1992	Burial Report	4529	Inadvertent discovery of human remains at 1908 Judd Hillside Road
Dagher 1993a	Burial Report	4658	Inadvertent discovery of cave containing multiple burials in Mānoa Valley.
Dagher 1993b	Site description	4659	Historic bottle cache found in Mānoa Valley Cave
Dagher 1993c	Burial Report	4666	Discovery of human skeletal remains at 2048B Ualaka'a Street
Jourdane 1997	Burial Report	5497	Inadvertent discovery of skeletal remains at Wo/Sullivan House construction, 1908 Judd-Hillside Road. Skeletal remains are of undetermined age and ethnicity
Bishop Museum (Bowen?) 1964	Field notes		Visited Koana cave in response to discovery of human remains. No report.
Barrera 1985	Survey and Testing		No sites reported in project area within the Mānoa Hillside Subdivision.
Rosendahl 1987	Reconnaissance Survey		No sites found at the Wa'ahila Reservoir Project Area.
Pietrusewsky 1989	Burial Report		Cremated dog and cat remains found at 2462 Mānoa Rd, no site number assigned to burial.
Fager & Graves 1992	Inventory Survey		No sites found at prospective well site project area
Jones et al. 1994	Archaeological Monitoring		Archaeological monitoring at the site of the UH School of Architecture. No sites.
Grune 1992	Archaeological Synthesis		Synthesis of sites in Mānoa Valley
Dixon 1993	Reconnaissance Report		Absence of cultural remains at proposed Board of Water Supply well within Mānoa Valley Park, recommended an archaeological monitor be present during construction.
Chaffee & Spear 1993	Archaeological Assessment		No sites located at 2 Vancouver Drive lots; Vacant lots, some evidence of 1900s house foundations and walkways on surface.
Hammatt & Chiogioji 1998	Archaeological Assessment		No sites found on a 2.4 Long portion of the H-1 Highway from the Punahou Street Overpass to Vineyard Blvd. Off-Ramp
McIntosh & Cleghorn 2007	Archaeological Monitoring		Archaeological monitoring near the site of the UH School of Architecture. No sites.

native Hawaiian cultivars (Fenstemacher 1989). Controversy arose when construction plans would have allowed encroachment into the garden area. Final plans limited disturbance to the recently restored southeastern portion of the garden area. The data recovery work was later conducted in a portion of the *lo'i* area that would be impacted by construction. Backhoe testing revealed evidence of a prehistoric irrigation system and pondfield agriculture. Radiocarbon dating of recovered samples indicated a period of prehistoric usage (A.D. 1443-1681), abandonment, and later reconstruction in the early historic period (Liston and Burtchard 1996).

5.4 Division of Mānoa Valley

Mānoa Valley was once divided into two sections, one for the *ali'i* and their retainers and one for the commoners. The *ali'i* lived on the high, cooler western slopes; the commoners lived on the warmer eastern slopes and on the valley floor where they tended their irrigated taro fields (Bouslog et al. 1994 12). Mary Kawena Pukui (in Sterling and Summer 1978:283) has stated:

> In Mānoa valley a low hill at the head of the valley and Rocky hill above Punahou are said by a kinswoman of mine to have marked the division between the chiefs and the commoners in that valley. The chiefs lived on the west half, the commoners on the east. The chief's excrement was buried secretly in the commoners' ground by the keepers...The imaginary line from Puu-o Mānoa to Ka-pali luahine marks the division of Mānoa; on the left called Mānoa-alii, and on the right, Mānoa-Kanaka.

Pu'u Mānoa is best known as Rocky Hill on the Punahou Campus. It seems that Kapaliluahine - the *mauka* reference point - is the small green hill in back of the Chinese cemetery (as illustrated by Sterling and Summers 1978).

Such a cognitive division of the valley suggests that the commoners - the vast majority of the populace - would have been buried on the east side of the valley. It also seems probable that the remains of the aristocracy would be buried on the east side as well, in as much as both corpses and excrement would have shared certain cultural values of dangerousness and defilement. It may well be that the division of the valley into Mānoa – Ali'i and Mānoa-Kanaka was drawn because the west side of the valley was generally higher and less swampy than the east side. It may have been drawn with regards to the experience of sunlight. The Mānoa Ali'i of the valley would have the experience of the rising morning sun which was associated with values of ascendancy, tumescence, vigor and fertility, while the decline of the sun which illuminates the Mānoa-Kanaka side would have been associated with values of decay, senescence, and death.

The four known sites of prehistoric burials in Mānoa proper (Bath and Smith 1988; Smith and Kawachi 1989; the Koana Cave site; and the Dole Street site) all fall in Mānoa-Kanaka, as defined by Pukui.

Perhaps significantly two prehistoric burials have been reported just to the west of Mānoa Valley (Bath and Smith 1988, Bath 1989), standing in relation to Makiki Valley much as the Kānewai burials relate to Mānoa Valley. This suggests a possible pattern of prehistoric burial practices that may have been widespread - interring the dead near the east border of south facing valley mouths.

Section 6 Results of Fieldwork

Fieldwork was conducted on May 14, 2008, by two CSH archaeologists, Chris Monahan, Ph.D. and Jon Tulchin, B.A., working under the overall guidance of Hallett H. Hammatt Ph.D. Specific methods and documentation details have been described in Section 2 (Methods). The scope of work called for a limited field inspection of the project area to identify any surface archaeological features; to investigate and assess the potential for impact to such sites; and to identify any sensitive areas that may require further investigation or mitigation prior to proposed development projects.

Field inspections were made of the following portions of the overall project area:

1. the Kānewai *lo‘i* (taro pondfields) and associated *‘auwai* system (collectively designated State Inventory of Historic Properties [SIHP] No. 50-80-14-4498);
2. Koana Cave, a possible habitation site, from which human remains were reportedly collected in the 1950s and accessioned by the Bishop Museum in the 1960s;
3. the posited location of Hipawai Heiau (designated SIHP No. 50-80-14-63) near the southern tip of TMK: (1) 2-9-023:001 (on the so-called “Mauka Campus”), and;
4. the Wa‘ahila Ridge area, located immediately east of Mānoa Stream in the lower Mānoa Valley.

6.1 Kānewai Lo‘i

CSH archaeologists and cultural specialists (working on the companion CIA for the subject project) visited the site with current Director of the Ka Papa Lo‘i o Kānewai, Mr. Makahiapo Cashman. We walked the entire site area, from above the *po‘owai* (the “head,” or *po‘o,* upstream end of the irrigation ditch that feeds the taro) to the *ho‘iwai* (the “return,” or *ho‘i,* downstream end of the main ditch) (Figures 45 through 47).

There appears to be some confusion regarding the historic significance of the Kānewai *lo‘i* (SIHP No. 50-80-14-4498), and its eligibility for the Hawai‘i Register of Historic Places (HRHP). Some sources suggest the site area is not historically significant, and therefore is not eligible for the HRHP, because the totality of the surface remains—including the *‘auwai* (irrigation ditch) system—have all been built or largely rebuilt since about 1980. Field inspection of the entire site area confirms these observations, and evidence of modern construction materials can be observed throughout all of the main components of the irrigation and pondfield complex.

However, prior subsurface testing (archaeological excavation), radiocarbon dating and pollen analysis by International Archaeological Research Institute, Inc. (cf. Liston and Burtchard 1996) demonstrate use of the area as a taro *lo‘i* from the middle 1400s, and perhaps earlier. Thus, as echoed by subsequent studies of this area from a historic preservation perspective (cf. Tomonari-Tuggle 1998), any proposed subsurface disturbances or major excavation at the Kānewai *lo‘i* should be preceded by additional archaeological testing (controlled excavation), or should be



Figure 45. Upstream end of the main *‘auwai* at Kānewai (facing downstream); red arrow indicates the approximate location of the *po‘owai* (“head” of the ditch)



Figure 46. Stone walkway between the main *‘auwai* (left) and the Mānoa Stream (right), facing downstream, approaching the Dole Street Bridge



Figure 47. Overview of the central portion of the Kānewai Cultural Garden

monitored by a qualified archaeologist to mitigate against any potentially adverse impacts to pre-Contact and / or early historic deposits that may still be present (see Section 7 below).

Clearly, given its proximity to the well-known (now in-filled) Kānewai Pūnāwai (Spring) and the probable pre-Contact cemetery area known as the "Dole Street burials" (SIHP No. 50-80-14-4266), and given its physiographic location at the important transitional zone between the upland valley / ridge system and the Waikīkī plain, the Kānewai Lo'i is a highly significant historic property, regardless of its loss of surface-feature integrity (Figures 48 and 49).

6.2 Koana Cave

As described in detail in Section 5.3 (above), human skeletal remains were reportedly collected from Koana Cave by a resident of St. Louis Heights in the 1950s, and turned over to the Bishop Museum, which accessioned these in the middle 1960s. No additional records of the Bishop's work at this cave have been located, although it appears that a site visit was conducted in the 1960s, at which time the cave was deemed to have relatively little excavation potential.

CSH archaeologists and cultural specialists visited Koana Cave, which is located in the extreme southeast corner of the UH property, a short distance upslope from Dole Street, immediately adjacent to residences of St. Louis Heights (Figures 50; see also Figures 48 and 49).

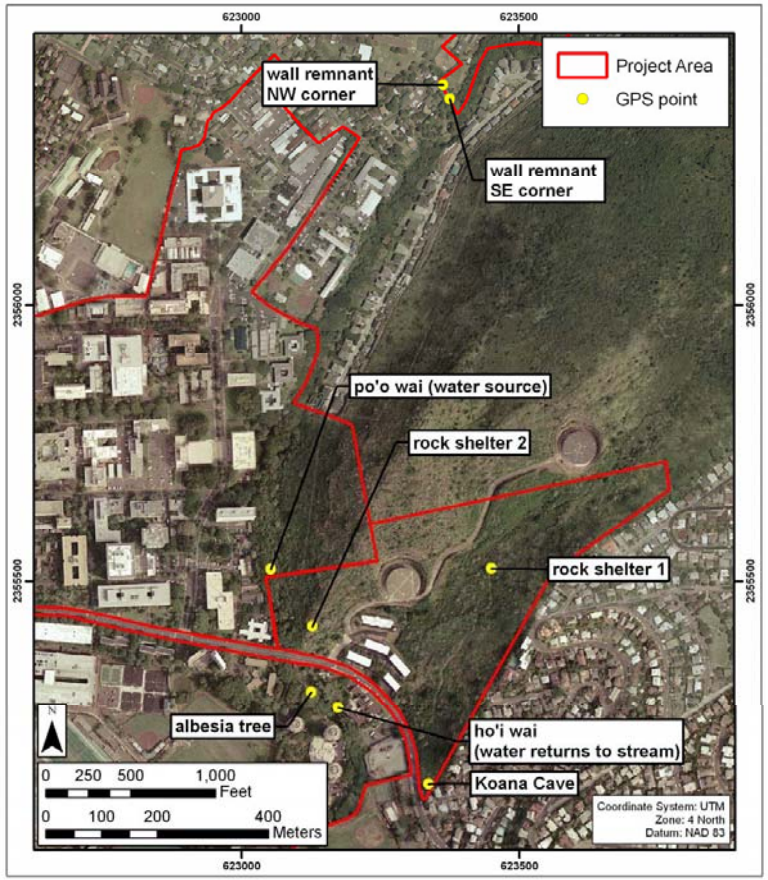

Figure 48. GPS locations of major sites and features described in the results section

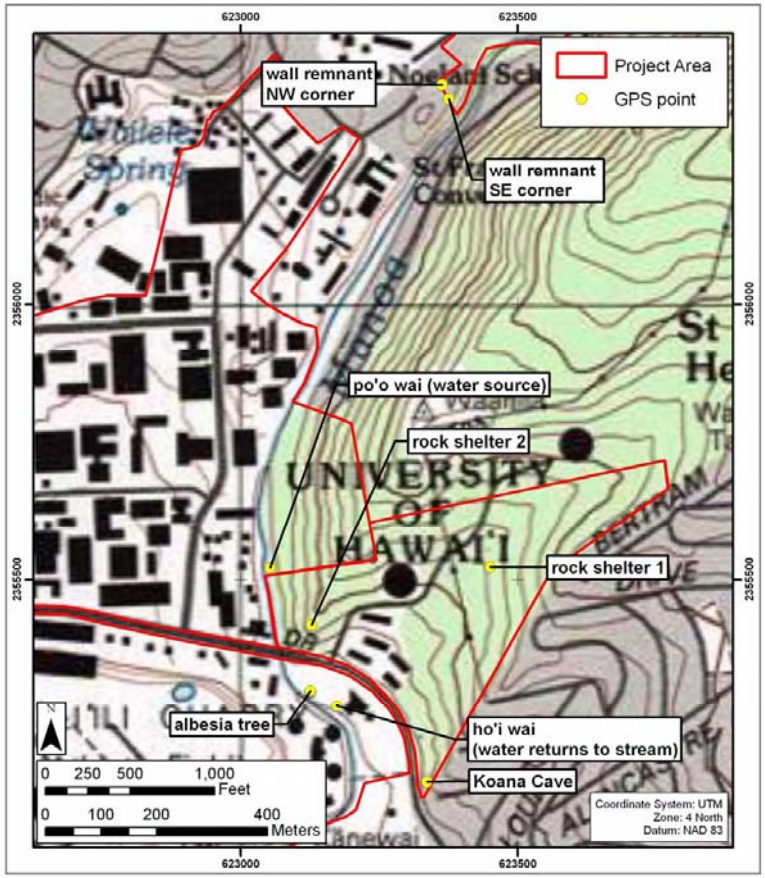

Figure 49. GPS locations of major sites and features described in the results section



Figure 50. Approximate location of Koana Cave indicated by red arrow, just above Dole Street

CSH staff carefully inspected the entire ground surface of the cave, which consists of one, relatively small main chamber; its maximum dimensions are approximately 5-6 feet in height at the south-facing opening (and diminishing considerably towards the back of the main chamber), approximately 12-15 feet across the main opening; and approximately 10-15 feet in depth from the opening to the back of the main chamber (Figure 51). No human skeletal remains were observed, nor were any minimally-identifiable or non-identifiable bones that might be deteriorated human skeletal remains observed. One cow (rib) bone and several *kukui* (candlenut, *Aleurites moluccana*) shells (some burned) were observed on the ground surface within the main chamber. No other historically-significant cultural materials were observed in the cave.

A relatively small terraced area is located outside of the main chamber, immediately south of the opening, and beyond the dripline of the overhang; this area of level soil, which measures approximately 12-15 feet in length (i.e., parallel with the slope contour lines) by 6-8 feet in width (i.e., perpendicular to the slope contour lines), has recently been used as a gardening site, with modern plastic drip-line tubing. It is likely that this area was at least partially modified (i.e., artificially enlarged and filled with soil) at some point in the past to take advantage of the natural rocky terrace. There is a relatively high probability of encountering historically-significant cultural deposits below the ground surface in this terrace area, especially nearer the dripline and just under the opening of the main chamber. Several small bones, including bird and fish, were observed on the ground surface in the terraced area. No other historically-significant cultural materials were observed on the terrace area.

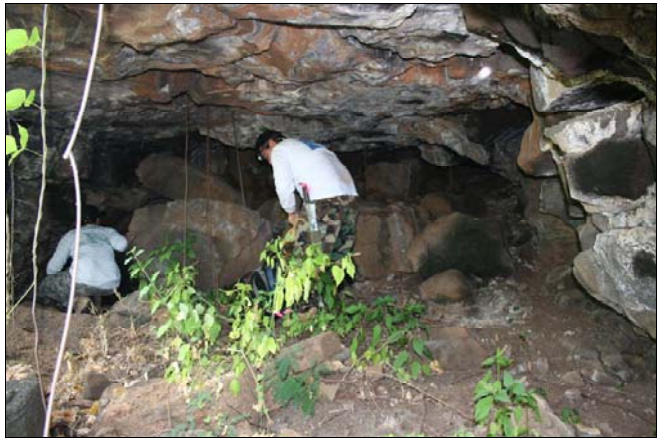

Figure 51. Main chamber of Koana Cave

6.3 Wa‘ahila Ridge

CSH archaeologists and cultural specialists conducted a pedestrian reconnaissance of the approximately 50-acre Wa‘ahila Ridge portion of the project area (Figure 52). Two specific areas with prominent rock exposures and overhangs, possibly representing rockshelters used in the past, were identified (see Figures 48 and 49). Both of these areas contain several possible rockshelters that might yield historically-significant cultural materials in subsurface deposits. Both areas also contain evidence of ongoing or recently-abandoned “homeless” shelters, tarps and tents that precluded more thorough inspection. For this reason, the two possible rockshelter areas should be considered representative and approximate descriptions of the available evidence on the ground. The area immediately west of the current Faculty Housing complex (Figure 53), for example, may extend some distance around the Wa‘ahila Ridge to the northwest; however, we were prevented from following it around due to the presence of people living in the area.

Other portions of the Wa‘ahila Ridge area include additional rock exposures and natural formations that may contain more possible rockshelters and / or petroglyphs, although high quality rock surfaces (typically required for petroglyphs) are rarely rare in the portions of the project area we visited.

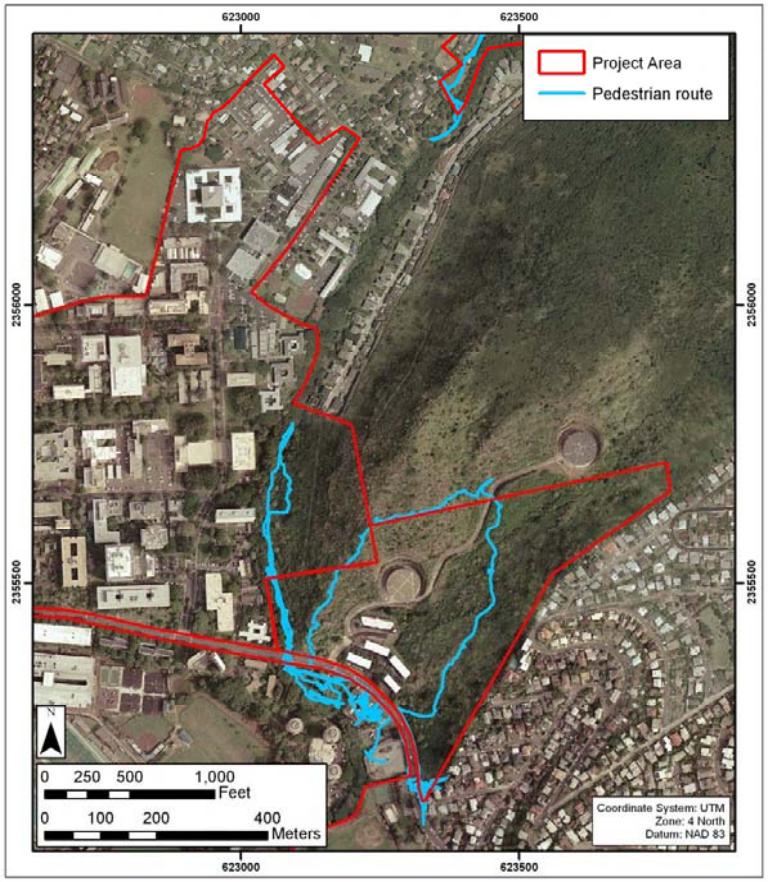

Figure 52. GPS tracking of pedestrian reconnaissance during the field inspection



Figure 53. Possible rockshelter located west of the Faculty Housing complex at Wa‘ahila Ridge

6.4 Hipawai Heiau

CSH staff visited the posited location of the Hipawai Heiau, which was accessed by way of UH’s agricultural research facility (the “Magoon Property”), adjacent to Woodlawn Drive (see Figures 48 and 49). As discussed above (Section 5.1.4; see Figure 38), as recently as 100 years ago, stone ruins have been depicted on historic maps in and around the reported located of Hipawai Heiau. We discovered what appears to be a very old remnant of stone wall (i.e., built in the traditional dry-stacked, core-and-fill style) located just outside of (and abutting) the chain-link fence defining the *makai* boundary of UH’s “Mauka Campus” (Figures 54 and 55). There is a good possibility that the main core of this wall remnant dates to pre-Contact or early historic times; as such, the wall should be treated carefully in the event that the existing fencing is altered or replaced (see recommendations below).

This old stone wall remnant lines up fairly well with the northern portion of the stone enclosure depicted in Figure 38 (Section 5.1.4). Accordingly, it is possible that as yet undiscovered subsurface deposits containing historically-significant cultural materials associated with Hipawai Heiau may be located in portions of the UH property.



Figure 54. Stone wall remnant at the location of Hipawai Heiau, facing northwest



Figure 55. Stone wall remnant at the location of Hipawai Heiau, facing north-northwest

Section 7 Summary and Interpretation

At the request of Group 70 International, Inc., Cultural Surveys Hawai‘i, Inc. (CSH) prepared this Archaeological Literature Review and Field Inspection for the University of Hawai‘i at Mānoa’s Long Range Development Plan (LRDP). The project area consists of the entire approximately 304-acre campus located in Mānoa [Waikīkī] Ahupua‘a, Kona District, Hawai‘i.

The scope of work called for an assessment of archaeological potential within the project area based on background research and a limited field inspection to identify any surface sites; recommendations for future archaeological work; and mitigation recommendations if there are archaeologically sensitive areas that need to be taken into consideration.

7.1 Historic Properties in the Project Area

The following historic properties located within the boundaries of the University of Hawai‘i at Mānoa’s (UHM) campus have previously been assessed as eligible for the Hawai‘i Register of Historic Places (HRHP):

1. The historic core of the campus (State Inventory of Historic Properties [SIHP] No. 50-80-14-1352), consisting of Hawai‘i Hall, George Hall, Dean Hall, Gartley Hall, Crawford Hall, Varney Circle, Founder’s Gate, Andrew’s Outdoor Amphitheater, Wist Hall and the Pineapple Research Center. These historic structures were added to the HRHP in 1984.
2. Kānewai Cultural Garden (SIHP No. 50-80-14-4498), consisting of modern surface features (irrigation ditches feeding into taro pondfields) overlying centuries-old deposits consistent with a long history of gardening at this spot along the Mānoa Stream. Subsurface testing (archaeological excavation), radiocarbon dating and pollen analysis by International Archaeological Research Institute, Inc. (cf. Liston and Burtchard 1996) demonstrate use of the area as a taro *lo‘i* from the middle 1400s, and perhaps earlier. It is also important to state the nearby “Dole Street burials” documented by CSH (Hammatt and Shideler 1991) are reburied on the grounds of the Center for Hawaiian Studies (see recommendations below).
3. SIHP No. 50-80-14-4191, a traditional-style presumably pre-Contact-era burial discovered during construction activities at Keller Hall (Smith and Kawachi 1991).

The following historic properties located within the boundaries of the UHM campus have not been previously assessed for eligibility for the HRHP:

1. Koana Cave, which has apparently never received a site number designation (see recommendations below), has yielded human skeletal remains (accessioned by the Bishop Museum in the 1960s), and probably contains as yet undiscovered historically-significant cultural materials consistent with habitation and / or gardening, in addition to more human skeletal remains.

2. Hipawai Heiau was designated by McAllister (1933) as “Site 63,” that is, SIHP No. 50-80-14-63, but no archaeological observations were made since the site was reported as “torn down” earlier by Thrum. CSH archaeologists may have identified a remnant section of stone wall associated with this *heiau*, however, as discussed in some detail above, this feature is located just outside the boundaries of the UH property.

In addition to the aforementioned historic properties located on the UHM campus, two areas in the Wa‘ahila Ridge portion of the campus containing possible rockshelters were identified during the course of the subject field inspection. As explained in detail above, additional testing (controlled archaeological excavations) would be needed to more accurately determine whether these possible rockshelters contain any historically-significant cultural materials.

7.2 Recommendations

CSH generally recommends the State Historic Preservation Division be afforded the opportunity to review any major proposed undertakings at UHM. In addition to this general recommendation, CSH also offers the following specific recommendations:

1. Alterations to, or near, the historic structures included in SIHP No. 50-80-14-1352 should be assessed by a qualified Architectural Historian. Potential impacts to historic structures include not only direct effects, but indirect effects as well (e.g., view plane issues affecting historic buildings and areas of campus).
2. Any major (deep) excavations or ground disturbance at Kānewai Lo‘i should be preceded by additional archaeological testing (controlled excavation) and / or should be conducted in association with monitoring by a qualified Archaeologist, in order to mitigate the potentially negative impacts of damaging or destroying as yet undocumented historically-significant cultural resources in subsurface deposits. Plans or proposals for any such work (including the flood-control project along the Mānoa Stream) should be conducted in full cooperation and consultation with the Center for Hawaiian Studies.
3. Given the Keller Hall burial discovery (SIHP No. 50-80-14-4191), in particular, it is possible that as yet undiscovered burials may still be present at some locations on the UHM campus; however, it is fairly difficult to predict with any specific certainty where burials might occur. Recent work in the “Old Quadrangle” portion of campus (McIntosh and Cleghorn 2007), and earlier work near the School of Architecture Building (Jones et al. 1994) did not find burials or any other historic resources; thus, CSH recommends consultation with the SHPD on future excavation projects on the UHM campus.
4. Koana Cave should be formally assessed by a qualified Archaeologist and assigned a State Site number. Given reports of human skeletal remains from this cave, it should also be preserved and protected from those who might disturb or desecrate its contents. Archaeological testing (excavation) of the cave might yield important evidence (e.g., radiocarbon dating samples), but this work would have to be balanced against the possibility of encountering / discovering

additional human skeletal remains. From a scientific perspective, the cave has relatively low potential for advancing archaeological knowledge of the area, given its relatively small size and apparently shallow soil.

5. No further work is recommended for the rock wall remnant that may be a portion of the Hipawai Heiau; however, should deep excavation or major development be planned for the adjacent Magoon Property, against which the wall remnant rests, archaeological monitoring or preliminary subsurface testing (excavation) might be warranted in order to ensure that no historically-significant cultural resources associated with the old *heiau* are damaged. Thrum's comments in reference to Hipawai Heiau, made approximately 100 years ago (see Sterling and Summers 1978:286), are instructive: "…partly destroyed many years ago, then used as a place of burial."

6. Finally, if the Wa'ahila Ridge area is slated for major development, the two possible rockshelter areas should be subject to formal archaeological inventory, including subsurface testing (excavation), prior to any substantial ground disturbance.

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APPENDIX F. CULTURAL IMPACT ASSESSMENT

Cultural Impact Assessment for the University of Hawai‘i at Mānoa Long Range Development Plan Project

Waikīkī [Mānoa] Ahupua‘a, Kona [Honolulu] District O‘ahu Island

TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

Prepared for

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Management Summary

Reference	Cultural Impact Assessment for the University of Hawai‘i at Mānoa Long Range Development Plan Project, Waikīkī [Mānoa] Ahupua‘a, Kona [Honolulu] District, O‘ahu Island, TMKs [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004 (Monahan and Ka‘uhane 2008)
Date	August 2008
Project Number	Cultural Surveys Hawai‘i (CSH) Job Code MANOA 16
Project Location	The Mānoa Campus occupies some 304 acres of land in lower Mānoa Valley, bounded by the Mānoa, St. Louis Heights, Mō‘ili‘ili and McCully communities. Its principal physical boders are the Mānoa residential community on the mauka (inland) side, the Wa‘ahila Ridge on the Koko Head side, the H-1 Interstate Highway on the *makai* (seaward) side, and the lower Mānoa and McCully residential commuities on the ‘Ewa (west) side. The project area is depicted on a USGS topographic map, Honolulu 1998 quadrangle (see Figure 1)
Land Jurisdiction	State of Hawai‘i
Agencies	State of Hawai‘i Department of Health / Office of Environmental Quality Control (OEQC), State of Hawai‘i Department of Land and Natural Resources / State Historic Preservation Divison (SHPD)
Project Description	The 2007 Long Range Development Plan (LRDP) focuses on projects that are on the Capital Improvement Program and/or are anticipated for development within the next 5-10 years. At this time, a total of at least seventeen (17) new buildings and/or building expansions are included in the LRDP (see Figure 4).
Project Acreage	Approximately 304 acres
Area of Potential Effect (APE)	The Area of Potential Effect (APE) consists of the entire approximately 304-acre campus, in the wider cultural and natural context of Mānoa Valley, greater Honolulu and the Kona District.
Document Purpose	The project requires compliance with the State of Hawai‘i environmental review process [Hawai‘i Revised Statutes (HRS) Chapter 343], which requires consideration of a proposed project’s effect on cultural practices and resources. CSH is undertaking this CIA at the request of Group 70 International, Inc. Through document research and (ongoing) cultural consultation efforts, this report provides preliminary information pertinent to the assessment of the proposed project’s impacts to cultural practices (per the OEQC’s Guidelines for Assessing Cultural Impacts). The document is intended to support the project’s environmental review and may also serve to support the project’s historic preservation review under HRS Chapter 6E-8 and Hawai‘i Administrative Rules Chapter 13-275.

Community Consultation	Hawaiian organizations, agencies and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the project area and the vicinity. Organizations and members / representatives of these organizations consulted included the SHPD, the Office of Hawaiian Affairs (OHA), Hui Mālama I Nā Kūpuna o Hawai‘i Nei, faculty members of the Kamakakūokalani Center for Hawaiian Studies, the Mānoa Heritage Center, the Mānoa Neighborhood Board, Ho‘okahe Wai Ho‘oulu ‘Āina, and Mālama o Mānoa.
Results	Background research conducted for this project yields the following results: (1) Given its abundant natural resources—including several tributary streams that feed into the main stream and several *pūnāwai* (fresh-water springs)—Mānoa Valley has been an attractive place to settle and garden for as long as people have lived on O‘ahu (i.e., well over a millennium). Lower Mānoa Valley, within which the campus is located, represents the prime wet-taro-growing area and agricultural heartland of the entire valley. (2) Mānoa is exceedingly rich in places names, *wahipana* (legendary or storied places) and associated *mo‘olelo* (oral histories), reflecting the valley’s elevated cultural and historical significance to Hawaiians, in particular. Important *mo‘olelo* focus on Mānoa’s many *pūnāwai*, which are directly associated with the exploits of two primary Hawaiian gods, Kāne and Kanaloa. These springs include Kānewai (location of the current Kānewai Cultural Garden), Hualani, Wailele—located near the present day athletic field of the Mid-Pacific Institute and associated with Kūka‘ō‘ō Heiau, Punahou (a.k.a. Kapunahou), Ka‘aipū, Wa‘aloa and Waiakeakua. The valley is also home to many *pu‘u* (hills, mountains), peaks, ridges and caves—all with associated *mo‘olelo*; these include Wa‘ahila Ridge (which defines the eastern border of the valley) and its numerous peaks. Finally, Mānoa is also associated with a variety of other *mo‘olelo*, including “Pīkoi the Rat Killer,” “Maluae and the Underworld,” and “The Woman Who Died and Came Back to Life;” as well as famous events and people of the early historic era, including

	Kamehameha I, Ka‘ahumanu and Boki. (3) The archaeology of lower Mānoa is somewhat problematic in that most of the campus was developed before historic preservation awareness and laws were in place; thus many or most surface-level sites and features once present in the project area have been destroyed and / or damaged by being covered with sediments and structures. Before these historic impacts, however, the campus undoubtedly contained a patchwork of gardens, including many *lo‘i* (stone terraces) and *‘auwai* (irrigation ditches), and house sites, including many small stone enclosures, terraces and platforms. Undoubtedly, there are still subsurface cultural deposits within the campus containing signigicant historic and cultural resources. (4) Burials have been documented near Keller Hall and along Dole Street, immediately adjacent to the Kānewai Cultural Garden and Kamakūokalani Center for Hawaiian Studies. The latter burials, representing the remains of at least 18 individuals, have been interpreted as a traditional Hawaiian cemetery. It is likely that more burials are located in subsurface deposits within the project area. (5) A recent field inspection of the campus by CSH found a number of possible rock shelters and overhangs in the Wa‘ahila Ridge area. Additional study of these possible archaeological sites would have to be conducted in order to more fully understand their function, chronological age and archaeological significance. Community consultation conducted for this project yields the following main concerns: (1) Many participants voiced concern about the possibility of encountering as-yet undiscovered cultural and historic sites, including most importantly, human skeletal remains and burials in subsurface deposits. One participant (Dr. Davianna McGregor) also pointed out that the burial site preserve near Keller Hall, which used to be marked by a ginger plant, is no longer being maintained (i.e., the ginger plant is not there anymore). (2) A few participants stated that existing undeveloped

	areas, including ridges and valley slopes, should not be developed or impacted in any way, given the already significant loss of such natural portions of the campus and given the importance of retaining a Hawaiian sense of place and landscape integrity. This concern about preserving the last undeveloped portions of the campus extends specifically to the Wa‘ahila Ridge area. (3) Many participants voiced concerns about future buildings and projects being more harmoniously designed and integrated into the natural surrounding and themes inherent to the valley. It is important to note that this type of concern is fundamentally a cultural one for Hawaiians, in particular, whose ‘world view’ and deeper philosophical / spiritual beliefs are based on such concepts as *pono* (in this case, “right ways” of doing things) and *lōkahi* (“harmony”), among other related concepts (e.g., *mālama ‘āina,* or “taking care of the land”). (4) A few participants talked about the importance of understanding and incorporating Hawaiian-language words, phrases and concepts that extends beyond the superficial (e.g., naming buildings). (5) The current Director of Ka Papa Lo‘i o Kānewai (a.k.a. Kānewai Cultural Garden) shared his personal knowledge of a well-known master navigator and teacher who previously indicated the large albizia tree at Kānewai Lo‘i (which is scheduled to be removed in association with a stream-erosion-prevention project funded by the Federal Emergency Management Agency) could be used to construct a large traditional *wa‘a* (canoe). (6) Many participants talked about the importance of using native plants in future projects. (7) The Wa‘ahila Ridge area is an important natural and cultural resource, containing trails, native plants and other significant sites and features (e.g., possible rocksheleter and overhangs). (8) A few participants provided detailed accounts of well-documented *mo‘olelo, wahi pana* and other cultural sites in Mānoa; in one case, one participant (Palani Vaughn) suggested there is another, alternative legend associated with the origins of the

	well-known spring (Ka Punahou, widely attributed to Kāne), but he did not elaborate further on this point. (9) A couple participants called into question the State’s (i.e., Department of Land and Natural Resources, Historic Preservation Division) poor record of protecting and preserving important cultural sites in Mānoa, including *heiau* that have been damaged or compromised by recent construction projects. (10) One participant (Palani Vaughn) suggested the university has not done enough to promote education about the traditions of old Hawai‘i in Mānoa; and that it should build a “learning center” (perhaps located at the Center for Hawaiian Studies) that would integrate *mo‘olelo, wahi pana,* the landscape and other cultural and historical information about Mānoa. (11) One participant (Dr. Davianna McGregor) pointed out that the Long Range Development Plan (LRDP) is not detailed enough for meaningful review and comment, and that descriptions such as building “expansion” or “replacement” are too vague. There is concern that the LRDP will be used to guide development 20 years from now, which, given the lack of detail, is problematic. (12) Dr. McGregor also pointed out that there are many significant and commemorative trees on campus that should be systematically catalogued in order to ensure their protection during future development of the campus.
Recommendations	CSH recommends the following measures, which, if addressed in a good faith manner, will help mitigate potentially adverse effects of the proposed project: (1) Community consultation participants and the wider Mānoa community should be afforded the opportunity to review the subject draft CIA and offer their input for the final verision of this report. (2) Given that the LRDP includes seventeen new buildings, building expansions and other infrastructure improvements, and given the lack of specific plans for these projects, the community should be afforded the opportunity to review and

	comment on each individual project as details become finalized and as more specific potential impacts (both positive and negative) can be assessed. (3) The University should proactively develop a plan to avoid disturbing burials and historic and cultural sites located in subsurface contexts. Such a plan may include archaeological inventory surveys prior to ground disturbance and / or archaeological monitoring of excavations during construction; specific decisions should be made on a case-by-case basis, in consultation with appropriate government agencies (e.g., SHPD, OHA) and Native Hawaiian organizations and individuals. In particular, every effort should be made to proactively avoid inadvertent finds of human skeletal remains and burials. (4) Planning and design of proposed projects included under the LRDP should incorporate Hawaiian cultural and historical themes and concepts in order to restore and accentuate an authentic Hawaiian sense of place. This should include (a) use of native and Polynesian-introduced plants, (b) integration of *mo‘olelo*, Hawaiian language and other Hawaiian concepts and ideas beyond superficial applications of such information (e.g., building names) and (c) preservation and protection of undeveloped spaces and natural resources. (5) The Wa‘ahila Ridge area, one of the only undeveloped places in lower Mānoa Valley, should be carefully preserved and protected from future development, and from modern abuses and damage that have already taken their toll (e.g., soil erosion from “off-road” activities). (6) Ka Papa Lo‘i o Kānewai, also known as Kānewai Cultural Garden, should be treated with the utmost care and respect; any plans for future improvements, alterations or development in or adjacent to Kānewai Lo‘i should include comprehensive consultation with its director and with the Hawai‘inuiākea School of Hawaiian Knowledge. (7) The issue of removing the large albizia tree scheduled for removal in association with the

	stream-erosion-prevention project should be discussed with the Director of Ka Papa Lo‘i o Kānewai, who has indicated the tree may be used to make a large traditional *wa‘a* (canoe).

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Section 1 Introduction

1.1 Project Background

At the request of Group 70 International, Inc., Cultural Surveys Hawai‘i, Inc. (CSH) prepared this Cultural Impact Assessment (CIA) for the University of Hawai‘i at Mānoa’s Long Range Development Plan (LRDP). The project area consists of the entire approximately 304-acre campus located in Mānoa [Waikīkī] Ahupua‘a, Kona District, Hawai‘i [TMK: (1) 2-8-015:001, 2-8-023:003, 2-9-004:005, 2-9-023:001 & 026, 2-8-029:001, 2-9-026:001 & 037, 2-9-027:054, 3-3-056:001 & 004]. The project area consists entirely of State of Hawai‘i-owned land.

The campus is located in lower Mānoa Valley, bounded by the Mānoa, St. Louis Heights, Mō‘ili‘ili and McCully communities. Its principal physical borders are the Mānoa residential community on the *mauka* (inland) / north side, the Wa‘ahila Ridge on the Koko Head (east) side, the H-1 Freeway *makai* (seaward) / south side and the lower Mānoa and McCully residential communities on the ‘Ewa (west) side (Figures 1–3).

The proposed LRDP focuses on projects that are on the Capital Improvement Program and/or are anticipated for development within the next 5-10 years (Figure 4). At this time, at least seventeen (17) new buildings or renovation/expansion projects are proposed:

- Kennedy Theatre Expansion
- Parking Structure at Kennedy Theatre
- Instruction Building at Henke Hall Site
- Campus Center Expansion to Northeast
- Law School Expansion
- I.T.S. - Bilger Hall Addition, Phase II
- Research Space - Infill South Courtyard of Biomedical Building
- Klum Gym Replacement
- Instruction Building - College of Education
- Media Facilities at KHET Site
- Parking Structure IIB/Bookstore
- Faculty Housing – Wa‘ahila Ridge or Mauka Campus
- Research Buildings – North and East of Biomedical Building
- Research Buildings - Mauka Campus
- Johnson Hall - Replacement Dormitory
- Hale Noelani - Replacement Dormitory
- School of Hawaiian Knowledge

These projects address current space and activity needs on campus. They are not based on any anticipated increase in enrollment over the next planning period. Enrollment declined from an all-time high of over 22,000 students in 1972 to a low of approximately 18,000 in 1987. Since then, enrollment has slowly increased reaching 20,644 students in the fall of 2007. Enrollment is projected to remain relatively stable through 2012, as indicated by a 2007 estimate by the University of Hawai‘i's Institutional Research Office. The anticipated opening of the new West O‘ahu Campus is also anticipated to reduce the pressure on undergraduate enrollment.

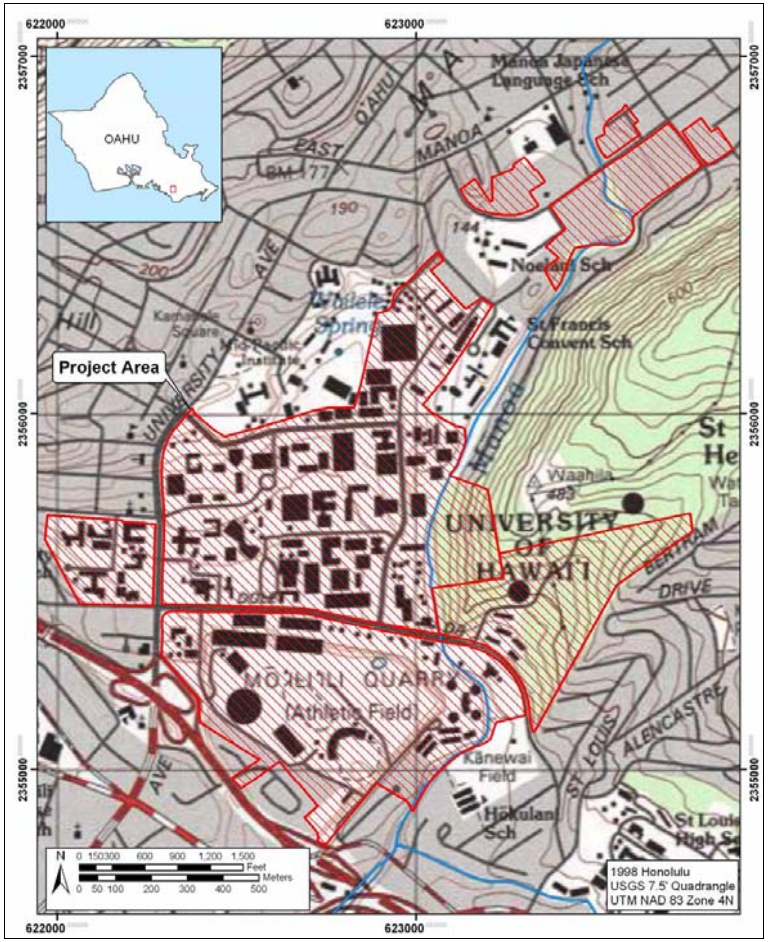


Figure 1. USGS topographic map, Honolulu 1998 quadrangle, showing University of Hawai‘i at Mānoa campus lands

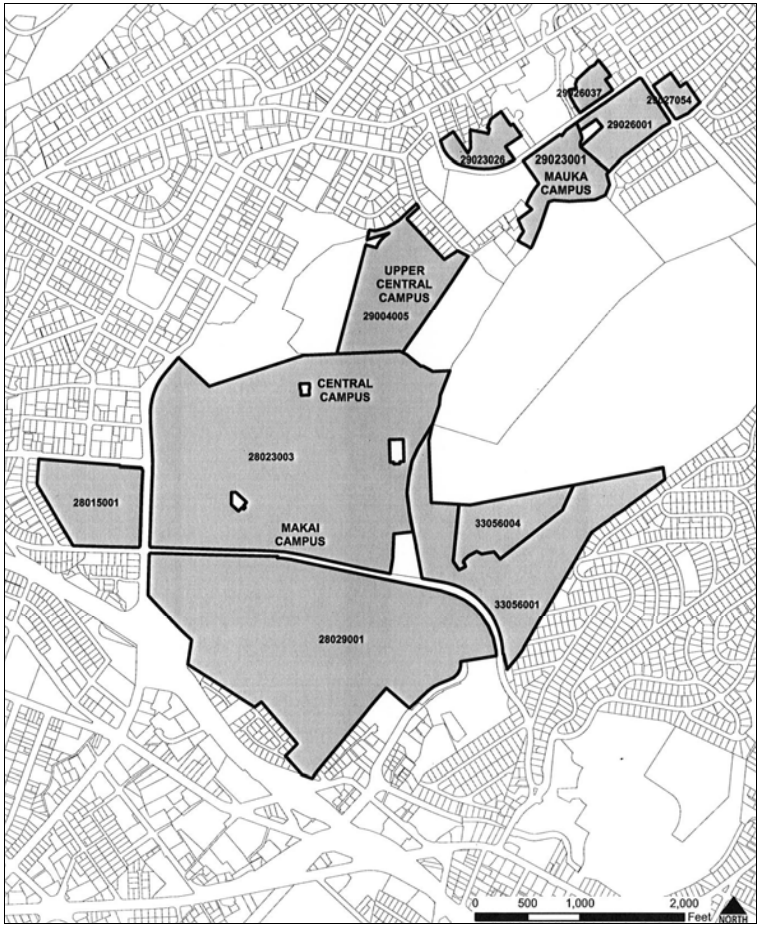


Figure 2. Map showing Tax Map Keys [1] 2-8-015:001; 2-8-023:003; 2-9-004:005; 2-9-023:001 & 026; 2-8-029:001; 2-9-026:001 & 037; 2-9-027:054; 3-3-056:001 & 004

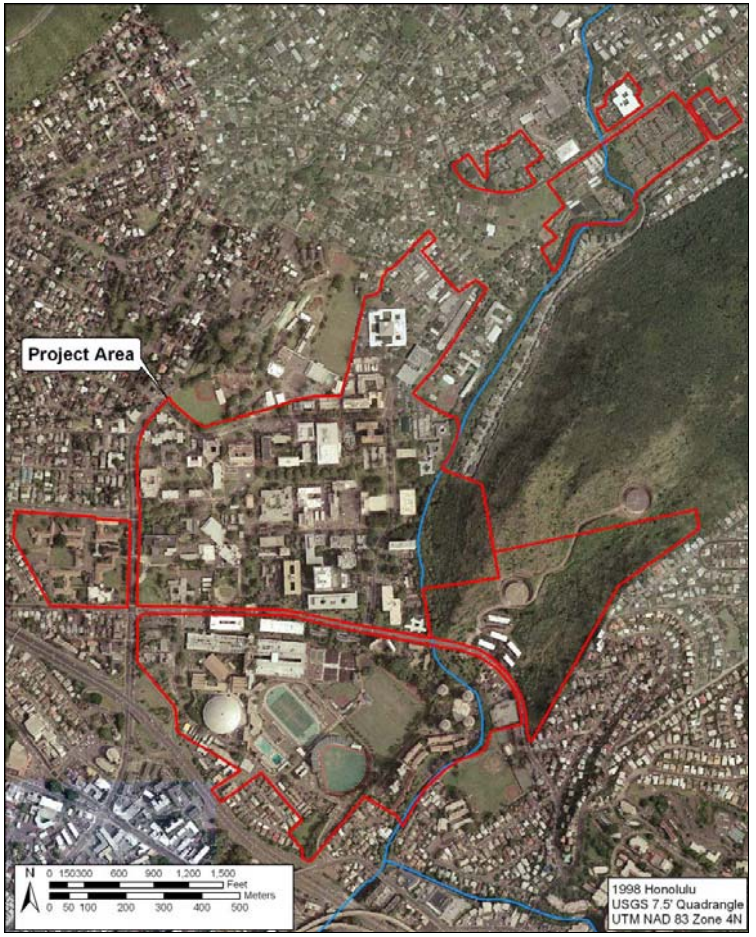


Figure 3. Aerial photograph of University of Hawai'i at Mānoa campus lands

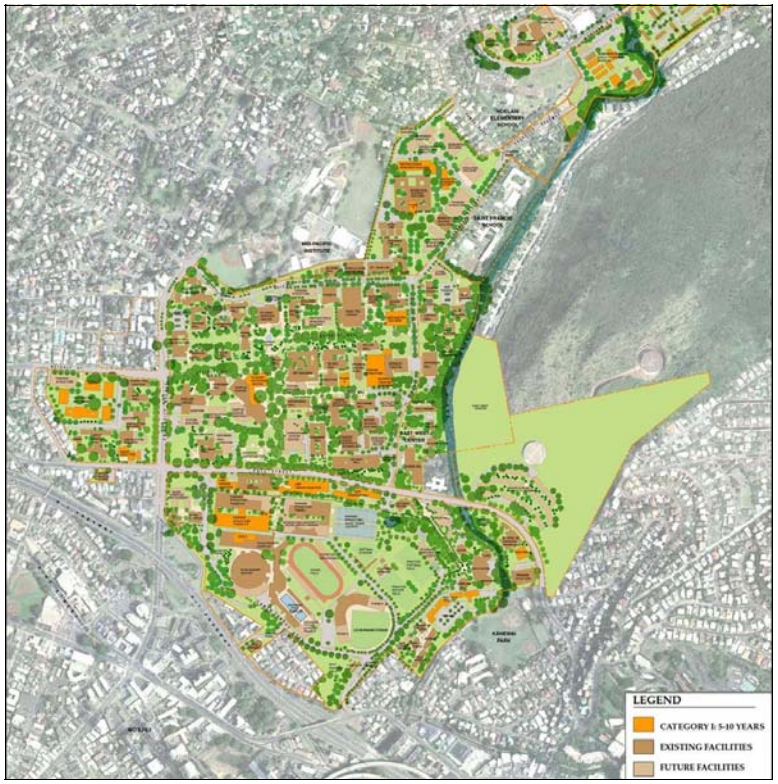


Figure 4. Long Range Development Plan 2007 Update

Rather than enrollment growth, campus development at the University of Hawai'i-Mānoa (UHM) is now stimulated by current facility needs and the desire to provide a more complete campus community experience. Universities across the country have focused on enhanced environments for learning, working, and living. Campuses of the future envision uses and activities not unlike that of any vital urban center.

Graduate and research space needs will also continue to fuel growth on the Campus. In a pattern typical of other major universities, research and administrative support facilities are related to the availability of research funding rather than enrollment. Overall, extramural funding at Mānoa has increased by 50% over the past ten years. In 2003, the Top American Research Universities ranked UHM among the top 50 public universities in federal research funding. New laboratories, offices and library resources will continue to be required to support evolving graduate work and research activities.

While not all research and graduate education will be campus-bound, as evidenced by the John Burns School of Medicine in Kaka'ako, telescopes atop Mauna Kea and research facilities on Coconut Island, the great majority of research and graduate student activities seek a direct relationship to the resources of the Campus. While distance learning and virtual teaching methods also promise changes to higher education, their immediate impact appears to be at the lower division and undergraduate level. Institutions such as UHM with large upper-division and graduate programs, successful professional schools and burgeoning research programs are anticipated to grow in-place. UHM's challenge is to use the opportunity afforded by this growth to achieve higher levels of quality in its physical and academic environment. The 2007 Update to the LRDP will serve as guidance towards this important goal.

1.2 Document Purpose

The project requires compliance with the State of Hawai'i environmental review process [Hawai'i Revised Statutes (HRS) Chapter 343], which requires consideration of a proposed project's effect on cultural practices. CSH is conducting this CIA at the request of Group 70 International, Inc. Through document research and (ongoing) cultural consultation efforts this report provides preliminary information pertinent to the assessment of the proposed project's impacts to cultural practices and resources (per the OEQC's Guidelines for Assessing Cultural Impacts). The document is intended to support the project's environmental review and may also serve to support the project's historic preservation review under HRS Chapter 6E-8 and Hawai'i Administrative Rules Chapter 13-275.

1.3 Archaeological Work at the Project Area

CSH is also conducting a companion Archaeological Literature Review and Field Inspection Report (CSH Job Code MANOA 15) for the subject project. The literature review and field inspection is designed to identify archaeological site types and locations in the project area, and to allow for future archaeological-work recommendations, if applicable. The goal is to identify cultural resources and historic properties, from a specifically archaeological perspective, and to provide recommendations related to the State of Hawai'i's historic review process. Results from the Archaeological Literature Review and Field Inspection Report are included in this document.

1.4 Scope of Work

The scope of work for this CIA includes:

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
2. A review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
3. Consultation and interviews with knowledgeable parties regarding traditional cultural practices at or near the parcel; present uses of the parcel; and / or other (non-Hawaiian) practices, uses, or traditions associated with the parcel.
4. Preparation of a report summarizing the results of these research activities.

1.5 Environmental Setting

1.5.1 Natural Environment

Mānoa Valley was formed during the volcanic eruptions that formed the Ko‘olau Mountains starting about 10 million years ago. This volcanic activity and the following erosion caused amphitheater-headed, deep V-shaped valleys on the southeast coast of O‘ahu, which are separated by sharp, high ridges. The Ko‘olau volcano reactivated approximately 250,000 years ago, pouring lava into the valley. This eruption built up new cones, including Pu‘u ‘Ōhi‘a (Tantalus) in the upper valley, and lower down the smaller cones of Pu‘u Kākea (Sugar Loaf), Pu‘u ‘Ualaka‘a (Round Top) and Pu‘u o Mānoa (Rocky Hill). The erupted lava cascaded down the western ridge of Mānoa Valley. This filled in the V-shaped valley, giving it a more rounded U-shaped appearance (Bouslog et al. 1994:4-5).

According to Foote et al. (1972), soils within the campus are mostly varieties of clay loam (Figure 5). The northeast portion of the campus and most of the central campus is Makiki Stony Clay Loam (MIA) with some Tantalus Silty Clay Loam (TCC) in the northwest corner. The Wa‘ahila Ridge area north of Dole Street includes a large portion of Rock Land (rRK) as well as Ka‘ena Very Stony Clay (KanE) and Pāmoa Silty Clay (PID) soils. South of Dole Street the southeastern portion of campus includes Kawaihāpai Clay Loam (KIA). The quarry area that dominates the lower campus was developed to exploit a thick dense deposit of epheline-meililite (so-called “blue stone”) basalt.

A notable feature of the dominant Makiki Stony Clay is “that there are enough stones to hinder cultivation” making up 15% of the soil by volume (Foote et al. 1972:92). Basalt outcrops are common. Several of the other soil types (rRK, KanE, PID) are described as having poor “workability” owing to the very sticky, very plastic nature of the clay. The best agricultural soil

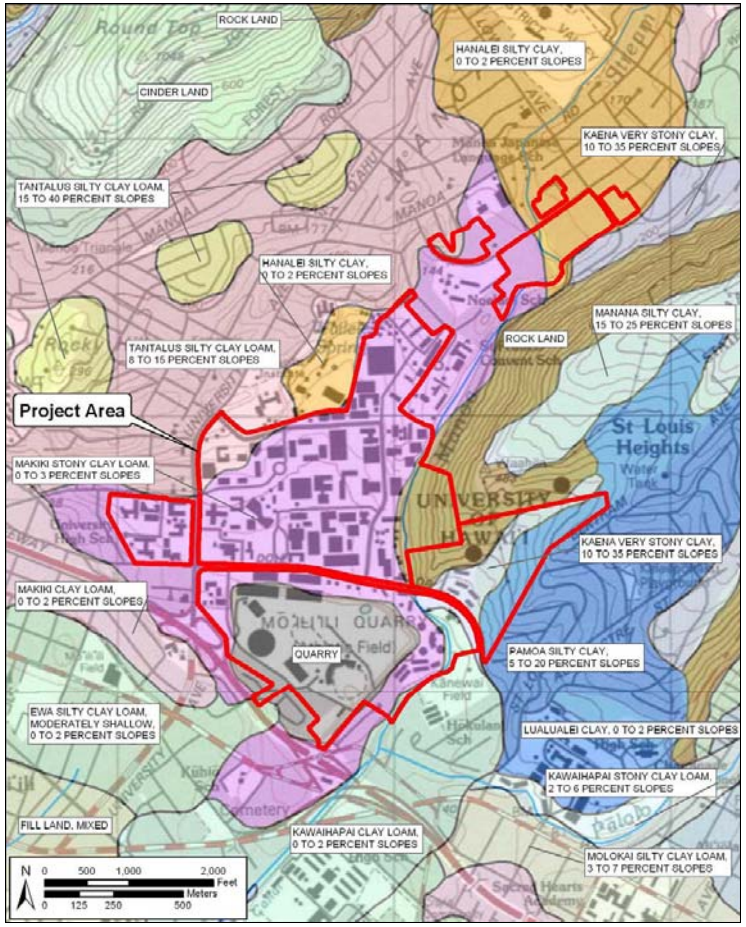


Figure 5. Soils map of University of Hawai‘i at Mānoa (data from Foote et al. 1972)

appears to be the Kawaihāpai Clay Loam – which rather notably lies in a very small area where the Kānewai taro *lo'i* (probably a traditional Hawaiian gardening complex) is located.

The Mānoa sub-basin watershed covers 6,150 acres and 12 miles of stream. 'Aihualama, Waihī, Lua'alaea, Nāniu'apo, Wa'aloa, and Waiakeakua are the tributary streams in the upper valley that merge at an elevation of 400 feet into the main Mānoa Stream. Half-way down the center of the valley, the Sugar Loaf eruption has pushed the streambed to the extreme east of the valley. Before the construction of the Ala Wai Canal, the lower portion of the stream, called Kālia Stream, flowed in a westerly direction, then made a wide bend to the east where it joined the Pālolo Channel in the general vicinity of the present-day Date Street near the *makua* side of the Ala Wai Golf Course.

Annual rainfall at the head of Mānoa Valley can reach up to 160 inches per year. At the lower boundary, rainfall is only 35 inches per year. The valley is often swept with strong winds that bring rain, including *ala'eli,* the "cool wind of the land," and *kākea,* a "stormy wind" (Bouslog et al. 1994:6). However, it is the Tuahine or Kuahine rain, a misty rain, for which the valley is most well known.

Before Hawaiian settlement, the slopes of Mānoa's ridges were probably covered with a dense forest, dominated by *'ōhi'a lehua* (*Metrosideros macropus*), *koa* (*Acacia koa*), and *loulu* (the native fan palm, *Pritchardia* spp.). The undergrowth would have included shrubs such as *naupaka kuahiwi* (*Scaevola* spp.), ferns such as *hāpu'u* (*Cibotium splendens*), *'ama'u* (*Sadleria* spp.), and *pala'ā* (also known as *palapala'ā, Sphenomeris chinesus* syn. *chusana*), and vines such as *'ie'ie* (*Freycinetia arborea*) (Bouslog et al. 1994:8). Mānoa, due to its broad, well-watered valley, was probably settled early by the Hawaiians, who probably cleared much of the lower areas near streams for wetland taro cultivation.

1.5.2 Built Environment

Since its founding in the early twentieth century, nearly the entire campus has been developed with numerous buildings, facilities and infrastructure. The only major areas of undeveloped land still remaining are located east of Mānoa Stream near the base of Wa'ahila Ridge (leading up to St. Louis Heights) and across from the existing East-West Center.

Section 2 Methods

Historical documents, maps and existing archaeological information pertaining to the sites in the vicinity of this project were researched at the CSH library. Information on Land Commission Awards was accessed through Waihona 'Aina Corporation's Māhele Data Base (www.waihona.com). The State Historic Preservation Division, Office of Hawaiian Affairs, O'ahu Island Burial Council, and community and cultural organizations in Mānoa were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the project area and the surrounding vicinity. The names of potential community contacts were also provided by colleagues at CSH and from the authors' familiarity with people who live in or around the project area. The cultural specialist conducting research on this assessment employed snowball and judgment sampling methods, an informed consent process and semi-structured interviews according to standard ethnographic methods (as suggested by Bernard 2005). Some of the prospective community contacts were not available to be interviewed as part of this project. A discussion of the consultation process can be found in Section 6 on Community Consultations. Please refer to Table 3, Section 6 for a complete list of individuals and organizations contacted.

Section 3 Traditional Background

3.1 Overview

Mānoa is sometimes treated as a portion of the *ahupua'a* of Waikīkī and sometimes treated as a distinct *ahupua'a*. It seems rather unlikely, given its geographic location and its overall size and general physiography, that Mānoa was its own land-locked (i.e., separate from Waikīkī) *ahupua'a* in pre-Contact times. The well-known "Pre-Māhele Moku and Ahupua'a" map and study of 1987 by the Hawaiian Studies Institute, which shows "major land divisions of O'ahu prior to the *Māhele* of 1848," does not show Mānoa as its own separate *ahupua'a* (Figure 6). It seems unlikely that Mānoa's residents would not have enjoyed unencumbered access to the seashore in pre-Contact times, although this may have changed with the late 18th century invasions of O'ahu from the windward islands (Maui and Hawai'i). Regardless, given its abundant natural resources—including several tributary streams that feed into the main Mānoa Stream and several *pūnāwai* (fresh water springs)—the valley has clearly been an attractive place to settle and garden for as long as people have lived on O'ahu (Figure 7).

At various times throughout this long history, Mānoa was home to kings and other high-ranking *ali'i* (chiefs), as described in legends, land records, early maps of Honolulu and other documents. Two chroniclers of historic Hawai'i talked about Kamehameha I's affinity for Mānoa:

> The places Kamehameha farmed and the houses he lived in at those farms were show places. His farmhouses in Nuuanu stood several hundred fathoms away from the right side of Kapahala, a knoll on the western side of Nuuanu Street and Hanaiakamalama House. Perhaps the location was chosen to enable him to look both inland and seaward to his food patches. Some elevated houses seem to have been for that purpose. So it was with Puupueo [today known as Roundtop, on the west side of the valley], directly below Ualakaa. ('Ī'ī 1959:69)

Thrum also stated that Kamehameha often stayed in Mānoa Valley:

> It is evident that Manoa has for several generations past, been held in high esteem by Hawaiians of rank. Kamehameha I was no stranger to the valley, and it early became the favorite resort of his immediate household and followers. (Thrum 1892:113)

This section begins by describing some of the many place names in the valley. Compared with other locations on O'ahu and the rest of the Hawaiian Islands, Mānoa is relatively rich in places names; this abundance of names—and their associated *mo'olelo* (oral histories) and legends, is a reflection of the valley's elevated cultural and historical significance to Kānaka Maoli (Native Hawaiians), in particular. For example, there are many *mo'olelo* and legendary accounts of Mānoa's *pūnāwai*, which are directly associated with the exploits of two primary Hawaiian gods, Kāne and Kanaloa. These springs include Kānewai (location of the current Kānewai Cultural Garden), Hualani, Wailele—located near the present day athletic field of the Mid-Pacific Institute and associated with Kūka'ō'ō Heiau, Punahou (a.k.a. Kapunahou), Ka'aipū,

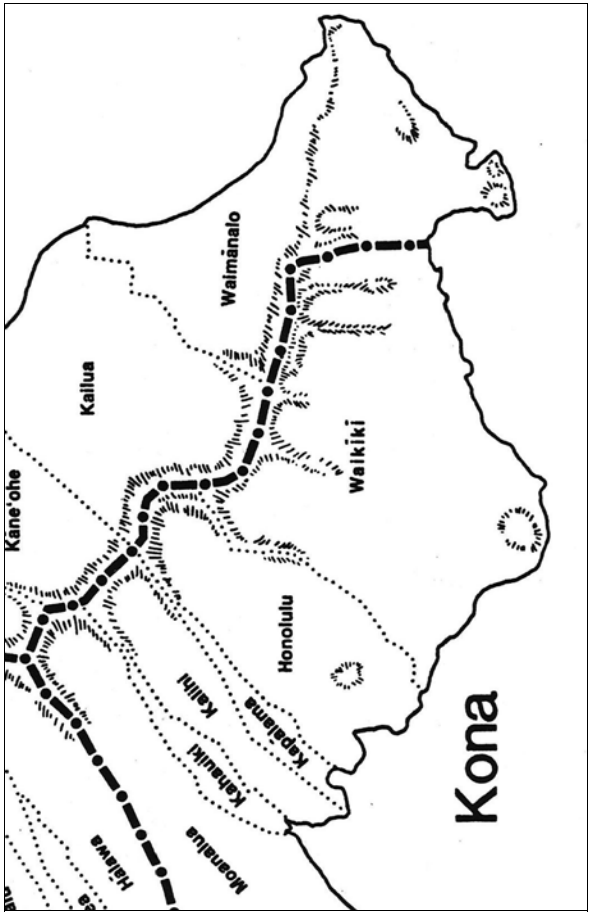


Figure 6. "Pre-Māhele Moku and Ahupua'a" map and study of 1987 by the Hawaiian Studies Institute showing Mānoa as part of Waikīkī Ahupua'a



Figure 7. 1929 Photograph of the Inter-Island Airway's amphibian plane, Hawaii, passing over Mānoa Valley (Hawai‘i State Archives)

Wa‘aloa and Waiakeakua. The valley is also home to many *pu‘u* (hills, mountains), peaks, ridges and caves—all with associated *mo‘olelo* and legendary accounts; these include Wa‘ahila Ridge (which defines the eastern border of the valley) and its six peaks [Keanapoi, Pu‘u Pia, Pūkele, Paliluahine (also known as Kapaliluahine or Pali Luahine) Akāka and Kūmauna], ‘Ulumalu, Pu‘u Pueo (“Roundtop”) and Pu‘u Mānoa. Mānoa is also associated with a variety of other *mo‘olelo* and legends, including “Pīkoi the Rat Killer,” “Maluae and the Underworld,” and “The Woman Who Died and Came Back to Life;” as well as famous events and people of the early historic era, including Kamehameha I (and his famous dog Poki), Ka‘ahumanu and Boki (Governor of O‘ahu under Kamehameha I and brother of Kalanimōkū).

3.2 Place Names

Translations presented without attribution in this subsection are from Pūku‘i et al. (1974), unless indicated otherwise. Figure 8 shows some place names of Mānoa Valley from an 1882 map by E. D. Baldwin.

The literal meaning of the word **Mānoa** is “vast,” or “wide and vast” (Pūku‘i cited in Sterling and Summers 1978:281). Along with Pauoa, Nu‘uanu and Pālolo, Mānoa is one of the famous “valleys of the rainbow,” as described in the legend of “The Lady of the Moon” (see below).

Place names for the many *pūnāwai* of Mānoa typically refer to the sacred nature of *wai* (fresh water), and stress the relationship between the water-giving gods (primarily Kāne, but also his companion Kanaloa) and *kānaka* (people) whose lives depend on it. According to numerous accounts (e.g., Williams 1935), the *kaona* (hidden or more subtle meaning) for **Kānewai** (location of the current Kānewai Cultural Garden) is “the healing waters of Kāne,” reflecting a widespread traditional belief in its curative properties. According to Bouslog et al. (1994:134), **Hualani** means “dug up by heaven,” but this interpretation may be problematic because the word for “to dig” (as in “dug up”) is actually *hua‘i.* According to Pūku‘i and Elbert (1986), one of the primary meanings of *hua* is “fruit, tuber, egg, produce, yield, ovum, seed…[etc.],” which suggests a more accurate interpretation for Hualani Pūnāwai is something like “heavenly fruit” or “seed” or “fruit” or “seed of heaven.” In any case, this is an evocative name for a *pūnāwai.* **Wailele** has been interpreted as “flying water” (Bouslog et al. 1994) or “waterfall” (Pūku‘i et al. 1974), and can also mean something closer to “leaping water,” based on one of the primary meanings of the word *lele,* as in a spring that bursts forth with water. **Punahou** means “new spring,” and in some older references it is called Kapunahou (or “the new spring”). **Ka‘aipū**, literally “the eating together,” is associated with a famous “supernatural woman” who lived under a stone there (see several other oral-historical associations for this spring, below). **Wa‘aloa**, “the long canoe,” and **Waiakeakua,** “water [used] by god,” are two more *pūnāwai* in Mānoa associated with many famous supernatural phenomena and events.

The five tributaries that fed into the main Mānoa Stream in the lower valley are: **‘Aihualama** (literally, “eat the fruit of the lama tree”), **Waihī** (literally, “trickling water”), **Nāniu‘apo** (literally, “the grasped coconuts”), **Lua‘alaea** (literally, “pit [of] red earth”), and **Waiakeakua** (literally, “water provided by a god”).

There seven principal waterfalls in the back of Mānoa Valley are: **Wai‘ihī‘iki** (literally, “small trickling water”), **Wai‘ihī nui** (literally, “big trickling water”), **Lua‘aulaea**, **Nāniu‘apo**, **Wa‘aloa**, **Kahuwai‘iki** (literally, “little water tender,” as in one who takes care of the water) and **Waiakeakua**.

Some of the primary *pu‘u,* ridges, peaks and caves include: **Wa‘ahila** (which Pūku‘i et al. 1974 do not define, but note is the name of a famous rain in the valley), **Keanapoi**, **Pu‘u Pia** (literally, “arrowroot hill”), **Pūkele** (literally, “muddy”), **Paliluahine** (also known as Kapaliluahine or Pali Luahine), **Akāka**, **Kūmauna** (these latter two are associated with “The Princess of Mānoa” (Kahala-o-Puna), **‘Ulumalu**, **Pu‘u Pueo** (literally “owl hill”) and **Pu‘u Mānoa**.



Figure 8. Outline of 1882 map by E. D. Baldwin, showing topographic points and traditional land units in Mānoa Valley

3.3 Mo'olelo Associated with Specific Place Names

3.3.1 Mānoa, Pauoa, Nu'uanu and Pālolo

One version of the legend of "The Lady of the Moon" describes the natural phenomena of Mānoa:

> Almost all day long the valley is open to the sun, which, looking on the luxuriant verdure and clinging mist, sends its abundant blessing of penetrating light. Rainbows upon rainbows are painted on the steep precipices at the head of the valley. There are arches of exquisite beauty, smashed fragments of scattered color, broad pillars of glorious fire blazing around green branches of ghost-like trees, great bands of opal hues lying in magnificent masses on the hillside, and lunar rainbows almost circular outlined in soft prismatic shades in the time of a full moon. (Irwin 1936:18)

> When showers creep down the valley one by one, rainbows also chase each other in matchless symmetry of quiet, graceful motion. Sometimes the mist in the doorway of the valley has become so ethereal that splendid arches hang in the apparently clear sky without cloud support. (Westervelt 1963a:128)

3.3.2 Kāne and the Fish of Mānoa

After Kāne had created all of the springs of Mānoa, Kāne and Kanaloa were at Waikāne (on the northeastern shore of O'ahu), when Kanaloa asked Kāne to provide fish to the people of Mānoa. Kanaloa called upon his fish god Pōhaku-kū'ula to go out and drive the fish up Mānoa Stream. He also commanded Kukalia, the daughter of the *kahuna* of the *heiau* Kulumalu to wave her *lepa* (flag) as a signal to the fishermen when to lower the '*upena* (fishnet). Pōhaku-kū'ula first drove the fish up through the lands of Waikīkī, dropping the fishnet for the first time at Akuakekau to feed the people of Akuakekau and Kanaloa, and then to Makawiliwili where the net was dropped for the second time. This fish god continued to drive the fish inland into the lands of Mānoa to Kapilpili.

> Then the fish came up to Kūkana, where Kukalia again signaled to drop the fishnet. When Kanaloa drew the net up, the fish were given to the chiefs of Kumu'ulu and their people. The fourth net was put down at Hipawai-that catch of fish being for the people of Pāmoa. Still the fish came, following the water course. When they arrived at Halelena, Kukalia, the ever-watchful sentinel, signaled to drop the fishnet; and that catch went to the people of Ka'aipū. The sixth catch was at Kalehua just as the evening star Hōkūloa was rising and the fish were given to Wa'aloa and the Kaululā'au chiefs. The number of fish had decreased, for the waterway was getting narrow, but Kukalia, the beautiful sentinel, kept signaling to Kanaloa to put down the seventh net. This was at Kukuio, a part of the Mānoa Stream where the fish came one by one. The fish came to Kahakiamano, then to Hopenui, where they began to be bewildered and excited. They swished back and forth and started up again in the excitement. They stayed there overnight and at dawn, just as the first red cloud broke over the mountain, the fish followed the water course up to Niuapō, then they spread, some

> going to Wa‘aloa and Waiakekua, others turning to the swamp, called Lua‘alae, or the Gulch of the Mud Hen, and on to Waihī, where most of the fish disappeared. (Bouslog et al. 1994:138)

After having provided the people of Mānoa with fish, the two gods traveled back to Konahuanui to rest. They started for home at Waihī, climbing the pathway of the ‘Opihi at ‘Aihualama and ascending the heights to Konahuanui, where they sailed for the east and above the clouds (Bouslog et al. 1994:137-138).

3.3.3 Pīkoi the Rat Killer

Another legendary beauty of Mānoa is described in the “Legend of Pīkoi the Rat Killer.” In this tale, a chief on Kaua‘i had eight children, six god daughters or demi-gods called *kīko‘o,* who were rats (*kīko‘o* is the name for the Hawaiian bow used to hunt rats), one *kanaka* daughter and one *kanaka* son. The *kanaka* son, Pīkoi, became a noted rat hunter on Kaua‘i, using a bow and arrow to kill the rats. The *kanaka* daughter, named Ka-ui-o-Manoa (“The Beauty of Mānoa”) moved to O‘ahu and married the chief of Mānoa, Pāwa‘a. They made their home in Mānoa Valley at Kahaloa and also had the land called Kaho‘iwai. One day Pīkoi and his father decided to travel to O‘ahu to visit their sister at Mānoa. While in O‘ahu, Pīkoi wandered from Mānoa toward the harbor at Honolulu, and joined several *ali‘i* in the sport of rat shooting. Pīkoi impressed a chiefess and her followers by shooting at a hidden rat, and striking and entangling the whiskers of three rats in one shot. He then proceeded to kill an additional number of rats in one shot, all strung along the length of the arrow.

The king of O‘ahu, Kākuhihewa, heard about this boy and wanted to find him. Only the caretaker of the high chiefess had seen the boy and she suggested to the king that he command all of the men of O‘ahu, each district for one year, to come to his residence at Ulukou in Waikīkī. In the sixth year it was the turn of Mānoa, and Pīkoi, his father, and Ka-ui-o-Mānoa made ready to travel to Waikīkī with other men of the lands of Mānoa, mentioned in the following passage.

> She [Kauiomanoa] went from their home at Kahaloa, (a place in the upland of Manoa) to a spot called Kaho‘iwai. There she made four lehua leis, two for the neck and two for the head and went home. They made ready to go to the lowland with their food which the stewards carried. All the members of Pawa‘a’s household went, none remained, and so it was with all the families in the upland of Manoa. The men and women of every locality in Manoa went, from Ka‘apakahua, Kawailele, Puahia, Kanewai, Kamo‘ili‘ili and Kamoku. (Kaui 1865; translation in Hawaiian Ethnological Notes, Vol. II, p. 713)

In another rat-shooting contest, Pīkoi again impressed the king, who made him his personal rat-hunter and gave him a grass hut in Mānoa, which Pīkoi returned to with his relatives to live (Westervelt 1963a:171-172).

3.3.4 Poki, the Dog of Kamehameha I

Pu‘u Pueo was also a favorite haunt of Poki, the wonder-dog of O‘ahu, whose home was on a little knoll behind Punahou College (now enclosed in the small Mānoa Par) (Taylor 1953). This dog was owned by Kamehameha I. By tradition, the dog was brought to the islands on the American trading ship *Eleanor*, which visited the islands in 1790 (Dorothy Barrere, cited in

Sterling and Summers 1978:285). Poki, or Boki, is a transliteration of the English name “boss,” and is not a Hawaiian name (Pūku‘i and Elbert 1986:338). According to legend, this dog was prayed to death (Titcomb 1969:22). After Kamehameha’s death, the dog was deified and worshipped; tales of the dog were possibly confused with other tales of other spirit dogs. The legends of this dog may date to Kamehameha’s time, or may have been borrowed from older legends of a dog apparition whose name is lost (Dorothy Barrere, cited in Sterling and Summers 1978:285).

Beckwith (1940:346) says that Poki has been confused with the legend of the ghost dog Kaupē and other spirit forms. In these legends, Poki is a dog-like creature “spotted or brindled in color and very long in body, who guards a certain section of Honolulu, but may appear in other places.”

> Travelers report having seen the creature and having made a long detour to avoid it. It sometimes appears as a form in the clouds, either resting or in motion. A foreigner reports seeing, as he was entering Moanalua valley from Honolulu just as the moon was rising, “a shapeless white form,” a mist “convulsed with movement,” which passed over the treetops from the Koolau range, preceded as it came by “the wailing of dogs” and followed as it passed by “a deathlike stillness.” (Beckwith 1940:346)

The spirit form of Poki may be connected with signs in the sky that the Hawaiians call *‘ōuli*, which are animal shapes seen in the clouds that were used to foretell the movements of the chiefs. The *ali‘i* believed that these denoted the presence of their ‘*aumakua* (guardian spirits) in the heavens (Beckwith 1940:346-347). Poki had magic powers – he could stretch himself along the mountains, his hind feet on the mountain ridge and his head in the valley below, just as:

> . . . the night clouds, sometimes darkened by falling rain, sometimes enriched by the halo of lunar rainbows, and sometime glorified by the silver moonlight, continue to stretch from peak to peak along the mountains and watch over all the various forms of life in the valleys below. (Westervelt 1963a: 88-89)

Poki is also seen at night in Mānoa, especially if one is standing on Pōhaku kīkēkē, the bell-stone located in Kamō‘ili‘ili. By tradition, the bell stone gives clear vision to one who stands on it. If while standing on the stone, one wishes to see Poki, then he appears “stretched along the mountain and silvered by moonlight” (Westervelt 1963a: 87-88).

The association of Poki with Mānoa may be due to the dog’s shared name with Boki Kama‘ule‘ule, the high chief who owned much of the land in lower Mānoa. High chief Boki’s original name was ‘Īlio-punahele, meaning “favorite dog”; when Kamehameha got the dog “Boss” (Boki or Poki) he changed the name of the young chief from ‘Īlio-punahele to “Boss,” which was pronounced as Poki or Boki (Day 1984:13). Pūku‘i et al. (1974:188) say that many dogs were named Poki around the time of Boki’s birth, including dog guardians (*kia‘i*). Some Hawaiians say that the dog Poki is the spirit of Boki, who watches over and protects Mānoa Valley (Westervelt 1963a:88).

In recent times, several people still report seeing a strange dog that they identify as Poki. In 1971, a visitor at the Bishop Museum saw a white puppy, which began to grow larger and more terrifying as it ran towards him. He did not stop running from this apparition until he got to the Kamehameha Shopping Center (Grant 1996:215).

3.3.5 Malua‘e and the Underworld

In the tale of “Maluae and the Underworld” (Kamakau 1991b: 51-52; Westervelt 1963b: 14-20), Malua‘e was a farmer who lived at the back of Mānoa Valley.

> He kanaka mahiai o Maluae no uka o Manoa, o Kanaloaohookau kona ‘āina, a o ka maia kana ai kanu nui, he maia na ko akua, a ua mahiai i na ai e ae na laua me kana keiki a me kana wahine. (Kamakau, Ke Au ‘Oko‘a, Oct. 13, 1870)
>
> Translation:
>
> Malua‘e was a planter in the uplands of Manoa, Oahu. Kanaloaho‘okau was his land. He raised a lot of bananas as food for the gods, and he planted other food, ‘ai, for himself, his wife, and his son. (Kamakau 1991b:51)

Malua‘e always honored the gods by placing some of his crop on an altar to the gods, Kāne and Kanaloa, before taking the rest home.

> His bananas grew rapidly by the sides of the brooks, and yielded large bundles of fruit from their tree-like stems; his taro filled small walled-in pools, growing in the water like water-lilies, until the roots were matured, when the plants were pulled up and the roots boiled and prepared for food; his sweet potatoes . . . were planted on the drier uplands. (Westervelt 1963b: 14)

He had a son called Ka‘ali‘i, meaning “rolling chief,” who was a careless, rollicking child. One day the boy grew hungry and ate some of the bananas that Malua‘e had placed on the altar to the gods. In anger, the gods struck the boy dead. Malua‘e found the dead boy with a piece of banana still stuck in his mouth. He was so distraught that he lay down on his bed and refused to eat or drink. The gods regretted their action, remembering the long devotion of Malua‘e.

The gods gave Malua‘e a spirit body (‘*ano kino lani*) and a marvelous hollow cane (*ko‘oko‘o mana*) called Maku‘uko‘o, which contained food to give him strength, a war club and spear to fight off ghosts, and a piece of lava for fire. They took him to Moanalua where there was an entrance to Pō (*po pau ‘ole*), the underworld. After many confrontations with ghosts who tried to impede his journey, he found his son “down in the *papa-ku*” (the foundation of Pō), still choking on the banana. The father caught the spirit of the boy and began his way up, again, fighting ghosts with his club and spear and gaining strength from the god’s food. Finally they were completely surrounded by the ghosts, and Malua‘e poured out the lava from the hollow cane, causing the spirits to flee. The father stuffed his son into the hollow cane and escaped from the underworld. He made his way home and returned the boy’s spirit to his body. Forever after, both the father and son took food to the altar of Kāne and Kanaloa to honor and thank them.

3.3.6 The Woman Who Died and Came Back to Life

An historic account of a woman who died in Mānoa was told in the newspaper *Aloha Aina* in 1903 and recounted in the book “The Legend of Kewalo.” The account was given by Mrs. Lydia Kaloio and by Mrs. Malie Kamana, the half sister of Mrs. Keakealani Maikini, the woman who died.

> Keakealani was very ill and asked to see all her immediate relatives. When they had assembled she told them that she was about to die, and soon after she expired in the arms of her sister Malie. They laid her on a couch. *Rigor mortis* set in, but after three hours Malie noticed one of her sister’s big toes jerk once violently. Another hour passed, then the woman crowed like a rooster just learning to crow. Two hours later a slight breathing was noticed, after which she was heard to murmur “*I wai* (water).” Water was poured carefully between her clenched teeth. After another two hours she opened her eyes and spoke. (Green and Pūku‘i 1936:120)

Keakealani dreamt that she rose from out of her body, ran from the house, and began to ascend the slopes of Punchbowl.

> On the summit were many people making merry. Just below the summit on the west side stood a dark man who waved to her to hasten and join the crowd; on the east side stood an older relative and immediately behind her aunt she saw her sister Anela who had died some years before. The aunt beckoned and her sister called “Sister, come!” She noticed that her aunt wore a short blue *mu‘umu‘u* which she had been fond of in life. She hurried toward them and as she drew near, her aunt gave her a violent push which sent her rolling down to the foot of the hill. She rose to reclimb the hill, but her aunt kept shoving and pushing her toward her home in Manoa until she had returned to the place where her body lay. Then the aunt forced her to reenter her body through the big toe. The ankle-joint looked to her like a dark cave and she would have drawn back, but her aunt forced her on. She continued up through her body, each joint looking to her more terrifying than the last. The torso was like an inky-black cavern. At last as air filled her lungs, she felt herself crow and she awoke from her deathlike sleep. (Green and Pūku‘i 1936:120-121)

Sometime later Keakealani felt death coming again. She insisted that a new purple silk *holoku* (loose dress) be made for her to wear, since she had learned during her last illness that what one wore at the time of death is what one would wear in the spirit world.

3.3.7 Kānewai Pūnāwai

Kōnāhuanui is the highest peak in the Ko‘olau Mountains and is the northwest corner of the Mānoa Ahupua‘a boundary. It was the home of the gods Kāne and Kanaloa. It was where their parents came on their way to and from the east from above and from the right (*mai kahiki a mai ka hiwamai*), meaning it was the starting and resting point of the gods since the first formation of the islands (Bouslog et al. 1994:133). Kāne and Kanaloa fished in the ocean off Kahala (east of Mānoa Ahupua‘a). One day the two gods traveled inland, looking for fresh water to wash off the saltwater on their bodies. They came to Kamō‘ili‘ili, and Kanaloa said:

> “Where are the springs and streams of living waters? Our people are always singing the chants of your life-giving springs and stream. They tell me that they are in the clouds, the sun and the bowels of the earth. Can you give it to me now?...Kane turned to Kanaloa saying “Be patient, thirsty one.” (Bouslog et al. 1994:134-135)

Kāne struck his staff into the soil and the water flowed so that the sand was washed from their bodies. The white sand is still found in the area today. The spring is called Kānewai, or “the

waters of Kāne," and the stretch of sand is called Kanaloa. At this place Kanaloa placed a stone, called Pōhaku-kū-ula, a god to attract and snare fish (Bouslog et al.1994: 134).

This underground pool Kānewai was known for the healing powers of its waters (Williams 1935). These legends do suggest that the locale of Kānewai would have attracted the infirm, some of whom may have expired there in the course of seeking healing and have been interred in the area. It is also notable that myths of the waters of Kāne emphasize a theme of eternal return, a theme played upon in the account of the repeated subterranean passage of fishes to Kānewai from the sea. Such associations may have increased the perceived auspiciousness of the area as a place to inter the dead.

This spring is also mentioned in a legend concerning the Hawaiian pig god, Kamapua‘a, who made both a spring at Kānewai and a spring called Pa‘akea (also called Kumulae or Hausten Spring) in the adjacent land section of Kamō‘ili‘ili.

3.3.8 Hualani Pūnāwai

Kāne and Kanaloa traveled further up the valley and Kanaloa suggested that Kāne again use his stick to produce water. Kāne struck the cane deep into the earth to bring forth a crystal water. Kāne commanded that a spirit guard the water gourd bottle Hualani, meaning "dug up by heaven." The name given to the land around was Maka‘īlio, "the dog's watchful eye" (Bouslog et al. 1994:134).

3.3.9 Wailele Pūnāwai

Kāne and Kanaloa then traveled to the northwest, near to the present day athletic field of the Mid-Pacific Institute. He struck the ground so forcefully that the water came flying up, so it was called *wailele*, or "flying water." This spring became a fishpond filled with *‘o‘opu* (used by Hawaiians to describe a large variety of fishes included in the families Eleotridae, Gobiidae, and Blennidae), *‘anae* (mullet, *Mugil cephalus*), and *awa* (milkfish, *Chanos chanos*). Kāne put a *kapu* (prohibition) on this spring so that no woman should bathe in it, and he commanded that a sacrifice at Wailele should always be a yellow dog, "*he ‘īlio ka mōhai puakea*."

One *mo‘olelo* related to Wailele Spring concerns a larg *pōhaku.* This

> "Near this spring stands a huge rock known as Kua‘i o Mānoa, which at times took the form of a magnificent youg chieftain whose favorite past time was surfing. From his home at Wailele he would watch the ocean and, when he saw the nalu ōpū, the budding waves, he would lift his surfboard and wander down to Ulukou at Waikīkī. When he saw the shadows of the Mānoa hills fall across the valley, he would say to the surf, "E ho‘i i kua‘i o Mānoa ua ahiahi"- "I must return to the beauty of Mānoa. It's evening." (Bouslog et al. 1994:134)

This version of the story is found in *Mānoa The Story of A Valley* (Bousloug, et al). The spelling of Kua‘i is questionable in that it is very similar to Kau‘i [the beauty]. Pūku‘i defines "kua‘i" as "to remove internal organs of animals, disembowel; to clean, as chickens." *Kau‘i* rather then *kua‘i,* would be more logical especially when looking at the author's translation of "*kua‘i*" as "beauty" in the saying "E ho‘i i kua‘i o Mānoa ua ahiahi- I must return to the beauty of Mānoa. It is evening." Also the above version states that the "huge rock" is "near this [Wailele] spring," but the accompanying photo is of a smallish rock located inside the spring (Figure 9).

Mo‘olelo similar to the one described above, identifies a large rock to the west of Wailele Spring as Ka U‘i o Mānoa, and describe a very similar story with the exception that "chieftan" is a chiefess. See Nakuina's version below.

An alternate origin for the name of Wailele ("leaping water") Springs was recorded by Mrs. Emma Nakuina:

> The old belief was that these clear, bright waters had their origin on the heights above the valley, on the western side, at Kakea, and came leaping down through underground channels, to appear again in the Springs of Wailele, from which the adjacent lands took their name. (Nakuina 1907:25)

According to Nakuina (1907:24), there was one *heiau* and a sub-*heiau* associated with Wailele. The *heiau* was called Ka-ua-la‘a, meaning "the sacred rain." It was located under a grove of mango trees towards the eastern and lower ridge of Mānoa. A picture of this stone structure is printed in the August 1907 Mid-Pacific Student, so it must have been still extant at that time. Thrum does not record a *heiau* in Wailele in his list of the *heiau* of O‘ahu in 1907, but it may be one of the *heiau* mentioned by Thrum in his list of forts built by the chief Kūali‘i after his victory over the *menehune* at Kūka‘ō‘ō Heiau in Mānoa. Thrum (1892:112) reported: "After Kuali‘i obtained possession [of the menehune fort at Kūka‘ō‘ō], he made it the principal temple fort of a system of heiaus, extending from Mauoki, Puahia luna and lalo, Kumuohia, Kaualaa, Wailele, and one or two other points between Kaualaa and Kukao‘o."

A land area adjacent to Wailele is Kauwala‘a, which by Nakuina's description and the similarity of the name (Ka-ua-la‘a) is probably where the *heiau* was located.

> Here once stood the heiau or temple devoted to the cult of Ua-ku-a-hine or the "Rain of Manoa." She was a fabled goddess who was married to a human consort and here they dwelt together. In the lifetime of her husband she took on human form. But this happy union must perforce come to an end with the death of the poor mortal husband. The goddess, in her grief at this loss, dissolved in mist and rain, and floated away to her home in the Manoa range, where she dwells immortally on the ridge of Kumauna. From this vantage ground, high up amid the cold-capped peaks, she sweeps down daily, along the mountain side to her old home at Ka-ua-laa. (Nakuina 1907:24)

The sub-*heiau* of Ka-uwalo-malie was located west of Ka-ua-laa, across the baseball field on the Mid-Pacific Institute under a grove of Pride-of-Indian trees. The son of the goddess Ua-ku-a-hine was the high priest of both of these *heiau*. The smaller *heiau* was named for his daughter, Ka-uwalo-malie (meaning "the place of the silent crying"), ". . . whose application suggests the grief of her grandmother, the goddess, as she melted away into the rain of the valley on the death of her husband" (Nakuina 1907:24-25).

The high priest also had a granddaughter, called variously Kumu-hau-nani (meaning "the beautiful hau tree") or Kau‘i o Mānoa (meaning "the beauty of Mānoa"). She lived on a rounded knoll on the grounds of the Mid-Pacific Institute. She was betrothed to the chief Kāne-wai, who lived in Mō‘ili‘ili. She lived in sacred seclusion at Wailele, but longed to be allowed to go with the other maids of Mānoa to surf at the Waikīkī coast. Her grandfather, the high priest, granted her desire, with the condition that she should return at a certain hour to her *kapu*-guarded home at Wailele.

> With this condition she willingly complied in spirit, but, at times, amid the excitement of the ocean – sport, she would forget the directions given and tarry beyond the stated hour. Then her retainers would seek their charge and would call to her in words which were destined to live through coming years. “E hoi, e ke Ui o Manoa, ua ahi-ahi.” “Come, come home, O Beauty of Manoa; it is now sunset.” “Ke hea mai nei ka Ua-ku-a-hine ia oe.” “The rain Ku-a-hine is calling to you.” (Nakuina 1907:26)

This poetic phrase became a common saying and was used to call out to friends as they wended their way homeward once the days’ work was done.

Another reference says Kau‘iomānoa lived near the large rock called Kau‘iomānoa. She leant “her mantle of beauty to the Mānoa girls, as the valley was famous for its beautiful young women thirty years ago” (Dictionary of Hawaiian Localities, Saturday Press, Dec. 15, 1883).



Figure 9. Identified as “Kua‘i o Mānoa” at Wailele Spring (from Bouslog et al. 1994:134)

3.3.10 Punahou Pūnāwai

Punahou is also associated with the gods Kāne and Kanaloa (Figure 10). Kāne and Kanaloa came to O‘ahu on a pointed cloud from the land of Kuaihelani, one of Kāne’s twelve islands in the heavens. They traveled from Hanauma to Waikīkī. Kanaloa would often complain of hunger,

and Kāne, a kindly, courteous god, would strike the earth with his staff. This would cause water to gush forth, which they would use to mix their ‘*awa* (kava, *Piper methysticum*) drink.

As described by Pūku‘i and Curtis (1951):

> Ma ko laua alahele, ua hoomaha ihola ma ka puu o Keapapa (o keia kahi e kapa ia nei o Punahou) a hoomaka hou no o Kanaloa e ne i wai, me ka hoouluhua pu nohoi i ka hiki ole ia Kane ke hoopii mai i wai na laua. Aka ihola o Kane, no ka mea, ua lohe aku nei kona pepeiao i ka halulu o ka wai ma kookoo, a hu maila ka wai a nui. Ua lilo keia wai i mea e hoopomaikai i na kanaka o ka aina, oiai, ua olelo ia o keia ke kumu a ka wai i koaa ai kala wai ma kahi i kapa ia nei i keia wa o McCully Tract. Ua kapa ia keia wai a Kane, o Ka-puna-hou.
>
> Translation:
>
> On their way they rested on the Keapapa hill (at the place now called Punahou) and again Kanaloa teased his brother for water and challenged his ability to produce it. Kane smiled, for he could hear the noise of water within the hill, and he thrust his staff into the ground and the water gushed forth in abundance. It has been a great blessing to the natives of that region . . . This water of Kane was called “The new spring,” Ka-puna-hou. (Pūku‘i and Curtis 1951:112-115)

There is a second version of the origin of the spring.

A chief Kaha‘akea once lived in the Ka‘ala Mountains and had two twin children, a boy named Kauawa‘ahila (Wa‘ahila Rain) and a girl Kauakiowao (Mountain Mist). The children’s mother had died, and Kaha‘akea married a woman named Hawea to help take care of his children. Hawea also had a son, but since he was deformed and ugly, she soon grew jealous of the twins’ beauty. When Kaha‘akea went on a visit, Hawea began to persecute her step-children:

> Driven to desperation they fled to Konahuanui, the mountain peak above the Pali of Nuuanu, but were soon discovered and driven away from there by the cruel Hawea. They then went to the head of Manoa Valley. The step-mother was not at all pleased at their getting out of the way of her daily persecutions, and searched for them everywhere. She finally tracked them by the constant appearance of rainbows at the head of Manoa valley, those unfailing attendants of rain and mist. The children were again driven away and told to return to Kaala where they would be constantly under her eye, but the children ran and hid themselves in a small cave on the side of the hill of Kukaoo whose top is crowned by the temple of the Menehenes. Here they lived some time and cultivated a patch of potatoes, their food at this time being grasshoppers and greens. The greens were the leaves and the tender shoots of popolo, aheahea, pakai, laulele and potato vines by rolling hot stones around among them in a covered gourd. This is called the “puholoholo.”…When the potato tubers were fit to be eaten, the brother (Waahila-rain) made a double “imu,” having a “kapu,” or sacred side for his food and a “noa” or free side for his sister. The little cave that was their dwelling was also divided in two, a sacred and a free part for brother and sister. The cave can still be seen and the wall of stone dividing it in two was still intact a few years

ago, as also was the double imu. In older times it was tabooed to females to appear at any eating place of the males. (Nakuina 1893:102)

The stepmother drove them away again, and the children found two caves in the rocky hill back of Punahou, one occupied by the brother and the other by the sister (Thrum 1998:133-136).

> In his [Kauawa'ahila] trips around the neighborhood for fruit and greens he had noticed a large rain-water pond to the east of the hill on which they dwelt. This pond was called Kanewai. Here he sometimes came to snare wild ducks. He also had met and knew the Kakea water god, a moo, who had charge of and controlled all the water sources of Manoa and Makiki Valleys. This god was one of the ancestors of the children on the mother's side, and was on the best of terms with Waahila rain. The boy paid him a visit, and asked him to assist him to open a watercourse from the pond of Kanewai to a place he indicated in front of and below the caves inhabited by himself and his sister. The old water god not only consented to help his young relative, but promised to divide the water supply of the neighboring Wailele spring, and let it run into the watercourse that the boy would make, thus insuring its permanence. (Thrum 1998:136-137)

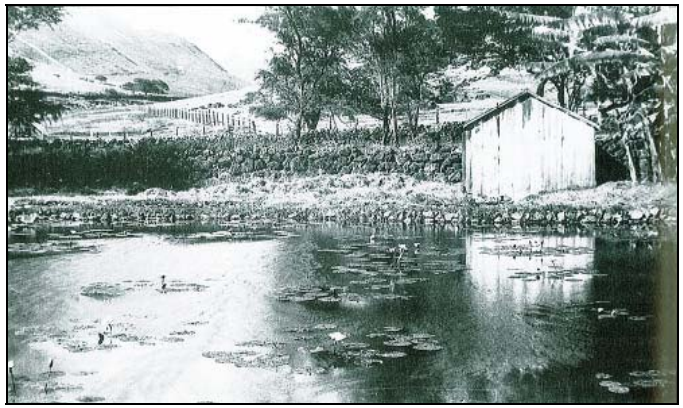


Figure 10. Kapunahou Spring (photograph from Bouslog et al. 1994:132)

The *mo'o* (water spirit) made a passage to open the underground. Kauawa'ahila dove into Kānewai Pond and came out at the place now called Kapunahou (the new spring). The gushing water soon formed a basin, which Kauakiowao was most surprised to see upon awakening. Kauawa'ahila planted some *kalo* (taro) patches around the spring, which attracted people to live nearby and become vassals to the twins. At the return of the children's father, Kaha'akea learned of the cruelty of Hawea; he killed her and then killed himself. Rocky Hill (also called Kaha'akea), the home of the children, was named for him (Thrum 1998:137-138).

A third story for the origin of Punahou spring concerns an old couple who lived at the foot of Rocky Hill in Mānoa. At a time of drought, the husband had to walk far into the valley for famine food, such as *kī* (or *tī*) roots and ferns. The woman, Kealoha, had to walk all the way to Kamō'ili'ili to fill her gourd with water. One night, after another tiring walk to Kamō'ili'ili, the woman had a dream. In the dream, a man asked why she was crying. She replied that she was so weary from the daily long walks to get water. The man told her that she did not have to go again, because there was a spring below a *hala* (pandanus or screw pine, *Pandaqnus odoratissimus*) tree near their home. Kealoha told her dream to her husband, Mukaka, the next day, but he made light of it. That night, Mukaka had a similar dream; the man told him of the spring under the *hala* tree and told him to make an offering of a red fish, wrapped in *tī* leaves, and cooked. The next morning, Mukaka made the offering and pulled up the *hala* tree. When the water began to gush, he cried out "Ka punahou! The new spring!" (Pūku'i and Curtis 1960:83-87).

A version of this story with more details was told by W.F. Alexander in 1911, who recorded that it was told to his grandfather by an old Hawaiian and his wife that had a *kuleana* (small family parcel) close to the spring of Kapunahou. In this version, the ceremony and offering are described:

> . . . He [Mukaka] went home with the fish, lighted the imu and cooked them in ti leaf wrappers. In the meantime the people gathered to eat the fish that had been prepared.
>
> The ancestral god was brought from its customary place with the ipu-o-Lono container. When the fish was cooked, the offering to the god was put into the ipu-o-Lono. The remainder was eaten by the people. (*Ka Nūpepa Kū'oko'a* 1915:5; translation from Hawaiian Ethnological Notes, Bishop Museum Archives)

From this legend, Punahou School adopted for their seal the *hala* tree with two taro leaves in the water flowing under it (Alexander and Dodge 1941:35-36).

The stone Pōhakuloa was a boundary marker placed at Punahou soon after this area was given to the American missionaries by Chief Boki. An appropriate stone was sought to serve as a marker and was found on the northeastern slope of Rocky Hill, nine feet long, seven feet high above ground, and two feet below ground. The workers dug hard the first day, but barely dislodged the stone. The second day, they were surprised to find their labors of the first day had been in vain, and the stone had worked its way even more firmly into the ground. The chief consulted a *kahuna* (priest) who said:

> Kuka kamailio iho nei lakou i keia mea ano e, a noonoo iho nei he pohaku kupua keia. Hele aku nei ke alii i ke kahuna e ninau pono ai, a i maila no hoi ke kahuna, "Aole kela he pohaku, aka, he kanaka! Mai kena aku e hele, e hoomalimali mua ia, a pau ia, nana no e hele." Kuhikuhi mai ke kahuna e hana i paina. E kii i puaa

> hiwa, niu hiwa, awa hiwa, moa hiwa, ia ula, poi lehua, a e kono i na kanaka hana e ai me no poe i akoakoa mai. A i ka pau ana o ka paina, eli hou aku nei na kanaka, o ka hemo no ia o ua pohaku nei.
>
> Translation:
>
> They discussed the marvel and came to the conclusion that his was a kupua stone. The chief consulted a kahuna. He said, “This is not a stone, it is a man, He is not to be forced, but coax him and he will go.” The kahuna proposed that a feast be prepared consisting of black pig, black awa, green coconut, black fowl, red fish, and pink poi, and the workmen and a number of others be invited to attend. After the feast the digging began again and the stone was soon out of the ground. (Green and Pūku‘i 1936:116-117)

Chief Paki (father of Bernice Pauahi Bishop), a powerful man said to be seven feet tall, lifted the stone upright. With men supporting the stone on each side, the stone moved of its own accord to its prepared place at Punahou. Laura Green and Mary Pūku‘i relate the later destruction of the stone:

> Some years later, Pohaku-loa was broken up. Annie Harris thinks that a part of it was removed to the Kapi‘olani Maternity Home and that the remainder is still to be seen standing at the front gate of the Punahou campus. (Green and Pūku‘i 1936:117)

Another version of this *pōhaku* is found in the archives of the Bishop Museum (Henriques Collection, 1925 Sites Commission Tablet).

> The Pohakuloa stone was worshipped in the old days by Hawaiian women, who prayed for the endowment of their children with wisdom and strength.
>
> Appropriately, this stone was used as part of the wall when Punahou School was founded in 1830. The tabu which endangered anyone who helped move the stone was removed by Kamehameha III, who challenged the tabu by sitting on the giant Pohakuloa stone—twelve feet long and weighing several tons. By the grace of the king’s presence, the Hulumanu or body guard of the king were able to carry the stone to its place in the wall. The men were “numerous as ants tugging at a kernel of corn.” Pohakuloa was broken up in 1856. This is the largest piece of Pohakuloa that is in existence today. (Henriques Collection, 1925 Sites Commission Tablet, cited in Sterling and Summers 1978:283)

3.3.11 Ka‘aipū Pūnāwai and Pōhaku

After Kāne created the spring at Kapunahou, Kanaloa suggested that they return to their home at Kōnāhuanui. They traveled through Mānoa over ‘Aihualama to the heights of Pu‘u o Mānoa (Rocky Hill) onto the plains to the land of Kulumalu (where the Castle home was later built on ‘Ulumalu Hill), which means “the shade of the breadfruit.”

> Kulumalu was *o‘io‘ina o nā akua*, the rest temple of the gods and the place where the food for the gods was cooked. Kanaloa, as usual, complained of being thirsty and Kāne answered gently, “Wait, thirsty one, until we get to Kala‘i” . . . [now the site of the Salvation Army’s Mānoa headquarters]. Kala‘i, known as the road of the gods, is where they rested and dined. At Kala‘i, Kanaloa still chided Kāne by saying, “Where are the springs of living water, Kāne? My mouth is dry and I shall wither up.” Kāne then turned to Kanaloa and said, “Let us go down the knoll and there we will find the entrance to the lizard goddess’ home, where you will find cool waters to quench your thirst.” After they had walked a few rods for Kala‘i and down a hollow place, Kane struck his magic cane into the ground and there burst forth the spring of Ka‘aipū, “the girdle of the cluster,” meaning a gateway. Kāne then created a supernatural guardian called Ka‘aipū, who was formed into a stone fish with its mouth wide open to guard the spring. This spring was the first gateway to the home of the Kihanuilanilulumoku, the Mo‘o or lizard goddess of Mānoa, who lived in the upper springs with her other fairy companions. These were the wives of Kāne and Kanaloa. Ka‘aipū the stone god is still on the premises of Ka‘aipū. It is said that Ka‘aipū often changed its form when it dwelled in the spring it would be an eel and represented a beautiful mermaid; at other times it would take the shape of a warrior. (Bouslog et al. 1994:135-136)

Thrum (1892:115) also discusses this sacred stone of Mānoa:

> Kaipu figures also in the valley legends as possessing a stone of peculiar merit and power, from which the land takes its name, and was believed by the natives to bring good or ill-fortune to its possessor according to the honor bestowed upon it. The stone is about four feet in length, somewhat tapering toward one end, and having a rather smooth bore of about three inches in diameter running through its entire length. The larger end has sufficient irregular regularities to furnish those superstitiously inclined with the idea of a face, the bore mentioned serving for its mouth, into which sacrifices of food used to be placed. Thus the god Kaipu held power over Manoans in days gone by.
>
> Ka‘aipu was an akua wahine pohaku. A local pohaku god in Manoa, with an opening on the top of his “Head,” which was considered as another mouth. (Malia Kamana, as told by Mrs. M. Pūku‘i, 3/16/54, to C.C.S, cited in Sterling and Summers 1978:285)

A third legend says that Ka‘aipū was the name of an area noted for the sweetness of its mountain apples. A great wizard who lived there was turned into the stone (Dictionary of Hawaiian Localities, *Saturday Press*, Dec. 15, 1883). This stone was in the ‘*ili* of Ka‘aipū, which was later owned by a farmer Carlos A. Long, who used the land for a fruit orchard; and then owned by the Montanos, who used it to graze the cows for their business, the Ka‘aipū Dairy. It later became the site for the Salvation Army’s Wai‘oli Tea Room.

This spring is also called Pū‘ahu‘ula (Sterling and Summers 1978:288, citing an article on “O‘ahu Place Names,” *Hōkū o Hawai‘i*, Feb. 11, 1930). The famous female *mo‘o*, Kiha-nui-lūlū-moku (great island-shaking *mo‘o*), lived here; she had eel, lizard, and woman forms, and made plants thrive in Wa‘a-loa ravine. Pū‘ahu‘ula means “feather-cloak spring” (Pūku‘i et al. 1974:190-191).

3.3.12 Wa‘aloa Pūnāwai

After leaving the Pū‘ahu‘ula springs of the *mo‘o* Kahanuilanilūlūmoku, Kāne and Kanaloa traveled up the valley, past Puka‘oma‘oma‘o, later the residence of Queen Ka‘ahumanu.

> They traveled on to Kahoiwai, where again the petulant Kanaloa said, “Where are your waters, Kāne? Your waters do not follow you!” Then Kāne gently said to Kanaloa, “Thirsty one, why not drink from this stream of rushing water?” The mischievous Kanaloa answered, “I do not want these waters. I want the waters that you profess to bring forth by your magic power. I am wandering with the god of bubbling springs and still do not have water to mix my ‘awa.’”
>
> Kāne turned to Kanaloa for the last time and said most kindly. “Wait a little longer, thirsty one, and I will give you of the life-giving water of Wa‘aloa, or ‘long canoe,’ at the garden of Kihanuilanilūlūmoku, where she happily spends her hours near the falls of *nāniu a pō*, the coconut trees of night. At this place her retinue cultivates the *kalo, hō‘i‘o* and sweet potato in our canoe for food.” (Bouslog et al. 1994:136)

The gods entered a ravine shaped like a canoe and Kanaloa struck his cane into the bowsprit of the canoe, creating Wa‘aloa Springs. Kāne and Kanaloa stayed awhile in this place in the company of the mermaids at the garden of Kihanuilanilūlūmoku.

A Hawaiian chant also speaks of Wa‘aloa as the garden owned by a legendary woman named Kihanuilūlūmoku-wahine. This woman, in a company of mermaids and *menehune,* went to her garden each month a few nights before the full moon. They planted taro, sweet potatoes, bananas, *hō‘i‘o,* bamboo, *kī*, *hala*, ginger, *lehua,* and other plants. As they worked they chanted:

O moon of the night of Hua,	Until Māhealani, the Full Moon, comes;
That brings fruit and food to the plants	For when Māhealani is here, Kulu, the Moon of
Here is the *kalo* plant,	Moisture will follow
The life of the land,	And the plants will show a bud
I give to the earth, Honua;	Then comes Kaloukūlua, thy companion.
Here is the sweet potato branch	To the plants they will bring two shoots,
I plant for thee and me;	And help thee, Hua, to bear the fruit.
Here is the shoot of sugar cane,	So, Kāne, God of Water,
So sweet to taste and eat,	And Hina, Mother of Mists,
The emblem of desire’s success;	Send your aloha down to us in moonlit mists.
I place it in the earth, Mother Earth.	Let it sweep along the hillside.
O Moon of the night of Hua,	Keep the new growth a-growing
Keep the plants green and alive	That your people from the night will live.

The mermaids would sing this as they came from the central springs of Mānoa Valley to the mountain freshets, all of which would provide water to the ‘*auwai* used to grow crops (Bouslog et al. 1994:213-214).

3.3.13 Waiakeakua Pūnāwai

According to the “Legend of the Waters of the Gods,” Waiakeakua is one of the many springs in Mānoa associated with the brother gods, Kāne and Kanaloa. When Kanaloa was weary of his stay with the mermaids at Wa‘aloa, he journeyed into the next ravine.

> As he traversed along the steps of the *menehune*, the legendary race of small people, and stood on the fern-clad slopes running down to the edge of the stream, he saw for the first time the beautiful virgin Kameha‘ikana sitting on a rock next to a nearby spring, accompanied by her stubborn old nurse. Rogue that Kanaloa was, he immediately made up his mind to possess her and began to chant to her of her beauty. Although she was somewhat flattered by Kanaloa’s attention, Kameha‘ikana resented his boldness. Her watchful, stubborn old nurse, seeing his attitude, called out in anger. “You cannot have this water,” meaning the young virgin. Whereupon Kanaloa became very angry at being repulsed and suddenly rolled a huge boulder down upon them and covered up this spring. This stone is called the sensitive stone of Waiakeakua, the waters of the gods Kāne and Kanaloa. During the season when the *‘ōhia‘ai* mountain apple, is in bloom, the stone’s color changes to a brownish red. Delicate wild flowers called “Kameha’ikana’s tresses” grow around this rock. Upon being closed with the boulder, the water of the spring was forced up onto the moss-grown boulders, which form the basin at the base of the ravine. Two little trickling streams issue from this rock, which is known as the breast of the beautiful goddess Hina. These two streams then fall into the basin below, which is also known as Waiakeakua, the water of the gods. (Bouslog et al. 1994:136-137)

A second version of this story has both Kāne and Kanaloa traveling to Waiakeakua Waterfall.

> Ia laua e ku ana ma ia wahi, nana aku nei i ke alo pali, a ninau aku nei o Kanaloa i kona kaikuaana, ina ua manao oia he wahi noho ia no ke kupua. Pii aku nei laua i kekahi pali laumania, a ike aku nei i kekahi wahine ui e noho mai ana me kona kahu wahine. O Kamehaikana ka inoa o keia wahine kupua. I kahi wa he kino kanaka ko laua, a i kahi wa, he kino pohaku, oiai ua loaa in na kupua ka mana e hoololiloli ai i ko lakou ano. Komo ihola ka iini iloko o Kane a me Kanaloa no keia ui nohea o ke uka o Manoa. I kona haka pono ana mai nohai, ua komo no ka hoohihi no keia mau akua e ku aku nei. O ka hoomaka no ia Kamehaikana e mino aka ma ke ano hooha‘i. Aohe i ike ke kahu o ke kanaka hea la o laua i hoohihi ai kana hanai, a i kona ike pu nohoi, i koi anei hooha‘i maoli, ua piha oia i ka inaina. Minamina loa ia o lilo ka luhi ana, nolaila ua leleino aku nei oia mawaena o na malihini a me kana hanai, a kino ke poo ilalo a paa loa. Lele mai nei o Kane e hoopakale iaia, aka, aole nai i hiki. Ke ku nei no ke kino o ke kahu o Kamehaikana a hiki i keia la, ilalo ke poo a iluna ka wawae. Kahi a Kane i hehi ai, ke waiho ala
>
> no kona kapuai. Ma kahi o na akua i ku ai, na kupu ae he mau kumu ohia e luhe ana na lala maluna o ka ili wai. Ua make keia mau kumu laau, a o na keiki keia e ulu nei, a e ku kiai nei i “Ka wai a ke akua.”
>
> Translation:
>
> As they stood facing the cliff, Kanaloa asked his older brother if there were *kupua* [spirits that have human and other forms] in that place. The two climbed a perpendicular cliff and found a pretty woman living there with her woman

attendant. Kamehaikana was the name of this *kupua*. Such was the nature of the two women that they could appear in the form of human beings or of stones. Both Kane and Kanaloa longed to possess this beauty of upper Manoa. The girl herself, after staring at them, was smitten with love for the two gods. Kamehaikana began to smile invitingly. The attendant saw that her charge did not know which one of the two gods she wanted and knew that if they both got hold of her she would be destroyed, and she was furious. Fearing death of her beloved one, she threw herself headlong between the strangers and her charge and blocked the way. Kane leaped to catch the girl but could not reach her. The body of Kamehaikana's attendant stands there to this day, with the head down and the feet up. The mark of Kane's footprint remains where he trod. At the place where the gods stood, mountain apple trees sprang up whose branches drooped over the surface of the water. The original trees are dead, but their seedlings are grown and guard **"**The water of the gods**." (**Green and Pūku‘i 1936:114-115)

Kameha‘ikana, meaning "a multitude of descendants," was one of the alternate names of Haumea, the goddess of childbirth (‘Ī‘ī 1959:44). Another name for Haumea is Walinu‘u (Beckwith 1940:281-283), who was a *mo'o* goddess.

A third version of this story names Kawaiakeakua, or Waiakeakua, as the pool associated with this legend. Kāne and Kanaloa found excellent ‘*awa* (plant used to make a narcotic drink) in Mānoa Valley, but Kanaloa wished to know where they could find water.

Kane replied, "Here in this hill side is water." So he took his staff and struck it fiercely against the precipice by which they had found awa. Rapidly the rocks were broken off. The precipice crept back from the mighty strokes of the god and a large pool of clear, cool water nestled among the great stones which had fallen. There they mixed awa and water and drank again and again until the sleep of the drunkard came and they rested by the fountain they had made. This pool is still at the head of Manoa Valley, and to this day is called Ka-Wai-a-ke-Akua (The water provided by a god). (Westervelt 1963a:41)

The waterfall above the pond was also known as Waiakeakua.

He ua paa unau iluna o keia kuahiwi ma kona moolelo ma kona moolelo oia wahi e iini ni o na malihini e makaikai ai he wai hi lele mailuna mai, a hokio keia wai a nona keia inoa Kawaiekeakua he ui ke nana aku laia e kaulana nei. O kahi keia o ka poe menehune e hiamoe a i ke ao, a po hele nui e hana i na heiau a loko ia a o ke ano ae a lakou e ike ai. (Hōkū o Hawai‘i, February 18, 1930)

Translation:

Visitors like to go and see a certain waterfall that drops from above into a pool. The name of this famous place is Kawai-a-ke-akua and is beautiful to see. This was where the menehunes slept in the day time and when night came they went to build heiaus, ponds or whatever they chose. (translation in Sterling and Summers 1978:288)

The pond was formerly a favorite place for picnics, drinking water, and swimming for the *ali‘i* visiting and living within the valley (Mrs. Marie H. Brown, Informant, J.F. Stokes, Sites Notes, cited in Sterling and Summers 1978:288). It was known as *wai hui a Kanaloa*, and wives were supposed to drink from the life-giving waters (Bouslog et al. 1994:137). The servants of King Kamehameha filled calabashes of water from here, using a stalk of *kī* or a banana leaf to funnel the water on the rock to a gourd. They then traveled down the valley swinging the gourds from the ends of sticks laid over their shoulders.

. . . When they came near any individual or group of Hawaiians they had to call out loudly, giving warning so that all by whom they passed could fall prostrate before the gift of the gods to the great king. (Westervelt 1963a:41)

3.3.14 Hills, Mountains, Peaks, Ridges and Caves

There are numerous hills, mountain peaks, and caves in Mānoa Valley which have legendary associations. On the *mauka* border in the Ko‘olau Mountain range are the peaks, Pu‘u Lepalepa, Awāwaloa (Mount Olympus) and Kōnāhuanui. The word *lepalepa* means "to hang in fringes or tatters" (Pūku‘i and Elbert 1986:203). Awāwaloa means "long valley or gulch" (Pūku‘i and Elbert 1986:35, 209). Kōnāhuanui, the home of the gods Kāne and Kanaloa, is the highest peak in the Ko‘olau Mountains. The place name means "large, fat innards" and refers to a story about a giant who threw his testicles (*kona hua nui*) at a woman who escaped from him (Pūku‘i et al. 1974:117).

Konahuanui, pali of O-ahu, was named because when a man, probably a giant, chased a woman who escaped into a cave, he tore off his testes and threw them at her. (I heard Dr. Brigham give this explanation long ago.)

Though the sexual explanations may be revolting it is perhaps better to make them than to have future malihinis [foreigners] delving into the meanings, and securing wrong translations. . . . (Lyons 1916:936)

The peak of Kōnāhuanui is pictured by Hawaiians as the highest point of the ridgepole of a house, the house is a legendary burial cave for the high *ali‘i* that the Hawaiians believed existed under the Ko‘olau Range between the districts of Kona and Ko‘olauloa.

Hookahi anahuna kaulana ma Oahu. O Pohukaina ka inoa, aia ma ka pali o Kanehoalani mawaena o Kualoa a me Kaaawa, aia ka puka i manao ia ma ka pali o Kuolo e huli la i Kaaawa, a o ka loa o ka puka, aia ma ka punawai o Keahuula-punawai. He anahuna alii keia, a he nui ka waiwai huna iloko a me na‘lii kuhiko.

. . . kekahi puka, a o kauhuhu o kauaoku o keia hale anahuna, oie no ka mauna o Konahuanui a iho i Kahuku. Ua olelo ia ma ka moolelo a kanaka, ua nui ka poe i komo iloko me ua ihioho kukui, inui Kona aku nei a puka i Kahuku.

A maloko a keia anahuna, he mau halokowai, he mau muliwai a mau kahawai, ua hana kinohinohi ia, a ma kauwahi aku, he mau aina palahalaha. (Kamakau, Ke Au ‘Oko‘a, Oct. 6, 1870)

Translation:

> There is only one famous hiding cave, *ana huna*, on Oahu. It is Pohukaina. The opening on Kalaeoka‘o‘io that faces toward Ka‘a‘awa is believed to be in the pali of Kanehoalani, between Kualoa and Ka‘a‘awa, and the second opening is at the spring Ka‘ahu‘ula-punawai. This is a burial cave for chiefs, and much wealth was hidden away there with the chiefs of old. . . .The mountain peak of Konahuanui was the highest point of the ridgepole of this burial cave “house,” which sloped down to Kahuku. Many stories tell of people going into it with kukui-nut torches in Kona and coming out at Kahuku. Within this cave are pools of water, streams, creeks, and decorations by the hand of man (*hana kinohinohi‘ia*), and in some places there is level land. (Kamakau 1991b:38)

On the western border of Mānoa are four peaks, Kaumuhonu, Pu‘u Makani (literally, windy hill), Pu‘u Laulā (literally, broad hill), and ‘Ualaka‘a, or Round Top. Pu‘u ‘Ualaka‘a, which is on the boundary between Makiki and Mānoa Valleys, has many legendary associations, and alternate stories of the origin of its name, which means “rolling sweet potato hill.”

On the eastern border of Mānoa, along Wa‘ahila Ridge, are six peaks: Keanapoi, Pu‘u Pia (literally, arrowroot hill), Pūkele (literally, muddy), Akāka, Kūmauna, and Paliluahine. Pūkele is also called Palikū, which means “vertical cliff.” Akāka, or Aka‘aka (meaning “laughter”), and Kūmauna are peaks mentioned in the Legend of the Princess of Mānoa. Paliluahine, meaning “cliff of the old woman,” has associations with Kamehameha I and older legends. In the central area of the western valley are a series of peaks and hills, Sylvas, Puka‘ōma‘oma‘o, Pu‘u Ahula, ‘Ulumalu, Pu‘u Pueo, and Pu‘u o Mānoa (Rocky Hill or Keapapa). The legendary associations for these landmarks are described in more detail below.

3.3.15 Wa‘ahila Ridge

Wa‘ahila is the name of the ridge dividing Mānoa and Pālolo Ahupua‘a. It is also the name of a beneficent rain associated with Mānoa and Nu‘uanu Valleys. This association is mentioned in the saying “*Ola ke kai o Kou i ka ua Wa‘a-hila,*” meaning “the land of Kou [Honolulu] lives by the Wa‘a-hila rain.” Wa‘ahila is also the name of a chiefess who excelled in a *hula* dance named for her (Pūku‘i et al. 1974:218; Pūku‘i and Elbert 1986:375).

The association of Wa‘ahila with wind and rain is also mentioned in the Legend of Kuali‘i. Kuali‘i was a celebrated chief who possessed some knowledge of the gods and sometimes could assume the attributes of a deity. He was a great warrior, and two brothers composed an *oli* (chant) to honor the chief and recount his exploits. Within the chant (Fornander 1917a, Vol. IV:392-393) is the following description:

I ke ala ihi, i ke alaloa,	Along the sacred road, along the long road,
I ke alaloa e heleia la-la,	Along the highway traveled by him.
Aole i like Ku.	Not like these art thou, Ku.
Aole i like i na laki,	Not like the ti leaf—
I ka laki pala o Nuuanu.	The yellow ti leaf of Nuunau,
I heheia e ka ua e ka makani a helelei.	Softened by the rain and wind till it falls;
Ka laki pala i ka luna i Waahila-la.	The yellow ti leaf on the heights of Waahila.
Aole i like Ku.	Not like to these art thou, Ku.
Aole i like i ka Waahila.	Not like the Waahila [wind].

3.3.16 Kaumana Pōhaku

Kaumana may have been an alternate name for Wa‘ahila Ridge, at least the *makai* portion of the ridge. Informant Solomon Kauai related an account of a fourth famous stone known as “Kaumana,” which may have been located near the present-day location of the Sacred Hearts Academy in the neighborhood of Mō‘ili‘ili. The legend of this *pōhaku* is presented in detail in the Waikīkī section of this report.

3.3.17 Akāka and Kūmauna Peaks and the Princess of Mānoa, Kahala-o-Puna

Several places in Mānoa are mentioned in the legend of “The Princess of Mānoa,” including the peaks Akāka and Kūmauna at the back of the valley. This story tells of the beautiful woman Kahalaopuna, also called Kaikawahine Ānuenue, meaning “the Rainbow Maiden” (Westervelt 1963b:84). This story has several versions with different place names emphasized and different endings.

The Princess of Mānoa was the daughter of Kahaukani (the *hau* tree wind of Mānoa) and Kauakuahine (the sister rain of Mānoa), who were the twin offspring of the mountain peaks ‘Aka‘aka (the peak now called Akāka), meaning “laughter,” and Nalehua‘aka‘aka, meaning “the *lehua* buishes of ‘Aka‘aka,” the neighboring promontory (Kalākaua 1990:511). In commemoration of this union, “the growth of *lehua* (*lehua ‘ōhi‘a*) bushes crowning the spur of ‘Aka‘aka, is said to still attest” (Thrum 1892:111). The twins were kept apart in their youth and raised by foster parents; the chief Kolowahi took the boy and his wife Pōhakuakalā took the girl. When the wind and rain twins of Mānoa were later married, it brought to Mānoa Valley “an inheritance of rainbows and showers for which it has since been distinguished” (Kalākaua 1990:512).

The union of the twin sister and brother resulted in a concentration of *mana* (power) in Kahalaopuna, so that she always gave off a rosy light.

> Her cheeks were so red and her face so bright that a glow emanated from them and shone through the thatch of her house when she was inside; a rosy light seemed to envelop the house, and bright rays constantly played over the house. When she went to bathe in the spring below her house, the rays of light surrounded her like a halo. The natives maintain that his bright light is still occasionally seen at Kahaiamano indicating that the spirit of Kahalaopuna is revisiting her old home. (Thrum 1998:119)

She lived in a grove of *‘iliahi* (sandalwood) trees at Kahaiāmano on the road to Waiakeakua, a pool within the tributary stream to Mānoa Stream. She often bathed at the sacred spring called Lua‘alaea. Kahalaopuna was betrothed in infancy to Kauhi, a young chief from Kailua (or Waikīkī in some versions). She was famed for her beauty, and one day, two lesser chiefs, named Kūmauna and Keawaawaki‘ihelei, claimed that they had been intimate with her. Her fiancé, hearing this rumor and believing that she had been untrue to him, went to Kahaiāmano and led her away from her house to Hualea, where he killed her and buried her. An owl god, her personal guardian spirit, or ‘*aumakua*, dug her up and resuscitated her. Kahalaopuna sang a lament of her cruel fiancé, Kauhi. who heard the lament and returned to Hualea and told Kahalaopuna to follow him again.

Kauhi killed her twice more, each time telling him to follow him, then killing and burying her; each time the owl again resuscitated her and brought her back to the living. On the third time, Kauhi buried his fiancé under the roots of a tree and the owl could not free the girl; instead, two spirits revived the girl. A young man, in some versions called Mahana, found her and took her back to his home in Kamō'ili'ili (old name for Mō'ili'ili, a land area in Mānoa). Kauhi was eventually punished for his cruelty and Kahalaopuna married her young rescuer (Thrum 1998:188-132). The lands and fishponds of Kauhi were given to Mahana, who ruled as a chief of these lands, with the beautiful Kahalaopuna as his wife for many years (Skinner 1971:220-222).

A second version of this tale has a darker ending. Kahaiāmano, the home of Kahalaopuna, means "the shark sacrifice," which is related to one alternate ending of the story. In this version, Kahalaopuna was killed five times by her fiancé, and revived four times by the owl. On the fifth murder, Kauhi buried her underneath a *koa* tree, so that the owl could not dig her up. Kahalaopuna's spirit called to several passerbys, including a young man who carried her to his home in Mō'ili'ili. The man's older brother and two spirit sisters carried Kahalaopuna to Mau'oki, an underground pool at Kamō'ili'ili to revive her. These healing waters were then called "the waters of Kahalaopuna."

The young man next provoked Kauhi into a dispute, claiming that Kahalaopuna was alive, which Kauhi denied. Kahalaopuna appeared and her grandfather 'Aka'aka testified that this was indeed his granddaughter, proving Kauhi to be a liar. Kauhi was put on trial with the *mo'o* of O'ahu as judges. As punishment, Kauhi, his followers, and the two men who falsely accused Kahalaopuna were baked in an *imu* (oven) at Ulukou ("grove of *kou* trees"), Waikīkī, near the side of the stream 'Āpuakēhau, a place close to where Mānoa Stream used to empty into the sea.

Some time following the night of the death of Kauhi, a tidal wave sent by a shark god swept over the land, carrying out the bones from the *imu* on the beach. The spirits of Kumauna and Keawaawakiihelie were transformed into two peaks at the back of the eastern side of Mānoa Valley (Thrum 1998:131). Kauhi, whose '*aumakua* was the shark god, was turned into a shark. 'Aka'aka learned of the transformation and urged his granddaughter to never go into the sea. The daughter obeyed her grandfather for two years, but one day when the surf was fine and there were many people in the ocean, Kahalaopuna decided the water was safe and took a surf board into the ocean. Kauhi now had his chance for revenge and bit her body in half, eventually dragging it to Wai'anae where it was completely devoured in a school of sharks.

In sorrow Kahalaopuna's parents and grandparents deserted their human forms. The father became the Mānoa Wind; his physical form was a grove of *hau* trees below Kahaiāmano. The mother became Mānoa Rain and her rain form could also sometimes be seen near Kahaiāmano. Kahalaopuna's grandfather 'Aka'aka became a mountain spur, and his wife, Nalehua'aka'aka, became a thicket of *lehua* bushes on the spur (Kalākaua 1990:511-522).

Fornander's version of the story tells of Kahala-o-Puna (the sweet-scented *hala* flower of Puna), called the princess of Mānoa (*ka'iu-ol-Mānoa*). She was the beautiful daughter of Ka-ua-kuahine (The rain of the mountain ridge) and Ka-hau-kani (the Mānoa wind), who were the twin sister and brother born to 'Aka'aka and Na-lehua-'aka'aka, which are the names of a projecting spur of the ridge and the red *lehua* bushes that grow upon it. Kahalaopuna was so beautiful that rainbows always played about her home, called Kahaimano, which was on the trail to the spring Kawaiakeakua. Mānoa girls later born in this area were also known for their beauty (Beckwith

1940:152-153), so much so that it was also called *ka ui o Manoa*, the "valley of beauties" (Nakuina 1904:42).

Kahalaopuna was affianced to Kauhi, a man from a powerful family of Ko'olau or Waikīkī. Two mischievous men said they had enjoyed her favor, which drove her fiancé into a jealous rage. Kauhi went to Kahalaopuna's house and asked her to follow him. He led her to the uplands of Pōhākea (area between 'Ewa and Wai'anae), where he struck her. Kahalaopuna chanted the following lines (Fornander 1918, Vol. V:190-191):

Kuu kane mai ka uka o Kahoiwai,	My husband from the uplands of Kahoiwai,
Mai ka uka laau hihi i ka nahele	From the uplands where the creeping trees grow,
Kuu kane o Kahaiamano e! Auwe!	My husband from Kahaimano, alas!
Me he mano la no ka lili ia'u,	Like unto a shark is your jealousy of me,
Ka hoi koke mai no nanahu ia'u	Quickly returning to bite at me,
O kuu nui aloha, ua hai iho nei e! Auwe!	My great love for you is, however, broken, alas!

Kauhi then beat her to death, and her spirit flew to the top of the tree and chanted her story, where passersby heard her and informed her parents. The parents dug up the body, found it still warm, and revived her to life (Beckwith 1940:152-153).

After Kahalaopuna's final death, her mother melted into the rain called Luahine-o-Mānoa. Her father became two things, a *hau* tree, and the wind in the valley. This *hau* tree supposedly could still be found up to the time of Queen Emma, and would groan and sigh whenever an *ali'i* died. According to Mary Kawena Pūku'i, March 16, 1954, cited in Sterling and Summers 1978:289), the property was later acquired and the tree was destroyed.

Kaho'iwai was the name of the home of Kahalaopuna and the name of the area where she still is supposed to be "mourning and wailing her death in consequence of her husband's rash anger" (Dictionary of Hawaiian Localities, *Saturday Press*, Dec. 1, 1883). A stream and adjoining land at the head of Mānoa Valley near Kaho'iwai, is known as Kahaiāmano (Dictionary of Hawaiian Localities, *Saturday Press*, Dec. 1, 1883), and is mentioned in the legend of Kahalaopuna.

In a third version of the "Legend of the Princess of Mānoa," the two men who accused Kahalaopuna of infidelity, were Kūmauna, who had a humped back and Keawaawaki'ihelei, who had a disfigurement called *maka-helei*, in which the eyelid is turned in such a way as to display the inner red membrane. These men were mountaineers, dwelling with a few retainers in the eastern corner of Mānoa Valley, in a place called the Canyon of the Makaweli. In this version of the tale, Kauhi leads Kahalaopuna first up the slopes of 'Aihualamaiki adjoining Kahaumakaawe. This slope was formerly covered by *koa* and *lama* (*Diospyros* spp.) trees. Near a large rock half way up the slope, Kauhi kills his fiancé with a blow to the head with a bunch of *hala* nuts.

> It was the belief of the mountaineers of the olden time that the spirit of the murderer Kauhi haunted the trail between Manoa and Nuuanu, and that often maile and fern gatherers were startled by a faint and mournfully sweet song changed by the spirit of Kahalaopuna, and the answering despairing wail of Kauhi, "O, my wife, come back to me! I was wrong." "*E ku'u wahine-e*, *hoi ma-i. Ua hewa wa-u*."
>
> In the eastern corner of Manoa Valley can be the seen the peak of Kumauna, with a hump on the back of the ridge leading up the peak, and alongside of it the ravine

> of Keawawa-Ki‘ihelei. These places belong to and are called after the two wicked men who were the cause of the sad death of Kahalaopuna.
>
> And when the gods realized that their favored maiden had been murdered, they decreed that the rains would fall daily about the valley of beauty, their tears in memory of her graces. (Nakuina 1904:45)

An alternate version of this story transforms many of the main characters into gods. According to this version, at the head of Mānoa valley lived Hine, the spirit of the rain-clouds, and Kani, her husband, who was the god of the winds. They had one child Kaha, who was so beautiful that the god of the sea asked for her to be the wife of his son, Kauhi, the prince of the sea. Kaha cared nothing for Kauhi, but “loved best of a swift flight in the cloud-chariot of Hine, when, driven by the winds of Kani, it skimmed over the shining green earth and far out above the blue ocean. It was such fun to spy out the little grass huts of the earth-folk, and pour down swift gusts of rain, just to see the people scurry to shelter” (Day 1906:2). One day Kaha spied some Hawaiian youngsters dragging up their *hōlua* (traditional sliding) sleds to the top of a hill. The rain from Hine’s cloud poured down and made the sleds too wet to use. One of the youngsters, a chief called Mahana, looked straight up into the clouds and shook his fist. When Kaha looked into the man’s eyes, she thought he was much finer than her own fiancé, Kauhi.

Hine saw the look in Kaha’s eyes and took her for a while to the other side of the mountain valley. Mānoa became parched and all of the waterfalls dried up. Kaha grew sad on the damp windward side of the mountain, missing the sunshine of her own home. One day while she was sitting on a high rock looking into Mānoa, a dense cloud surrounded her and lifted her out of the mountains. When she reached the earth, her form was that of a beautiful mortal girl. Kaha found Mahana and the other people and spent a wonderful day sledding down the hill over and over. At the end, Mahana asked her to be his wife. Kaha, who now realized that she was mortal and could not return to her own air-people, accepted and lived with Mahana and his people. One day, Kaha swam far past the reef to gather seaweed. A shark could be seen from the shore, but Kaha was gone. The shark was a form of Kauhi, who had seen Kaha and meant to return her to her own air-people, but since Kaha had become mortal, the bite of the shark was fatal, and he returned her body sorrowfully to the shore. The people laid her in a grave in the central part of the valley where the weeping of Hine and the wailing of Kani can still be heard. The children of Mānoa sometimes say “Oh, there comes Hine with her tiresome tears!” (Day 1906:1-11).

3.3.18 Pali Luahine and Kamehameha’s Cave

On the eastern corner of Mānoa Valley there is a series of foothills called Kapaliluahine. The area was known for its very sweet *‘ōhi‘a* (Dictionary of Hawaiian Localities, *Saturday Press*, Dec. 15, 1883). The name, meaning “cliff of the old woman” refers to the legend of a *mo‘o* who once lived on the *pali* (cliff) back of the Maunalua fishpond. This woman annoyed the people of Maunalua and was driven out by Pele. She traveled to Mānoa and behaved herself there, calling her new home Pali Luahine.

> Luahine had two sons, Kumauna and Palihala. There are three stones. The lower one is Luahine, and the two higher up are her sons. Mrs. Pukui thinks that Pali Luahine is back of the “little green hill.” (M. Pūku‘i 5/28/53, cited in Sterling and Summers 1978:290)

Westervelt (1904:2) claimed that Kamehameha, who landed at Waikīkī when he invaded O‘ahu in 1795, lived with his warriors for a time in a great cave on the east side of Mānoa Valley: “The path to the entrance is marked by a few straggling coconut trees. The Hawaiians say this cave formerly extended through to the mountain spurs from Mānoa to Pālolo Valley.”

This cave, located in the area called Kapaliluahine, has been surveyed and the back is solid stone, and could not have led to Pālolo Valley. The location of this cave is on Wa‘ahila Ridge in the area now covered by Woodlawn Drive near the astronomy building of the University of Hawai‘i.

According to a long-term resident of Mānoa Valley, Mary Jane Montano, the name Kapaliluahine came from this historic association with Kamehameha I. This story relates that the warriors were homesick, and Kamehameha sent a message to an old chiefess named Waluwalu on the island of Hawai‘i. The wives of the warrior were brought to O‘ahu on a fleet of war canoes, and the place that the women camped was called “the hillside of the old woman,” or Kapaliluahine (Bouslog et al. 1994:14, 187).

3.3.19 Puka‘ōma‘o, or Puka‘ōma‘oma‘o

Puka‘ōma‘o means “green apertures or openings” (Pūkui et al. 1974:190), and probably referred to the green shutters on the Queen Ka‘ahumanu’s house in Mānoa Valley (Sterling and Summers 1978:287). The longer name Puka‘ōma‘oma‘o can mean “green gateway” and may refer to this point as the access point to the head of the valley. Ka‘ahumanu’s estate was large and extended across the upper valley, including Pu‘ulena, which in 1845 became the old Chinese burial ground. On her estate, there was a “kind of village of forty or fifty huts, the houses of the chiefs, a schoolhouse and a chapel” (Diary of Elisha Loomis, cited in Bouslog et al. 1994:153). In 1829, the location was described as in the back of the valley in East Mānoa by Charles Stewart, a chaplain on the American naval vessel, the *Vincennes*.

> The valley of Manoa, you recollect, was always a favorite resort of mine–this afternoon Mr. Bingham drove me in a wagon to it. There is now a good carriage road, in that direction, as far as the country house of Kaahumanu, nearly five miles from Honolulu. Her residence is beautifully situated, and the selection of the spot quite in taste. The house is an inferior building, but stands on the height of a gently swelling knoll, commanding, in front, an open and extensive view of all the rich plantations of the valley; of the mountain streams meandering through them, and the humble habitation of the farmer sprinkled around; of the district of Waititi; and of Diamond Hill, and a considerable part of the plain, with the ocean far beyond. On the right, the ground rises rapidly for a few rods, to a thicket of hibiscus and Eugenia, at the foot of a magnificent mountain, exhibiting from the base to its summit a perpendicular height of a thousand feet—as rich a variety of projecting cliff and wild recess, of dripping rocks and mantling foliage, of graceful creeper, pendant shrub, and splendid flower, as Arcadia itself can boast. On the left, there is a gradual descent, from the house, of two or three hundred feet to the depth of the valley. Here this is a half a mile wide, and bounded at that distance, by a spur of mountain, which, commencing at the entrance of the valley on the plain two or three miles in front, rises first in uncovered swellings, but rapidly assumes, as it runs inland, a boulder formation, till in several places it

> presents a succession of broad based and regularly defined pyramids, beautifully verdant and tufted with wood; giving a most peculiar character to that section of the scenery.
>
> Immediately behind the house, and partially flanking it on either side, is a delightful grove of the dark leaved and crimson blossomed Ohia, so thick and so shady as insensibly to remind one of Cowper's Wilderness at Olney---filled with cool and retired walks and natural retreats, and echoing to the cheerful notes of the little songsters, who find security in its shades to build their nests and lay their young. The view of the head of the valley inland, from the clumps and single trees edging this copse, is very rich and beautiful; presenting a circuit of two or three miles delightfully variegated by hill and dale, wood and lawn, and enclosed in a sweep of splendid mountains, one of which in the centre rises to a height of three thousand feet. (Stewart 1831:140-141)

Ka‘ahumanu retired to her estate in Mānoa to get away from the heat, dust, and political enemies that she made in Honolulu. In 1826, Ka‘ahumanu ruled against a libel charge made by a British whaling man, Captain Buckle, in favor of the Lahaina missionary, Mr. Richards. Mr. Richards had spread the news that the captain had purchased a Hawaiian woman for money, breaking the law against prostitution. This ruling by Ka‘ahumanu caused great anger among the critics of the missionaries, including the British Consul to Hawai‘i.

> Ua lilo o Kaahumanu i enemi no ke Kanikela a me na haole kalepa a pau e noho ana ma Honolulu, a ua kokua ia mai e Boti a me Manuia, pakele loa aela o Kapena Bakala a me Kapena Kalaka. . . .
>
> O ke kumu nae o ka pepehi ia ana, ua ai ka bipi a ua Kanikela nei i na mea kanu a Kaahumanu o uka o Manoa, a hopuhopu ia ka bipi a puka loa i Pawaa. Ua hoohei ia ke kanaka nana i alualu i ka bipi e ke Kanikela Beritania. O Kanekuahine ka inoa, he kanaka kiai no Kapukaomaomao i uka o Manoa. (Kamakau, Ka Nūpepa Kū‘oka‘a, June 6, 1868)
>
> Translation:
>
> The queen by this decision made enemies for herself of the consul and the foreign merchants and of Boki and Manuia of her own people. . . . The consul beat up one of her [Ka‘ahumanu's] keepers who had chased away the consul's cattle which roamed at large all the way to Pawa‘a and were eating Ka-‘ahu-manu's plantings at Kapuka‘oma‘oma‘o in Manoa. (Kamakau 1992:280-283)

Ka‘ahumanu died in this house. She was moved to Mānoa in 1832 from her house in Honolulu ". . . in hope that the salubrious air would prove beneficial, but which terminated fatally June 5th of that year" (Thrum 1892:113). John Papa ‘Ī‘ī (1959:158) stated "Kaahumanu died on June 5, 1832, at her house with the green shutters in Manoa valley, close to Kawaiho‘olana. Because of her love for Manoa she went there during her last illness after having been sickly for four or five years." The place name Kawaiho‘olana could not be found on the 1883 Bishop map, but a long-term resident of the valley, Maka Woolsey, placed this area *mauka*

of the *‘ili* of Kukuio, shown on the 1882 Baldwin map (see Figure 8) as just *makai* of the *‘ili* of Komoawa‘a. Samuel Kamakau reported:

> A hiki i ka poeleele ana iho, o ka loaa no ia i ka mai, a i ke ao ana ae, o ka hoihoi ia no ia i uka o Manoa, ma kahi i ku ai o kona hale hooluolu ma ka Pukaomaomao, ma ka lihi malu o ka ulu ohia apane me ka ulu kukui. Hookahi wale no ple me ka hapa ke kaa ana i ka mai, a i ka wanaao o ka Poalua, la 5 o Iune 1832, make ihola o Elisabeta Kaahumanu, i ke 64 o kona mau makahiki. Aohe i lu ia iho kona kino a me kona hanohano ui a maikai.
>
> I ka wa kakahiaka nui, ua hoihoi ia mai i ke kulanakauhale, i auamo ia mai ma loko o ka manele hale lole, a no ka lululi, ua komo pu laua me ke kaikamahine Kamanele i loko o ka hale lole [Kamakau, Ka Nūpepa Kū‘oko‘a, Aug. 29, 1868].
>
> Translation:
>
> Late that night she became ill and at daylight was removed to her rest house up Manoa Valley at Puka-‘oma‘oma‘o on the edge of the *‘ohi‘a* and *kukui* groves. A week and a half later in the early hours of Tuesday, June 5, 1832, Elizabeth Ka-‘ahu-manu died in her sixty-fourth year, while her body showed no look of age and her bearing was still impressive. Early in the morning she was brought into the city on a covered litter and it shook so much that her niece, Ka-manele, occupied it with her. (Kamakau 1992:308)

Thrum (1892:113) places her residence in the *‘ili* of Komoawa‘a:

> The locality where the good queen passed away shows little evidence now of ancient royal residence. It was situated well in the valley at a place known as Komoawaa; the residence itself being called Pukaomaomao, from its green painted doors and blinds. Puulena, the old Chinese burial ground, from the year 1845, situate at the head of the central road of the valley, is said to have been part of Kaahumanu‘s estate. (Thrum 1892:113)

An 1872 reminiscence in the Hawaiian newspaper, *Ka Nūpepa Kū‘oko‘a*, implies that Ka‘ahumanu's residence is at or near Kaho‘iwai.

> He aina maikai no o Manoa, oia ka helu elua o ke awawa a ka olu i noho ai, ua hoopulu mau ia oia e ka noe a me ka ohu, a he uliuli lipolipo hoi in na lauu, mai kona piko honua a i kona mau kuemaka pali; a nona hoi ka ua kaulana, he Kauhine a ka mahani kulakulei kauhale, he Kakea. A ma keia wahi no i luana mau iho ai ka Makuahine Alii Kaahumanu, e walea ana i ka olu o ka wai o Kahoiwai, a me ka huihui momona o ka wai peepee, palapalai o Waiakekua, a no ka honi mau paha i na ea oluolu o ka uka; a na kona a i alii no hoi a lei mau na lehua puakea o Naniuapo, a kuu aku la kona luhi. (Kaulilinoe, Ka Nūpepa Kū‘oko‘a, Nov. 16, 1872)
>
> Translation:
>
> Manoa is a fine land and one of the two vallies where coolness dwells. It is constantly kept moist by fog and mist and it is green with trees from the base to

> the top of the cliffs. To it belongs the famous Kuahine rain and the wind that pushes over houses, the Kakea. Here the Queen Mother, Ka'ahumanu spent the time, enjoying the cool waters of Kaho'iwai; the refreshing water of Waiakekua where the palai ferns hide [by the banks] and to inhale the cool air of the upland. Around her royal neck was always a lei of the white lehua of Naniuapo until she was released from this weary life. (translation from Hawaiian Ethnological Notes, Bishop Museum Archives, p. 605)

By 1932, only the stone foundation of the house remained. This newspaper article also places Ka'ahumanu's residence in the *'ili* of Kaho'iwai.

> Just past the junction of Manoa Road and Oahu Avenue in upper Manoa valley, surrounded by market gardens and where automobiles whiz past, a green overgrown path leads off the highway to a tiny clearing, shaded by fine old hau trees and bushes in which there is a stone foundation of a former house. The stones are moss covered and the structure which once covered them has long since disappeared. Yet this is historic ground, the homesite of one of the island's greatest queens.
>
> Kaahumanu, queen of Kamehameha the Great, had her summer house on this cool spot. It was doubtless the same sort of grass house which was in general use, although probably more spacious and elaborate as befitted a queen. The dimension in one direction is 60 feet; the place was known as Kahoiwai, or "Returning Waters." (cited in Sterling and Summers 1978:287)

As can be seen from the preceding citations, there are various interpretations about the exact location of Ka'ahumanu's house within her large estate. 'Ī'ī placed the house "near Kawaihoolana," but this place name could not be found on any historic maps. Figure 11 shows the possible locations of the house as suggested by several other authors. The 1932 newspaper article places the house near the junction of Mānoa Road and O'ahu Avenue. Bouslog et al. (1994:198) used this reference to suggest that Ka'ahumanu's house may have been in the general location of the Salvation Army's Wai'oli Tea Room in the *'ili* of Ka'aipū, where Mānoa Road and O'ahu Avenue cross. This seems to contradict the 1932 article, which places the house in the *'ili* of Kaho'iwai, *mauka* of Ka'aipū.

Several other references place the house in the *'ili* of Pū'ahu'ula, which is the land adjacent and *mauka* of Ka'aipū.

> Mahope iho oia noho ana, ua hoi aku ka Aliiwahine Kaahumanu uo uka a noho he hale pilimauu Hawaii nui o ka ui i Puu ahuula ma Manoa, he uluhau ie wahi o keia aina. (Hōkū o Hawai'i, Feb. 18, 1930)
>
> Translation:
>
> After a while Kaahumanu went to Manoa to Puahuula to live in a large Hawaiian grass hut. There was a hau grove there. (Translation in Sterling and Summers 1978:288)

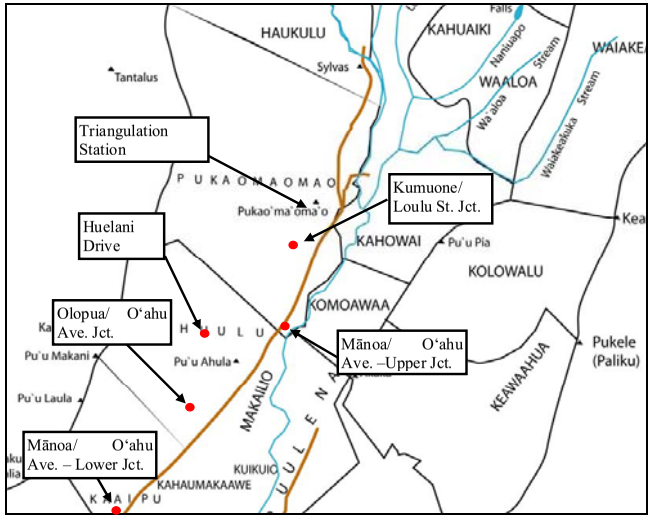


Figure 11. Possible (approximate) locations of Puka'ōma'oma'o, house of Queen Ka'ahumanu (tracing from 1882 map of Mānoa Valley, surveyed by E. D. Baldwin)

According to legends concerning the gods Kāne and Kanaloa journey through Mānoa Valley, Laura Green and Mary Kawena Pūku‘i state that:

> Hoomau no laua i ka laua huakai hele, a i Manoa, i Puahuula (I Puahuula i noho ai o Kaahumanu, ka wahine a Kamehameha naiaupuni).
>
> The two continued their journey up Manoa to Puahuula (the place where Kaahumanu lived, wife of Kamehameha the conqueror of the islands). (Green and Pūku‘i 1936:114-115)

Mary Kawena Pūku‘i describes the home of the queen within a grove of guava trees near a pool and spring.

> Queen Kaahumanu lived in Manoa. Her home was called Pukaomao. The first guavas and the first goldfish were brought there by the queen. Mrs. Malia Kakoi Kamana remembers her mother telling her that a tapu was placed on the guava; no one could have any unless the queen gave them to her. But the birds pecked the fruit, and soon the guava spread all over the island. (Mrs. Mary Kawena, Hawaiian Ethnological Notes, Vol. 1, p. 1378)
>
> Pu-ahu‘ula (Pu here is short for Puna) ‘Spring-of-the-Feather-Cape.’ There was a mo‘o who lived there. Somewhere mauka of Pukaoma‘o. (M. Pūku‘i, 3/26/54, cited in Sterling and Summer 1978:288)

A book on Ka‘ahumanu’s death mentions such a feather cape associated with this location:

> . . . Realizing that the end was near, Ka-ahumanu asked to be taken to Pukaomaomao, her mountain home far up in Manoa Valley. . . .
>
> The couch upon which Kaahumanu was to rest had been prepared with loving care. Spread first with sweet-scented maile and ginger leaves, it was then covered with a golden velvet coverlet. At the head and foot stood towering feather kahilis. Over a chair nearby was draped the Kamehameha feather cloak which had been worn by Kaahumanu since the monarch’s death. (Mellen 1952:270, 272)

Mary Kawena Pūku‘i believed that Ka‘ahumanu’s house was near the end of Huelani Drive in the *‘ili* of Pū‘ahu‘ula, where there was once a spring called Huelani. She believed that the name, *huelani*, the royal gourd, referred to the well that was once near Ka‘ahumanu’s home. This would place the house in the *‘ili* of Pū‘ahu‘ula, *mauka* of the hill Pu‘u Ahula. Princess Victoria Kamāmalu, the granddaughter of Kamehameha I, was said to have had a home on a hill in Pū‘ahu‘ula, *makai* of Ka‘ahumanu’s house (Bouslog et al. 1994:198). This seems to confirm that Ka‘ahumanu’s house was *mauka* of the hill Pu‘u Ahula.

A 1940 article by Ethel Damon also placed the house in Pū‘ahu‘ula, at the end of Olopua Street.

> On the north slope of the valley, leading the way for present-day roads and houses, Kaahumanu built a home where she often retired for quietness, she said, and freely moving air. Here she planted choice *lehua* trees and the tiny red Hawaiian hibiscus which still grew there not so long ago. Her Green Gateway she called this home, Pukaomaomao, through which she looked out over the valley below. Until very recently one could clamber up to the foundations stones of Pukaomaomao, in a little Japanese flower garden above Olopua Street, a short mile mauka of the Waioli Tea room, and today a thicket of hau trees still twists itself protectingly about some of those stones. (Damon 1940:5-6)

Most of the recent research on this question has placed the house in the *‘ili* of Puka‘ōma‘oma‘o. As noted previously, the 1932 newspaper article said that the house was at the junction of Mānoa road and O‘ahu Avenue. Mānoa Road and O‘ahu Avenue actually merge at a second point farther up the valley. This location is within the *‘ili* of Puka‘ōma‘oma‘o, just *makai* of the *‘ili* of Kaho‘iwai. This location is also just west of the border of the *‘ili* of Komoawa‘a, where Thrum (1892:113) placed the house.

Bouslog (1983:13) believes that the question has finally been answered. On the 1882 map of Mānoa Ahupua‘a (see Figure 11), there is a triangulation station marked “Pukaomaomao.” This map was drawn by Erdman D. Baldwin, the grandson of the missionary Dwight D. Baldwin who had personally visited the queen’s house. Thus E. D. Baldwin would have known exactly where the queen’s house was located. This mapped point is about at the modern junction of Kumuone and Loulu Streets in the *‘ili* of Puka‘ōma‘oma‘o. Of all the suggested locations, this last is the most *mauka*, which would agree with the descriptions of Ka‘ahumanu’s house as at the “head” of the valley.

3.3.20 ‘Ulumalu Hill and Kūkaō‘ō Heiau

According to legends, the *menehune* built a fort and a temple at the top of the hill ‘Ulumalu. They were driven away from their fort by the high chief Kuali‘i during his reign (sometime in the 1700s). Kuali‘i rebuilt it after his seizure of the fort.

Another legend says that the *menehune* were driven from their fort and temple by the owls, who became their bitter enemies.

> The legends say that the fairy people, the Menehunes, built a temple and a fort a little farther up the valley above Pu‘u-pueo, at a place called Kukaoo, where even now a spreading hau tree shelters under its branches the remaining walls and scattered stones of the Kukaoo Temple. It is a very ancient and very noted temple site. Some people say that the owl-god and the fairies became enemies and waged bitter war against each other. At last the owl-god beat the drum of the owl clan and called the owl-gods from Kauai to give him aid. (Westervelt 1963a:132)

With the aid of the Kaua‘i owls, there was a great battle and the “fort and temple” were captured; the *menehune* were driven out of the valley. The *heiau* and the hill were also associated with a legendary cave. In “The Legend of Punahou Spring” (Thrum 1892:113), the twin sister and brother Kauawaahila and Kauakuahine hide themselves in this cave when they run away from their cruel stepmother.

In the late nineteenth century, the Castles (descendents of an early missionary family) built a large estate on this hill, called Pu‘uhonua. The house was later torn down and many small houses were built in this area during the 1910s. Several owners of these houses have heard the “ghostly footsteps of children” running up and down their stairs in these houses over the years. Glen Grant (1996:113) has speculated that these sounds may be related to the child-size *menehune*, running over the area on which their fort once stood.

3.3.21 Pu‘u Pueo

In several versions of the story of Kahala-o-Puna (Sterling and Summers 1978:285), the owl that revives the Princess of Mānoa lives on Pu‘u Pueo, or “Owl Hill” (Pūku‘i et al. 1974:205). Kauhi, the fiancé, first leads Kahala to the foot of the valley near a spot called ‘Aihualama (the name of one of Mānoa’s tributary streams). The owl god finds her, revives her, and carries her back to the head of the valley. In the second attempt by the fiancé to kill Kahala, he leads her along a ridge of the valley and kills her with a bunch of *hala* nuts. The owl again finds her and revives her. At the third attempt, the fiancé leads Kahala across the ridges of Mānoa to Nu‘uanu, and kills her there. The longest waterfall in the back of Mānoa Valley is supposed to be the tears of Kahala for the suffering caused by her jealous fiancé (Westervelt 1963a:129-130).

The owl of Pu‘u Pueo was sometimes known as Pueo Ali‘i, the king of the owls. He was associated with other ghost spirits who he led as an army along the hillside below Pu‘uhonua Temple (the Castle home). Kāhuna would consult with him by signs or oracles (Westervelt 1963a:130-131). The owl king ruled over the valley and acted as an avenging spirit. One time, the owl “sought to execute judgment upon a culprit for some alleged transgression, but upon the pledging of the accused for a hearing before executing judgment, it became thereafter the established custom that no one should be condemned till tried and proven guilty” (Thrum 1892:111).

Pu‘u Pueo (or the nearby ‘Ulumalu hill) may have been the site of the *heiau* mentioned in the “The Story of Kapo‘i,” which was introduced in the Makiki Valley section of this report. Kapo‘i, who lived in Makiki, had gathered some owl eggs for his supper. Pueo, the owl followed him to his home and begged for the return of the eggs. In kindness, Kapo‘i returned the eggs, and in return the owl agreed to be Kapoi’s personal ‘*aumakua*, or guardian god.

> Ka lilo ana o ka pueo i akua no Kapoi.
>
> Kauoha mai la ka pueo ia Kapoi e hana i Heiau; a e kukulu i kuahu a i lele, a o ka inoa o kahi e kukulu ai o Manoa. Kukulu iho la o Kapoi i ka Heiau a pua. A kau iho la i ka mohai a me ka maia iluna o ka lele, a kapu iho la, a noa ae la. (Kamakau, Ka Nūpepa Ku‘oko‘a, July 22, 1865)
>
> Translation:
>
> The owl then became a god for Kapo‘i. He commanded Kapo‘i to build a *heiau* and a *kuahu* and a *lele* [altar where sacrifices are placed] altar within it. The *heiau* was to be built in Manoa. Kapo‘i built the *heiau* and placed his sacrifices and bananas on the *lele* altar; he imposed the *kapu* and freed it. (Kamakau 1991b:23)

This angered the king of O‘ahu who was building his own *heiau,* and had announced that no one else could set a *tabu* on a *heiau* and lift that *tabu* before him. Since Kapo‘i committed this very act, the king decided he must be killed and sacrificed at the chief’s own *heiau*, at Kūpalaha in Waikīkī. The owl ‘*aumakua* made an appeal to the king of the owls, who lived in Mānoa Valley. The owl king summoned all the owls of the islands, who attacked the king’s men and set Kapo‘i free. The place of this great battle in Waikīkī was known as Kūkae-unahi-o-pueo, meaning “the-confused-noise-of-owls-rising-in masses” (Westervelt 1963a:127-137). Another version says that the owls scratched at the eyes and noses of the men and covered them in excrement, so the place of battle was called Kūkae-unahi-o-pueo, meaning “the scaly excrement

of owls.” The *‘auamkua* of Kapo‘i was from then on worshiped as the god Kū-kaua-kahi. (Kamakau 1991a:23).

3.3.22 Pu‘u o Mānoa (Rocky Hill)

According to the eminences of boys who attended Punahou School, there were many caves in Pu‘u o Mānoa, which they called Rocky Hill. Some boys once found a wooden idol “in a cave on Rocky Hill, a vestige of the *heiau* that once stood in that area” (Foster 1991:128). The *heiau* they refer to must be Kūkaō‘ō Heiau, which was actually on ‘Ulumalu Hill, *mauka* of Rocky Hill. It is possible that since both hills are on the same ridge, that the boys considered ‘Ulumalu part of Rocky Hill. The boys at the school gave this hill its current name, as they did many of the peaks and hills of Mānoa Valley, including Tantalus and Mount Olympus.

> There is a small hill back of Punahou, which is very rocky. And for that reason the Punahou boys gave it the name of Rocky hill. . . . The sides are covered with cliffs about 40 or fifty feet high. Some times on Saturday the boys go up to Rocky hill and roll down the great rocks over the cliffs. Which come down with a great crash.
>
> There are also some magnificent caves there. Which we boys have found. There are some Wilde cates [sic] which have dwelling in the caves. The boys Once had the success of killing one which we brot down to Punahou and bearid it with great seremony. (Boy’s composition 1848, cited in Alexander and Dodge 1941:136)

As previously noted in the above section on legends concerning springs, Rocky Hill had several alternate names. In the Legend of the Waters of Kāne at Punahou, Rocky Hill is called Keapapa. In the Legend of Kauawa‘ahila (Wa‘ahila Rain) and his sister Kauakiowao (Mountain Mist), the twin children of the chief Kaha‘akea hide in a cave in Rocky Hill to escape from their stepmother, Hawea. When Kaha‘akea learns of his wife’s cruelty to their children, he kills Hawea and then himself. The hill in which the children hid was named after the father, Kaha‘akea.

3.4 Interview with Maka Woolsey about West Mānoa Valley

Maka Woolsey, a Chinese-Hawaiian businesswoman, was the granddaughter of Nāholowa‘a, who had moved to O‘ahu from Maui during the reign of Kamehameha II and received a three-acre *kuleana* in Mānoa Valley called Keaulana. With her second husband, George Woolsey, she became involved in the growing of taro and the sale of *poi* (pounded taro), becoming the proprietor of the Mānoa Woolsey Poi Factory. During the writing of the book “Manoa, the Story of a Valley” (Bouslog et al. 1994:99-104), she was interviewed about legendary places in the valley. The interview is written as if one is walking up the western valley on the old trail, now covered by Mānoa Road.

Maka Woolsey began her story at Punahou College. She pointed out the location of Pōhakuloa, a *pōhaku kapu*, or sacred stone in the long rock wall of Punahou School, marking the boundary of Kapunahou. The stone was placed there during the reign of the chief Paki. Another sacred stone, Keapoapo, was also on the Punahou campus. According to Maka Woolsey (Bouslog et al. 1994:111), the two stones call to each other: “You come here,” says one, “No, you come here,” answers the other.

Heading into the valley, one next stopped at Kapukahau at the present junction of Hastings and Punahou Streets. A hut owned by Ke‘ilianu offered shade and rest to travelers. Further on was Keaeae, the “red in the rock.” This *pōhaku* was named for a legend concerning a young man named Keaeae, who was slain by his own family to save him from any possible misfortunes in his future life. When he was slain, this rock on the Mānoa path turned deepest red (Bouslog et al. 1994:111).

At the summit of the hill were once two high and two low stones, called *pōhaku kau kanaka*, which were placed as seats for resting (today just *makai* of Lanihuli Drive).

Across the road, in a Punahou pasture, was Nukalaiki, a *pōhaku* with the face of a man. From this point Maka pointed out stones on Pu‘u o Mānoa (Rocky Hill), which may have been *māheleāina* or “division stones” used to mark the boundary line between Mānoa (chiefs and commoners division). The summit of Pu‘u o Mānoa was also used to sight fish; if fish were sighted a signal was sent to the peak Pu‘u o Pia, in the upper valley, to tell people to come down to fish.

At Keoneakeke, a sandy *makai* slope near the junction of Mānoa Road and East Mānoa Road, was a dangerous place. It was here that sweet potatoes growing on Round Top would be dislodged by high winds and come rolling and bouncing down to the road. This legend is also used to describe the one hollow area at the base of Round Top. According to Maka Woolsey:

> The potato had once grown in a patch of an old couple. It grew larger and larger and the couple walled it up with sand, trying to cover it. One could see this sandy mound from great distances. One day the old couple went to Wai‘alae to catch fish for the ceremony of *‘uala*. When they looked back to Mānoa, they saw that the potato had vanished. When they hurried back, they saw that it had rolled down the hill, resting in the hollow below. All the people of the area saw the great potato, made an *imu* (earth oven) and each one in the village had a piece of the great ‘uala (Bouslog et al. 1994:112)

At Pu‘u Pueo, the last hill of the lower valley was a cave where the owl, Pueo, watched over the valley. It is said that Queen Ka‘ahumanu could see signals from Pueo from her house further up in the valley. Next was Kalumalu or “breadfruit shade,” the hill location of Pu‘uhonua, the Castle home. At a gulch near the head of Castle Trail was a *kū‘ula* or fish god stone name Kukalia. At this spot, fishermen could look down to the sea and search for schools of fish, such as *awa-no‘okina* (milkfish, *Chanos chanos*) and *āholehole* (Hawaiian flagtail, *Kuhlia sandvicensis*), fish that traveled into freshwater. These came up Mānoa Stream, then went past Ka‘iukūkalu in Mō‘ili‘ili, then to Kamakawiliwili, then Kaumake, Hipawai, Halelena Stream to Kalehua, then Kukuio, and finally to Kawaiho‘olana and Hopenui (Bouslog et al. 1994:112).

The hero Kawelo once threw his *‘ō‘ō*, or digging stick, which landed at Kukakao‘o on the ridge. This land once had a wall built by the *menehune* across it. On the same ridge was a peak called Kahuluokapua‘a, which was *kapu* and “even the birds turned and flew around it” (Bouslog et al. 1994:113).

At Kūkaō‘ō were two companion *pōhaku* called Hauola or “new life.” One could regain one’s health by sitting on these stones. On the nights of *Pō Kāne* (27th night of the lunar month), one could see Huaka‘i, the headless man, on these slopes.

In the upper valley was the land called Ka‘aipū, a well-watered area shaded by *‘ōhi‘a* trees where Kamehameha III once built his retreat. Ka‘aipū is near the present site of the Wai‘oli Tea Room. Near here was also a *pōhaku*, who spoke to a local woman in a dream. The stone was covered with rubbish, and told the woman that if she cleaned the stone and moved it to her *lānai*, it would provide good fortune to her family for many years. When the family moved away and left the stone behind, only misfortunes happened to the next owners of the property. Finally, the original owners moved the stone to their new home in Kalihi-kai.

The adjoining land is Pū‘ahu‘ula, which has a gulch named Kūwowowo, meaning “the place of the echo.” Any sound here forms an echo. Next is the land Kaukahōkū, meaning “the hanging star,” named because the *maka‘āinana* traveled by this place on the way to their taro patches in the upper valley in the early morning “by the light of the morning star.” There were six great taro lands in the upper valley. The most *mauka* was Kahaulani or “spreading *hau*.” Purple taro, called *mana ulu*, was grown at Hi‘iakawai, a part of Pu‘ulena. Ka‘ahai‘ioa was a taro patch at the site of the coconut grove near Woodlawn. Other taro patches were Puohau, Kukuio, and Kalehua.

Next was Puka‘ōma‘oma‘o, the home of Queen Ka‘ahumanu. *Makai* of the residence were the waters of Waiakeakua and a pool called Kawaiho‘olana, which means “to float.” Only the Queen could use this pool; it was *kapu* (taboo) to everyone else. On the mountainside of Puka‘ōma‘oma‘o, was Pukakomo, a natural opening into Pālolo Valley, which was used as a trail to this neighboring *ahupua‘a*. At Lili‘uokalani’s death in 1917, this opening was closed off by rocks. This may be the cave inhabited by Kamehameha and his troops during their invasion of O‘ahu (Bouslog et al. 1994:113).

> Maka also knew many other mysteries of Mānoa. Along the cliffs of the left side she could point out where the burial caves were located. From any of these caves, fragments of *tapa* waved ever so gently as a sign of remembrance. She spoke of Poki, the guardian dog of the valley, who if seen was a warning to the people of *kapu.* When you saw this dog, it was best to keep away from Mānoa. ‘Ololi‘i, the pig and dog *akua* [god], who had no hair, was also known to Maka. This god lived in upper Mānoa at the site of ‘*aki‘aki* (rushes). (Bouslog et al. 1994:113)

3.5 Settlement and Subsistence in Mānoa

Handy’s (1940) description of Mānoa suggests it was once home to an extensive Hawaiian settlement supported by vast taro gardens:

> In upper Manoa the whole of the level land in the valley bottom was developed in broad taro flats. The terraces extended along Manoa Stream as far as there is a suitable land for irrigating…About 100 terraces are still being cultivated, but these do not constitute more than one tenth of the total area capable of being planted…Bennett…described the upper valley as “checquered with taro patches.” (Handy 1940:77)

The relative fertility and productivity of Mānoa is reflected in the “Indices of Awards,” which lists 74 Land Commission Awards (LCA) in 21 named localities at Mānoa (discussed in detail below). These and other Land Commission documents attest to the substantial population of the area in the middle nineteenth century and presumably early. Coulter’s (1931) population estimates for O‘ahu (Figure 12) show a large settlement in the Mānoa Valley. In the late eighteenth century, King Kamehameha I’s warrior-chiefs were attracted to the land for the cultivation of food for their invading army (‘Ī‘ī 1959; Kamakau 1961).

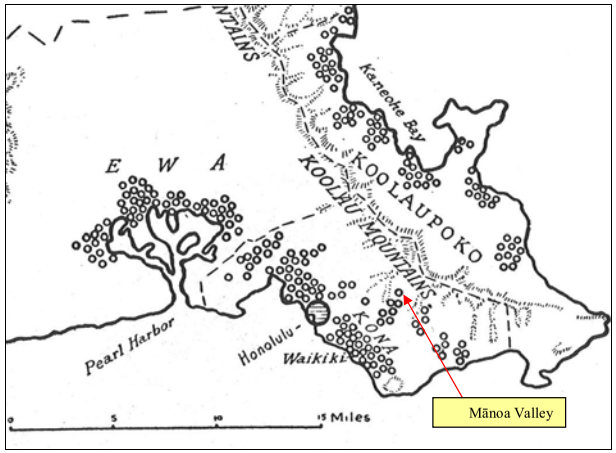


Figure 12. Portion of Coulter’s (1931) population-estimate map for O‘ahu in 1853 showing approximately 350 people in Mānoa Valley (each symbol represents 50 people)

3.6 Streams, Springs and Pōhaku

Mānoa Valley is watered by five tributary streams that merge to form the lower Mānoa Stream. The five tributary streams are ‘Aihualama (literally, eat the fruit of the lama tree), Waihī (literally, trickling water), Nāniu‘apo (literally, the grasped coconuts), Lua‘alaea (literally, pit [of] red earth), and Waiakeakua (literally, water provided by a god). There are seven waterfalls in the back of Mānoa Valley, named Wai‘ihī‘iki (literally, small trickling water), Wai‘ihī‘nui (literally, big trickling water), Lua‘aulaia, Nāniu‘apo, Wa‘aloa, Kahuwai‘iki (literally, little water tender) and Waiakeakua (literally, water [used] by the god) (Pūku‘i et al. 1974). Several of these waterfalls in the back of Mānoa Valley are shown in Figure 13.

The *‘ili* of Kānewai was given to Kaleiheana, a warrior ally of Kamehameha I, after the battle of Nu‘uanu in 1795. When Kaleiheana died the land was deeded to the descendants of Kamehameha and finally became part of the Bernice Pauahi Estate. In 1945, the land was deeded to the University of Hawai‘i, which evicted several farmers who were still growing taro. The abandoned taro *lo‘i* were rediscovered by students at the college in 1980, and were cleared and restored. This restored area was called the Kānewai Cultural Garden.



Figure 13. Waterfalls in the back of Mānoa Valley as seen from Kanānā (photograph from Bouslog et al. 1994:4)

3.7 Trails of Mānoa

Several place names within Mānoa are located on a map of early nineteenth century trails as described by John Papa ʻĪʻī (Figure 14).

> Our description of the trails of the royal town is finished, but we have not yet told of the trails going to lower Waikiki, Kamoiliili, and Manoa. . . . At Kawaiahao a trail passed in front of the stone house of Kaina, late father of Kikaha. The trial went above Kalanipuu's place, along the stream running down from Poopoo to the sea, close by Kaaihee in Makiki, to Puu o Manoa, then below Puupueo, where a trail branched off to upper Kaaipu and Kahoiwai, and another to go below Kaahulue, to Kapulena [Puʻulena] and Kolowalu. (ʻĪʻī 1959:92)

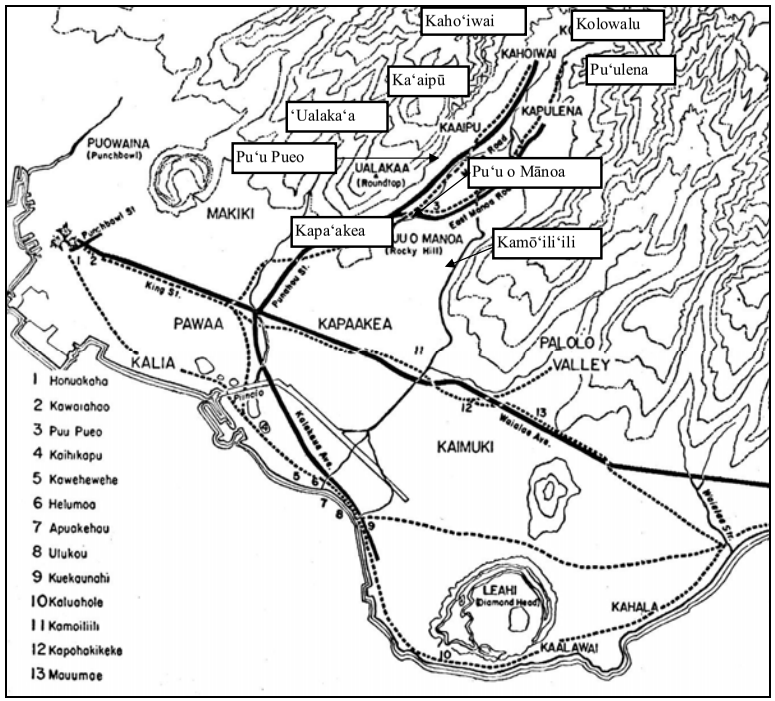


Figure 14. Early nineteenth century trails on the southwest coast of Oʻahu (illustration from ʻĪʻī 1959:93), showing locations of some place names in Mānoa

Section 4 Historical Background

In 1792, Captain George Vancouver described Mānoa Valley on a hike from Waikīkī in search of drinking water:

> We found the land in a high state of cultivation, mostly under immediate crops of taro; and abounding with a variety of wild fowl chiefly of the duck kind … The sides of the hills, which were in some distance, seemed rocky and barren; the intermediate vallies, which were all inhabited, produced some large trees and made a pleasing appearance. The plains, however, if we may judge from the labour bestowed on their cultivation, seem to afford the principal proportion of the different vegetable productions … At Woʻahoʻo [Oʻahu], nature seems only to have acted a common part in her dispensations of vegetable food for the service of man; and to have almost confined them to the taro plant, the raising of which is attended with much care, ingenuity, and manual labor. In the several parts of its culture, the inhabitants, whether planting, weeding, or gathering, must, during the whole of these operations, be up to their middles in mud, and exposed to the rays of a vertical sun … (Bouslog et al. 1994:9-10)

Exactly one century later, before it was urbanized, the beauty of Mānoa Valley was described by Thrum:

> Manoa is both broad and low, with towering hills on both sides that join the forest clad mountain range at the head, whose summits are often hid in cloud land, gathering moisture there from to feed the springs in the various recesses that in turn supply the streams winding through the valley, or watering the vast fields of growing taro, to which industry the valley is devoted. The higher portions and foot hills also give pasturage to the stock of more than one dairy enterprise.
>
> . . .For nearly a mile the road leads by or along pasture fields with no vestige of tree or shrub other than the lantana pest and an occasional algeroba (kiawe), and passes along Round top or Ualakaa . . .
>
> At this summit of the road the whole valley opens out to view, the extensive flat area set out in taro, looking like a huge checker-board, with its symmetrical emerald squares in the middle ground, surrounded by pasture fields on the slopes at the base of the guarding hills. Here and there 'mid sheltering trees, humble dwellings dot the scene around, while up the rugged slopes the almost endless shades of green with black worn seams of rock oft times lightened by 'silvery thread of torrent', forms the background to one of the most charming pictures, either in the clear sunlight, heightened as it often is by cloud shadows chasing rifts of sunshine down the mountain sides; or, as frequently, may be, to watch the drifting mist or rain sweep down one side of the valley, while the other basked in the sun, throwing over its weeping neighbor a "bow of promise" so radiant and bright that its-double, or even triple, reflection is no rarity. (Thrum 1892:110-111)

Mānoa Valley was a favored spot of the *aliʻi*, including Kamehameha I, Chief Boki (Governor of Oʻahu), Kaʻahumanu, Haʻalilio (an advisor to King Kamehameha III), Princess

Victoria, Kana‘ina (father of King Lunalilo), Lunalilo, Ke‘elikōlani (half sister of Kamehameha IV), and later Queen Lili‘uokalani.

> The site of the various houses that once sheltered Haalilio and his retinue is pointed out just above the old Ehu homestead, known later as the ‘Charley Long’ premises and, till very recently, part and parcel of Montana’s Kaipu Diary. Rev. H. Bingham, of early Hawaiian Mission fame, is also referred to by old timers as having had a residence adjoining the Haalilio premises, though his history makes no mention thereof. (Thrum 1892:114)

4.1 Early Ownerhip and Use of Mānoa Valley

Mānoa was given to the chief Kame‘eiamoku by Kamehameha I after his conquest of O‘ahu. After Kame‘eiamoku’s death, the land was inherited by his son Ulumāhiehie (or Hoapili), who became the governor of Maui during the reigns of Kamehameha II and Kamehameha III. Liliha, the daughter of Hoapili, inherited the lands in 1811 and brought them with her to her marriage with the high chief Boki, governor of O‘ahu. They had a residence at Punahou in Mānoa Valley which they often used (Bouslog et al. 1994:14-15). As noted previously, the entire floor of Mānoa Valley was a “checkerboard of taro patches.”

Boki traveled with Kamehameha II on his ill-fated trip to England. While there, Boki met John Wilkerson, a British agriculturalist who had once been a planter in the West Indies. Boki and Wilkerson traveled back to Hawai‘i on the English ship *Blonde*. In 1825, Wilkerson planted seven acres atop Punahou Hill (Pu‘u Pueo) with sugar cane, the first sugar plantation in the Hawaiian Islands.

> I ka makahiki 1826, ua hoomaka ia ke kanu koana ma Manoa, he haole Bertiania ka mea nana i hana. O Boti a me Kekuanaoa kekahi mau alii kokua nui i ka mahi ko, a o ia paha ka hoomaka mua ana o ka wili ko ma Hawaii nei. A i ka haalele ana o ka haole, ua lilo ka wili ko ia Boti, a o Kinepu ke kanaka nana e hooponopono. Ua kukulu ia ka hale puhi ko ma loko o ke kulanakauhale o Honolulu, ma ka pa kokoke i kahi o Keolaloa Sumner ma e noho nei. He mau hana maikai keia a Boti. (Kamakau, Ka Nūpepa Kū‘oko‘a, May 23, 1868)
>
> Translation:
>
> In 1826 the cultivation of sugar was begun in Manoa valley by an Englishman. Boki and Ke-ku anao‘a were interested in this project and it was perhaps the first cane cultivated to any extent in Hawaii. When the foreigner gave it up Boki bought the field and placed Kinepu in charge. A mill was set up in Honolulu in a lot near where Sumner (Keolaloa) was living. For this action Boki is to be commended. (Kamakau 1992:278)

Wilkinson died in 1826, the mill for the sugar was moved to Honolulu, and Boki lost interest in the endeavor. In 1828, he sold the sugar plantation and sugar mill (or took as partners) to four Honolulu businessmen: William French, Stephen Reynolds, John C. Jones, and John Ebbets (Kuykendall 1938:172). French encouraged Boki to turn the sugar mill into a distillery. When Ka‘ahumanu heard of this, she was outraged and took the Punahou lands away from Boki and gave them to Hiram Bingham and his wife as a base for mission work.

John Wilkerson was also the first to try to grow coffee in the islands.

> At the foothills just above Kaipu, is the reputed location of the first Coffee nursery of the islands, also the work of John Wilkinson, with plants brought by him in the Blonde, from Rio de Janeiro. All the shady recesses and glens at the head of the valley show evidences, to-day, of this early agricultural effort, but to no pecuniary or commercial advantage, for it is all neglected and overgrown. (Thrum 1892:114)

Captain John Kidwell brought a variety of pineapple to the islands called Smooth Cayenne in 1885. He conducted experiments with 31 varieties of pineapples on his farm, in the vicinity of current campus. Smooth Cayenne worked best, and this variety became the standard for the pineapple industry. The sugar cane plantation was destroyed, but some of the coffee plants were used to start coffee cultivation on the islands of Kaua‘i and Hawai‘i (Bouslog et al. 1994:15). The only remaining structures associated with this endeavor noted by Thrum in 1892 were a few filled-in cisterns and wells, and stones marking the western side of the sugar house foundation.

Prince Tute of Tahiti, who became the tutor of Kamehameha III, was also given a piece of land by Boki, in a lot adjacent to the sugar plantation. During the Māhele, he enclosed his lot with a stone wall. Tute died in 1859, but his descendants (the Sumners) continued to live in the area, which later became part of the Montano ranch, and then part of the fruit farms owned by Carlos Long (Bouslog et al. 1994:16). On the 1882 Baldwin map (see Figure 7), Ha‘alilio and Tute are shown owning two pieces of adjoining land in Kalehua and Pu‘upueo. Queen Lili‘uokalani later owned land on the old Brenig premises bordering the land of John Stevenson.

Ka‘ahumanu had a great estate in the upper valley, which included the lands of Pu‘ulena. After the deaths of Boki, Liliha, and finally Ka‘ahumanu in 1832, many of these royal lands were given to Charles Kana‘ina, the father of King William Lunalilo. Kamehameha II was also said to have maintained a summer house in Wai‘oli and Ka‘aipū. Lunalilo gave some of these lands to Kapōkini, who gave them to Ha‘alilio. When Ha‘alilio went on a diplomatic mission to England, he returned the lands to Kamehameha III (Bouslog et al. 1994:16).

An 1817 map by Otto Kotzebue (Figure 15) and an 1855 map by La Passe (Figure 16) show a dense concentration of population in Mānoa Valley. In 1836, French missionaries visited Mānoa, counting 50 houses. If each house contained five people, this would put the population at 250 Hawaiians. The general population of Honolulu and the coastal plain was about 6-7,000 people (Coulter and Serrao 1932:109), which probably represented only a small percentage of the total population of the area that existed before the Hawaiian people were decimated with war, exotic diseases, and the disruption caused by the influx of Westerners and Asians, and their influence on the economy and culture of Hawai‘i. An 1847 record lists 34 eligible landowners; only two were non-Hawaiian. An 1849 tax list includes 195 Hawaiian names, meaning the population of Mānoa was probably about 1,000.

4.2 Mid Nineteenth Century and Land Commission Awards

A total of 68 commoners were granted *kuleana* (Land Commission) awards in Mānoa *makai* of King Street, totaling 332.26 acres (Figures 17, 18 and 19; Table 1). Twenty-seven awards were less than an acre; 31 awards were less than five acres, four awards were less than 10 acres; and one award was for more than 10 acres (to ‘Akahi, a *wahine* [female] cousin of Bernice

Pauahi Bishop, in Kaipua *'ili*, LCA 5368:1, RP 1262, 10.25 acres); five awards were for more than 30 acres (J. Stevenson [Ka'aipū, 34.96 acres, and Nāniu'apo, 30.17 acres], Kaleiheana, 66.59 acres, Kaunuohua, 35.40 acres, and Beckley, G. for heirs, 36.10 acres). Victoria Kamāmalu received most of Kānewai 'Ili. C. Kana'ina (father of King W.C. Lunalilo) received the *'ili aina* of Kolowalu and Pāmoa, and all of Kukuio and Kalehua. The largest grant went to the American Board of Commissioners for Foreign Missions who received a total of 301.68 acres; this became the campus for Punahou School (Bath and Kawachi 1990:3-5). Chief Boki gave Hiram Bingham this piece of land in 1829 (DeLeon 1978:3).

The Land Commission documents suggest that most of the agriculture and habitation at Mānoa was in the east-central part of the valley (along Mānoa Stream) between the present-day Mid Pacific Institute and the Chinese cemetery. There were a few claims and awards in the far northern part of the valley, at Punahou, and a few in the Kānewai/Kalaepōhaku area.

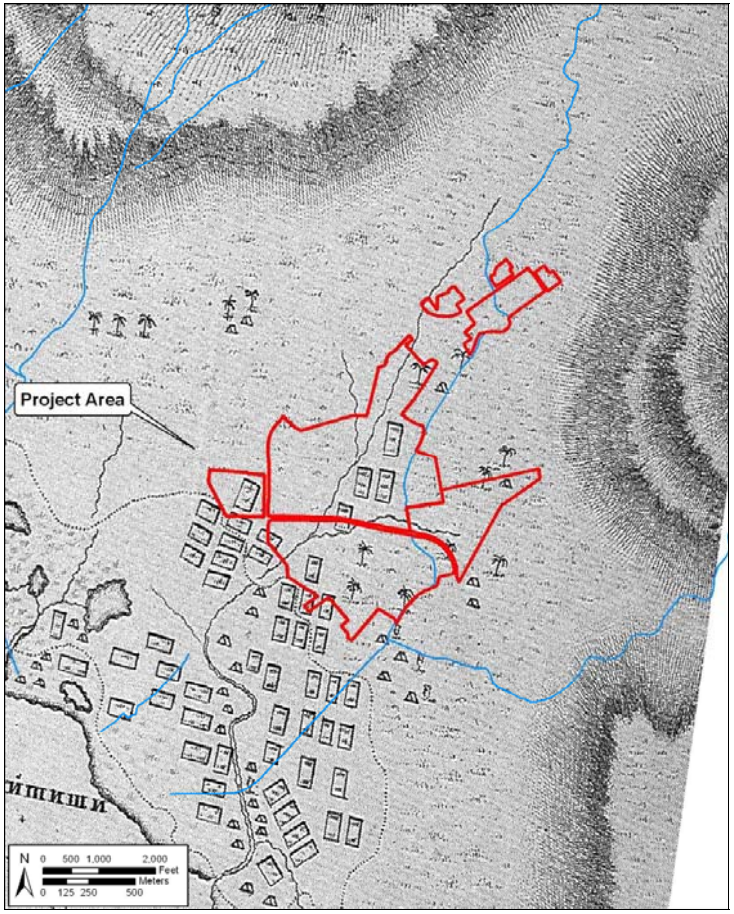


Figure 15. Kotzebue map of 1817 showing vicinity of project area (should be understood as somewhat schematic)

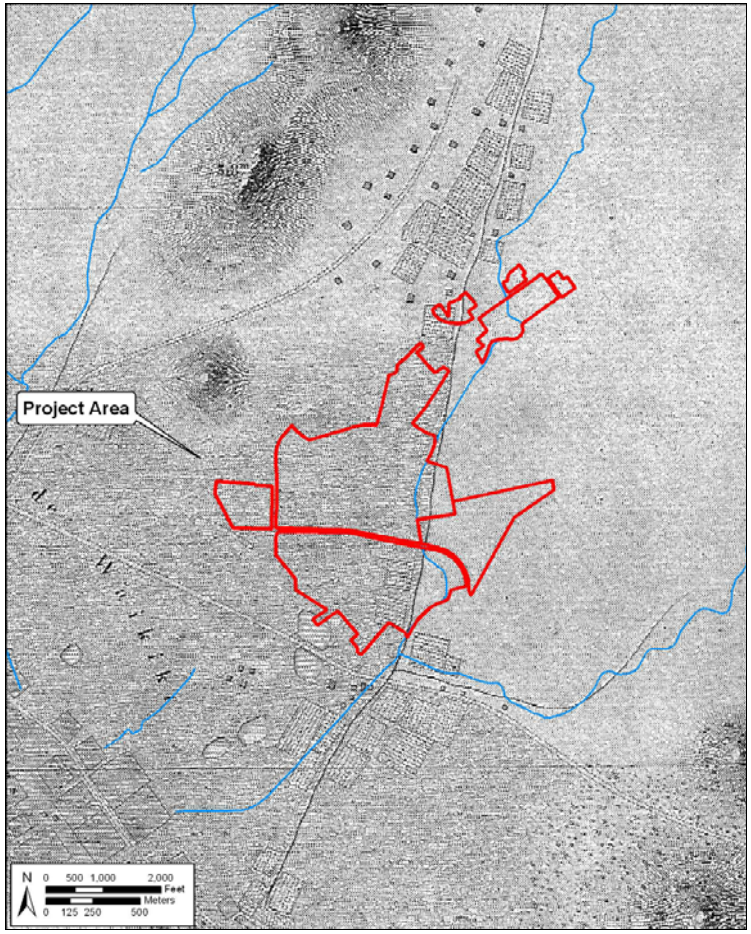


Figure 16. LaPlace map of 1855 showing vicinity of project area (should be understood as somewhat schematic

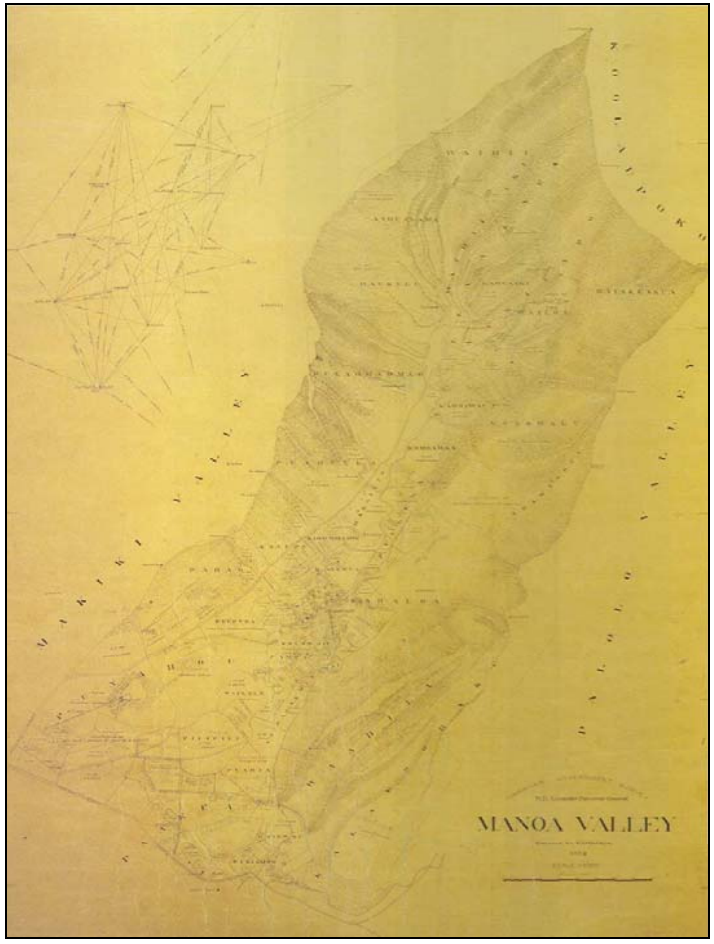


Figure 17. 1882 E. D. Baldwin map, showing Land Commission Awards and Grants in Mānoa Valley

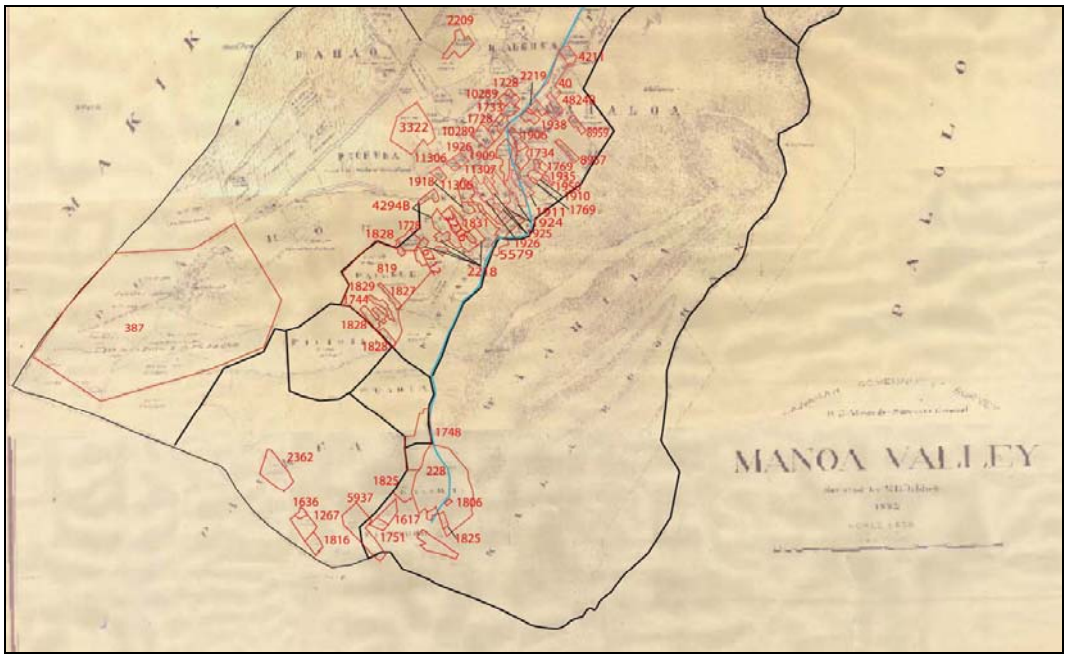


Figure 18. Makai portion of 1882 E. D. Baldwin map with Land Commission Awards outlined in red

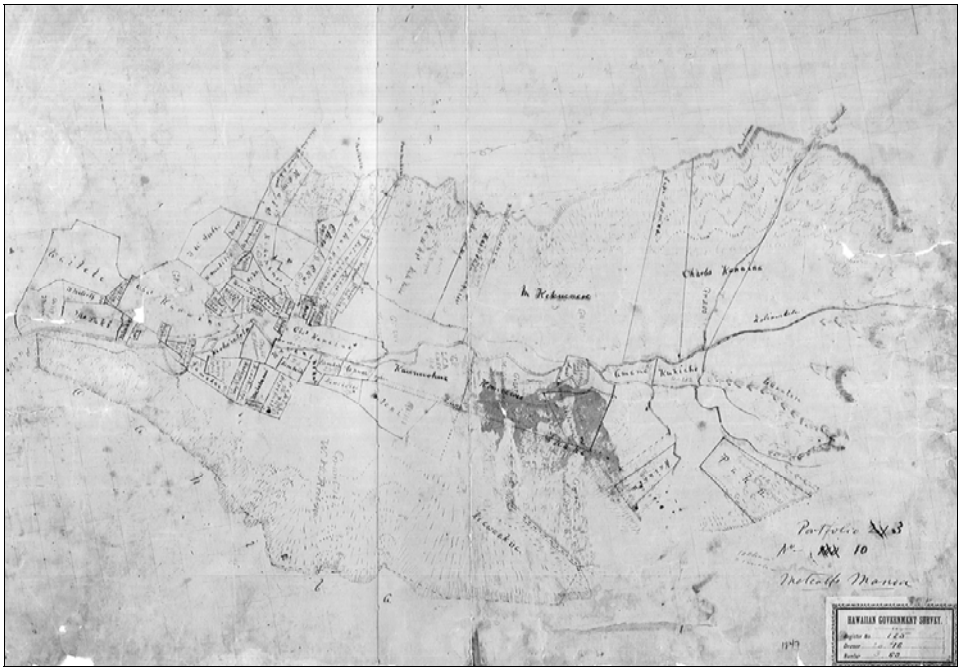


Figure 19. 1847 Hawaiian Government Survey map; surveyed by Theophilus Metcalf

Table 1. Land Commission Awards for Mānoa Ahupua‘a

Claim	Claimant	Location	Notes
17	Jones, Eli	Beretania St.	House
40	Kai, D.	Ka‘ahaloa	Māhele Award
42	Maigret, Louis	Wailele	
228	Kaleiheana	Kānewai	Kānewai Pool
387	ABCFM (mission)	Punahou	Received from chief Boki: spring, house
707	Kaiaina		Received land from Kamehameha
819	Beckley, George	Wailele	Farm called “Kawailele”
1130			House, 2 patches, pasture
1267	Kawela	Pa‘akea	3 ‘*āpana*: taro *lo‘i;* taro *lo‘i*; house
1273	Spear	King St.	
1274	Hulilau	Piliamo‘o	Dry taro, 12 taro *lo‘i*, *hala* trees
1356	Namaka	Piliamo‘o	2 taro *lo‘i*
1525	Kuaana	Piliamo‘o	2 taro, house, pasture
1617	Kenao	Piliamo‘o	4 taro, 1 ditch, 2 houses
1627	Keonea	Kānewai	
1636	Haole	Pa‘akea	2 *‘āpana:* house, fence; house, fence
1728	Kuikuikahi	Halelena, Wailele	3 *‘āpana*: *pahale* (house); *lo‘i ma hale lena*; taro *lo‘i*, pasture
1733	Kaheenalu	Halelena	4 *lo‘i*
1734	Kauhi	Hamamakahwaha, Hipawai	2 ‘*āpana*; house enclosed; 6 taro *lo‘i*
1744	Hakuole	Wailele	5 taro *lo‘i*
1748	Ono	Kānewai	Houselot
1751	Aea	Piliamo‘o	3 ‘*āpana*: house; taro *lo‘i;* taro *lo‘i*
1755	Kaluaapana, Peter	Hamamakowaha	
1769	Malaihi	Hamamakawaha, Kahamama	Taro *lo‘i*
1806	Hinai	Kānewai	3 taro *lo‘i*
1813	Keaka, I.	Piliamo‘o	2 taro *lo‘i*
1816	Kaaha	Pa‘akea	2 ‘*āpana*: 6 taro, pasture; taro *lo‘i*
1825	Kuewa	Kānewai	*‘Āpana* 3-4 - Pasture with 2 houses; ‘*āpana* 5 - taro
1827	Wahahee	Wailele	6 taro *lo‘i*
1828	Ewaloa	Wailele	3 ‘*āpana*: taro *lo‘i;* taro *lo‘i,* house
1829	Hoohoku	Wailele	8 taro *lo‘i*
1831	Mamala	Pāmoa	3 ‘*āpana*, 8 taro *lo‘i*, ‘*auwai*, house; taro *lo‘i*; house
1906	Kaumakaokea	Hamamakowaha	House at Kolowalu
1908	Kalaau	Kamo‘olepo	4 *lo‘i*
1909	Kaianui	Kolowalu	‘*Auwai*, 6 taro *lo‘i*, houselot
1910	Apiki	Hamamakawaha, Kolowalu	*‘Auwai*, *pili*, taro for *konohiki*
1911	Naihe	Hamamakowaha	Taro, house

Claim	Claimant	Location	Notes
1918	Kamahiai	Kolowalu	2 *‘āpana: pahale*; 6 *lo‘i*
1920	Paaluhi	Pu‘ulena	3 taro *lo‘i*, pasture, house
1921	Moku	Kahawai	9 taro *lo‘i*, *kula*, house
1922	Nawaanui	Kali‘i	13 *lo‘i*, sweet potato
1923	Kekua	Kaho‘iwai	6-8 *lo‘i*, ‘*auwai*, house
1924	Kealohapauole	Kaualaʻa	3 ‘*āpana*,: 7 taro *lo‘i*; taro *lo‘i*, house on south side; pasture
1925	Paniani	Koloalu, Koloaluiki	‘*Auwai*, *pili*, pasture, 2 houses
1925	Koi	Kolowalu	*Pili*, taro, land sinking in
1926	Nanauki	Kolowalu	1 ‘*āpana*: pasture, house; taro
1927	Nawaakakele	Pāmoa	12 *lo‘i*, *kula*, house
1928	Aiia	Pu‘ulena	4 taro, pasture with house
1929	Kaanaana	Pu‘ulena	*Lo‘i* for *konohiki*, ‘*auwai*, pasture
1930	Kaaea	Pu‘ulena	2 ‘*āpana*: taro *lo‘i*, pasture, houselot; *lo‘i* for *konohiki*
1931	Kaiwi	Pu‘ulena	9 taro, pasture, house
1935	Puuwaewae	Kamamakoaha, Hamamo	7-8 taro *lo‘i*
1937	Kahalepohaku	Pu‘ulena	6 taro *lo‘i*, pasture, house
1938	Lupe	Kamo‘olepo	2-4 taro *lo‘i*
1940	Upepe	Pu‘ulena	Taro *lo‘i*, pasture
1944	Maemae	Komoawaa	14 taro lo‘i, *kula*
1945	Kamaikaaloa	Komoawaa	6 taro *lo‘i*
1946	Makalii		16 taro *lo‘i*, *kula*, houselot
1947	Puuki	Komoawaa	6 taro *lo‘i*, *kula*, houselot
1948	Ma	Komoawaa	7 taro *lo‘i*, *kula*, houselot
1949	Kipi	Hipawai	13 taro *lo‘i*, *kula*
1950	Kalua	Hipawai	3-4 taro *lo‘i*
1951	Nui	Kaho‘iwai	Taro *lo‘i*, house
1980	Haole	Piliamo‘o	
2209	Keaulana	Kaaipuluna	*Kalo* taro & *kula*; pasture named
2216	Kaohe	Pāmoa	2 ‘*āpana*: 16 taro, watercourse; house site near taro
2218	Kaawahua	Pāmoa	4 ‘*āpana*: taro *lo‘i* and pasture in each
2219	Keawe	Kamo‘olepo	2 taro *lo‘i*
2209	Keaulana		*Kalo* taro & *kula*; pasture named
2362	Kaaimoa	Pa‘akea	2 taro *lo‘i*, pandanus, house
2530	Kaahu	Piliamo‘o	
3028	Kauhi	Punahou	
3322	Tute, T.	Haliimaile	Garden farm with stone wall
3906	Neki, K.	Kolowalu	Heiau of Kūkaō‘ō, fence; house in
4211	Kaululaau	Kaahaloa iki, Manuahi	10 taro patches & pasture in one
4294B	Kalaweaumoku	Pāmoa, Ka‘ahaloa	2 *‘āpana*

Claim	Claimant	Location	Notes
4605	Hakau, wahine	Kaho‘iwai, Kaluohau, Hokeulu, Pi‘inaio	6 *‘āpana*: 5 taro *lo‘i*; 3 taro *lo‘i*; pasture; 1 ditch; 1 ditch; 1 fish pond
5368	Akahi	Ka‘aipū	8 taro *lo‘i*
5579	Kahapapa	Hipawai	5 taro *lo‘i*, Kahawai Stream
5937	Paukuwahie	Piliamo‘o	
6450	Kaunuohua	Pu‘ulena	Loko Kūwili
6616	Nuuanu	Kānewai	
6712	Paikau	Kalena, Wailele, Pu‘ulena	3 *‘āpana*: 2 *lo‘i*, *kula* house; mountain land; 28 *lo‘i*, *kula*, house
7713	Kamamalu, Victoria	Kānewai	
8555	Kaina, M.	Maka‘īlio	4 *lo‘i*, *‘auwai*, pasture
8559	Kanaina, C.	Kukuhio, Pāmopa	2 *‘āpana*: taro; *‘ili* of Kalowalu
8957	Kuhaumea	Ka‘ahaloa	5 taro *lo‘i*, house 2 *hala* trees
8958	Kahele	Ka‘ahaloa	1 taro *lo‘i*, *kula*, house
8959	Kuamoo	Ka‘ahaloa	8 taro *lo‘i*, sweet potatoes
10289	Namokae	Halelepa (Halelena)	2 *‘āpana*: 6 taro patches, pasture
11029	Stevenson, John	Ka‘aipū, Kapo, Kukona, Kamakela	3 *‘āpana*: *pali*, pasture (22 acres); pasture, *kalo*, stream (9 acres); *kalo* (2 acres)
11306	Kalama	Halelena, Kolowalu	2 *‘āpana*
11307	Kea	Kolowalu	9 *lo‘i*, house site

4.3 The University of Hawai‘i at Mānoa Land Commission Awards

Charles S. Bouslog (in Kobayashi 1983:183) gives the following summary account of the history of Hawaiian tenure of the University of Hawai‘i at Mānoa lands:

> The grantees of land at the mahele (mostly 1848-50) have their names recorded forever in all subsequent deeds and title search leads back to the first owner. All but one of these names for campus land were Hawaiian. Names seen are Ewaloa, Kapehana, Kaumakapili, Mooiki, Ono, Poonui, Puoa, Hakuole. Charles Kanaina (the father of King Lunalilo) at mid-century was the owner of much of the Mauka Campus and of the large areas now in the Lyon Arboretum. For most of these men, it is a one-time legal enshrinement; few of the names are seen again, except in deed.
>
> I have attempted to trace the ownership changes of some of the original grants: 718, 882, 1744, 1748, 1828 (see the 1882 map).
>
> In the “Native Register” (p. 270) Ewaloa signed with his mark. There is a reference to his widow in 1876, and to an heir in 1881, when the land passed into the hands of Emma Davison. No more Ewaloa.
>
> Hakuole has modern descendants but the land is no longer theirs. For Land Grant 1744, he made his mark in the “Native Register” and testified: “I got this land in 1830…for taro land for cultivating sweet potato at Kawailele in the land of Lui Palani (Louise French), the konohiki.” This was on December 3, 1847. An heir sold to Ilikealani in 1864. The family continued in the valley. One man is listed as a Manoa taro planter in the city directory of 1888. In 1894-95 one is listed as living in Manoa. The last kuleana seems to have been sold to a Magoon in 1896.

The largest parcel in Mānoa (LCA 228, 66.59 acres) for a private individual was awarded to Kaleiheana at Kānewai. John Papa ‘Ī‘ī (Native Register; August 14, 1846) relates the following

> Kalaiheana’s land, called Kanewai, is at Waikiki. It has some leles in Mānoa . . . that was the land of Keeaumoku at Waikiki, adjoining the north side of Kalaepohaku. This land became his upon the victory of Kamehameha I at the Battle of Nuuanu, also Waialua, as was the custom of granting land to chiefs at that time.

When the *peleleu* (Kamehameha’s fleet of large canoes) came, the land passed from Ke‘eaumoku to Papa and Kaleiheana and all the *leles* were also conveyed. In Foreign Testimony, ‘Ī‘ī relates the following:

> Kanewai is its name. It borders on the sea which enters part of it. On S. and E. is land of Kalaepohoku on NE & N is land of Waihi. From NW & W round is Piliamo. On W. Keokapu has land. This land belonged to Kiaumoku father of Kaahumanu. . . . When Kiaumoku obtained it was in 1804. Claimant is his descendant.

This later account is particularly interesting because of the reference to Kānewai bordering “on the sea which enters part of it.” This corroborates the account in the *Star Bulletin* (Williams 1935) of a subterranean passage linking Kānewai and the sea, and suggests that the famous Kānewai pool lay in Kaleiheana’s LCA. The reference to LCA 228 being bordered on the northeast and north by the land of Waihī is uncertain, but may refer to springs or seeps on the nose of Wa‘ahila ridge (Waihī – “trickling water”).

Testimony relating to Keliipo’s land claim (LCA 1635, 0.43 acres) is of particular interest in that it provides the clearest picture of land use in Kānewai. The Native Register offers the following account:

> ‘Ili of Kanewai, Ahupua‘a of Waikiki. I have two lo‘i. My lo‘i on the west is bounded on the north by the lo‘i of Kalama, on the east by the Kula of Maalahia, on the south by the lo‘i of Kalama, on the west by the lo‘i of Kanemakini, one small house.

The Foreign Testimony offers the following accounts:

> This land is Kanewai, Waipio, Waititi. Kalo land only. No house or fence. Mauka is a stream dividing it from upland Waialae, Kalama [is] Konohiki; Makai Stream and wasteland; Honolulu, Kalama. Claimant had this from Kalama about 8 years ago on account of friendship and work.
>
> One taro patch and the boundaries are Mauka is the ditch; Waialae, [lands of] Kalama; the Konohiki, Makai a stream; Honolulu, Kalama the Konohiki. Acquired in 1841, he has done Friday work for the Konohiki.

The testimony for Keliipio’s land claim suggests there were a number of small *lo‘i* (irrigated plots) in the area north of Mānoa Stream and south of the ‘*auwai* (irrigation ditch), which were cultivated by different people with a number of *lo‘i* belonging to the *konohiki* (overseer) named Kalama.

The land claim of Nu‘uanu (LCA 6616:1, 0.96 acres) lists three *lo‘i*, four coconut trees, a small sweet potato *kula* (dryland plot), and a house lot. While it is not clear whether these are all in *‘āpana* (lot) 1, it seems a virtual certainty that he claimed a *lo‘i* there.

The testimony associated with Keonea’s land application (LCA 1627) relates that “Kaleiheana gave claimant these lots” and the presence of *lo‘i* and a house lot on the property.

Figures 20 through 24 illustrate some aspects of land use changes from the 1880s to the end of the nineteenth century in and around the project area.

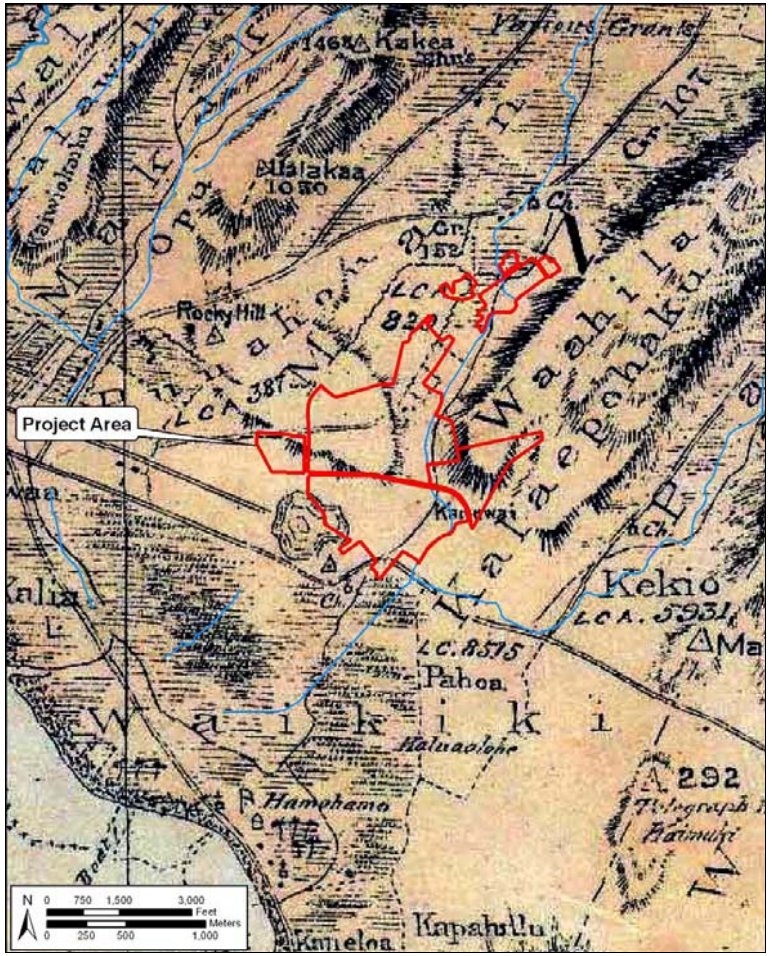


Figure 20. 1881 O‘ahu Island Government Survey map

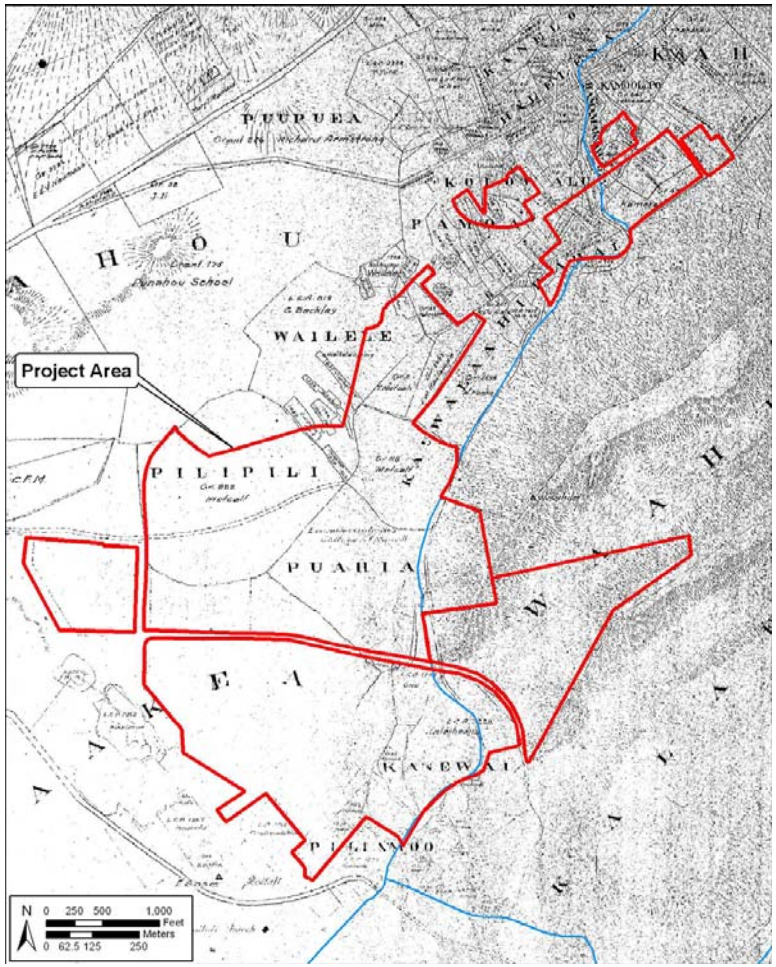


Figure 21. 1882 E. D. Baldwin map showing vicinity of project area

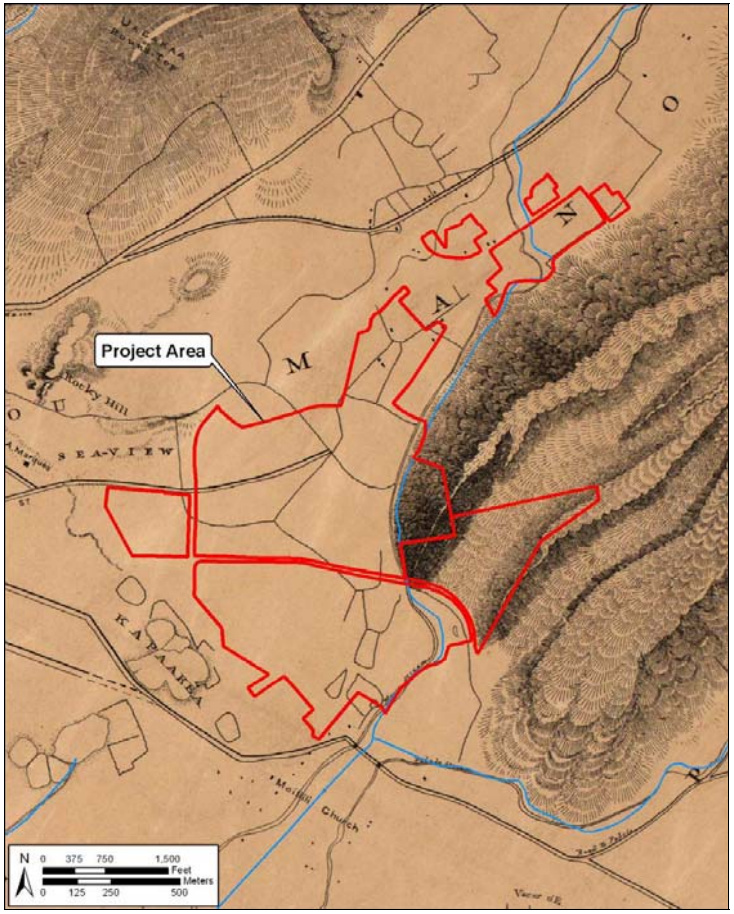


Figure 22. 1887 W. E. Wall map showing vicinity of project area

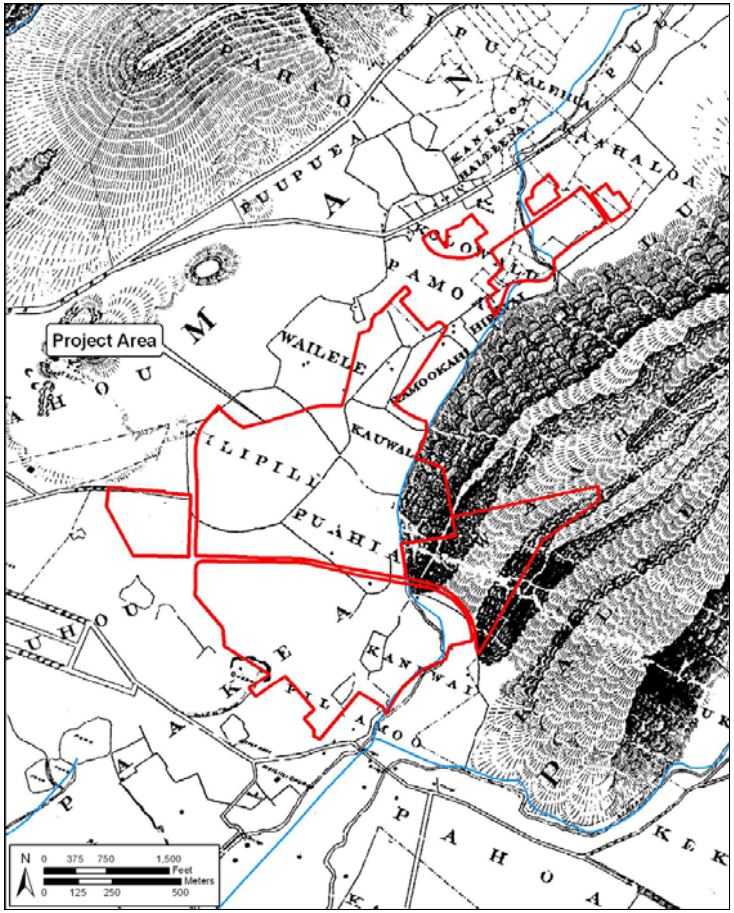


Figure 23. 1897 M.D. Monsarrat map showing vicinity of the project area

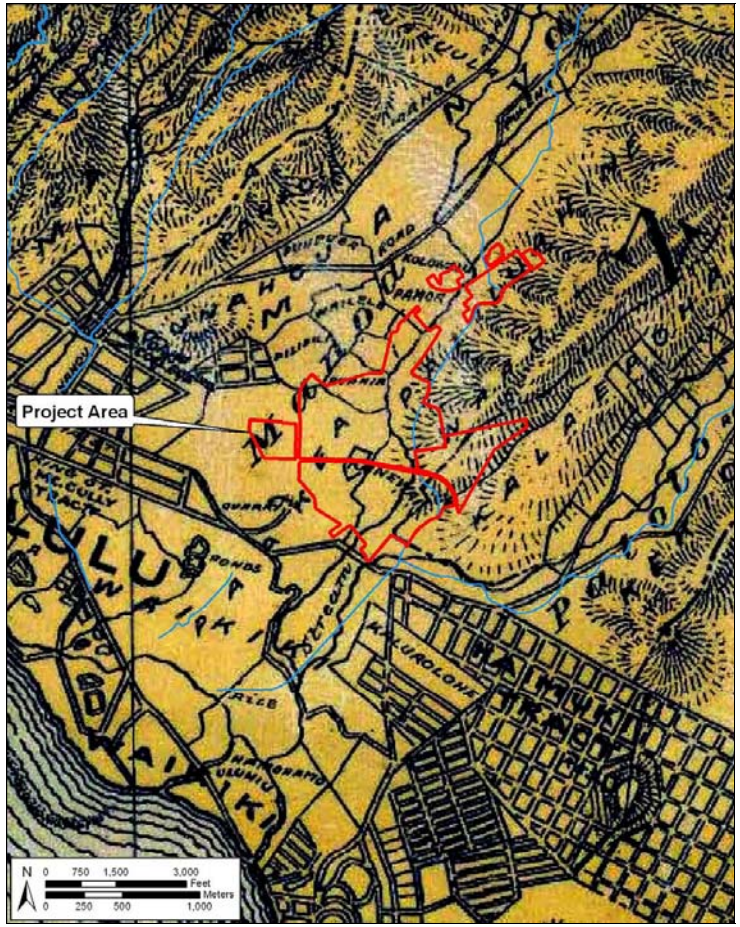


Figure 24. 1899 O'ahu Island map showing vicinity of project area.

4.4 1900s to Present

Hawaiians and Chinese continued to grow taro on the floor of Mānoa Valley in the late nineteenth century (Figure 25). However, disease, out-migration to the centers of population, the loss of traditional culture, and other factors led to a decimation of the resident Hawaiian population. By the end of the century, half of the taro lands in Mānoa Valley were cultivated by Chinese. They also raised other vegetables and bananas. For a time pineapples were raised on the lower slope between Pu'u Pia and Wa'ahila Ridge (the eastern boundary of the *ahupua'a*) (Emery 1956:57).

The well watered, fertile and relatively level lands of Mānoa Valley supported extensive wet taro cultivation well into the twentieth century. Handy and Handy (1972:480) estimated that in 1931 "there were still about 100 terraces in which wet taro was planted, although these represented less than a tenth of the area that was once planted by Hawaiians."

In the early past of the nineteenth century, the Japanese began to move in to the upper valley to start truck farms, growing strawberries, vegetables, such as Japanese dry-field taro, Japanese burdock, radishes, sweet potatoes, lettuce, carrots, and soy beans, and flowers to sell to the Honolulu markets. Bananas were grown on the northeastern slopes of the valley. Several dairies were also opened in the area, including the first opened by William Harrison Rice in 1844. The result of the presence of these dairies was that many previously forested slopes were denuded by the grazing cattle (Emery 1956:57, 62).

Rice cultivation was attempted in Mānoa Valley by 1882, but the project was unsuccessful.

> Though the valley is under almost complete cultivation of taro, largely by Chinese companies, an effort was made by them in 1882 to divert it to the growth of rice, but after two years struggle with high winds, cold rains and myriads of rice birds it was abandoned. In the spring of 1884 a north wind, with the local appellation of Kakea, visited the valley, which blasted all the taro, withered all the growing rice, moved a number of houses bodily and demolished several entirely. This is said to have terminated the rice industry of Manoa, since which time its fields have been devoted to taro, as it had been for many preceding generations. Sweet potatoes and bananas are also cultivated in a limited measure, and some attention is being given to fruit culture . . . (Thrum 1892:116)

In the 1903-04 Honolulu City Directory, 148 names are listed, 107 haole (Caucasian), 11 Chinese, 9 Japanese, and 21 Hawaiians. In 1932, the valley had 1,000 homes (with an estimated population of 5,000), about 300 Caucasian, 173 Japanese, ten Chinese, ten Portuguese, six Hawaiian , five Puerto Rican, two Filipino and one Spanish (Coulter and Serrao:1932:109). By 1944, the population of Mānoa was 15,000. By the year 2000, Mānoa had a population of 21,112 (City and Co. of Honolulu 2000). Figures 26 through 31 show the growth of roads and residential areas during in Mānoa from the early to middle twentieth century.



Figure 25. Checkerboard taro fields on the floor of Mānoa Valley

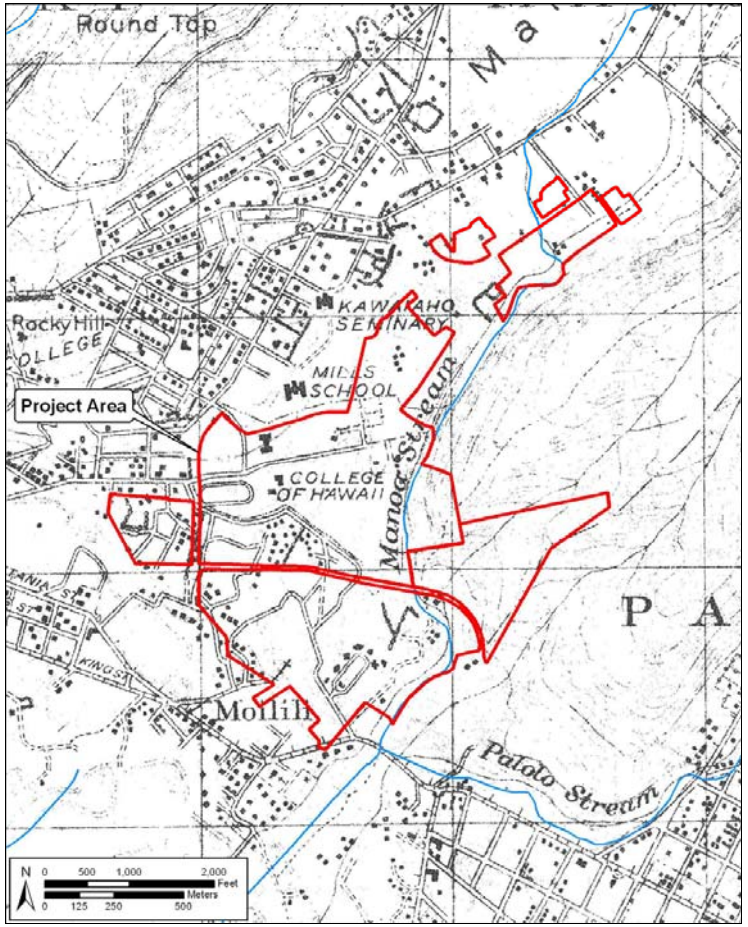


Figure 26. 1919 Fire Control map showing vicinity of project area

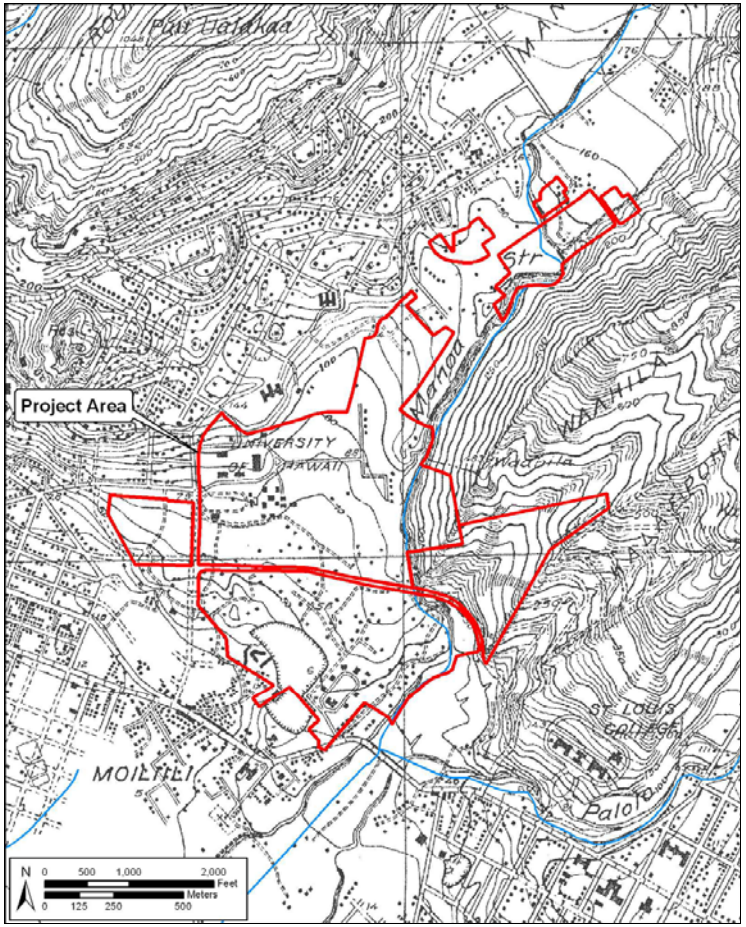


Figure 27. 1927 US Geological Survey map showing vicinity of project area

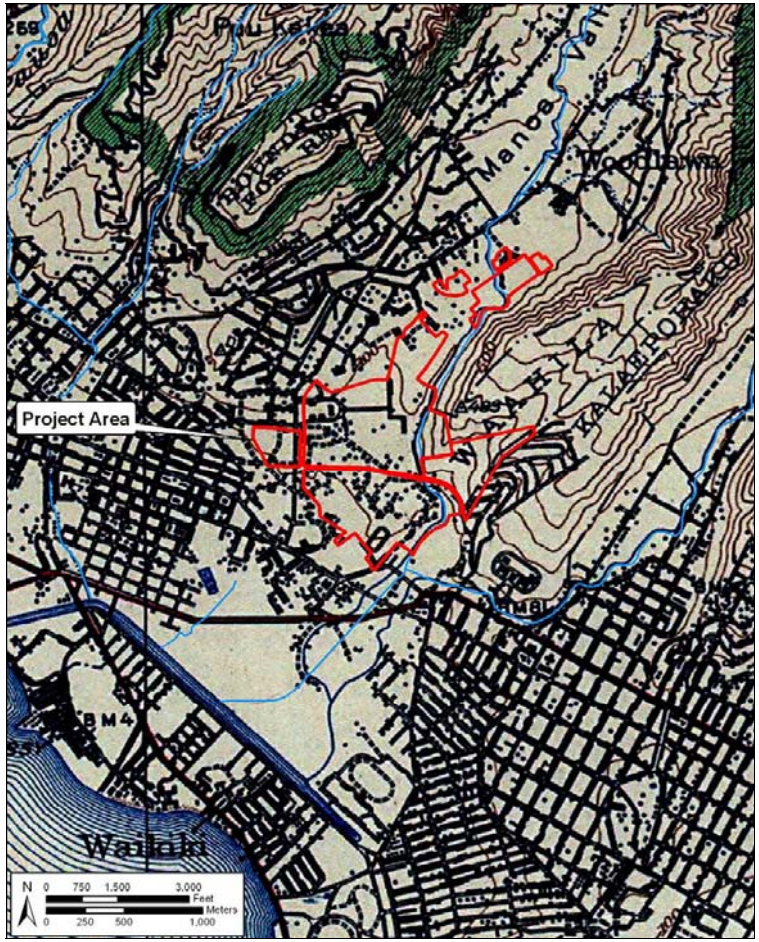


Figure 28. 1938 map showing vicinity of project area

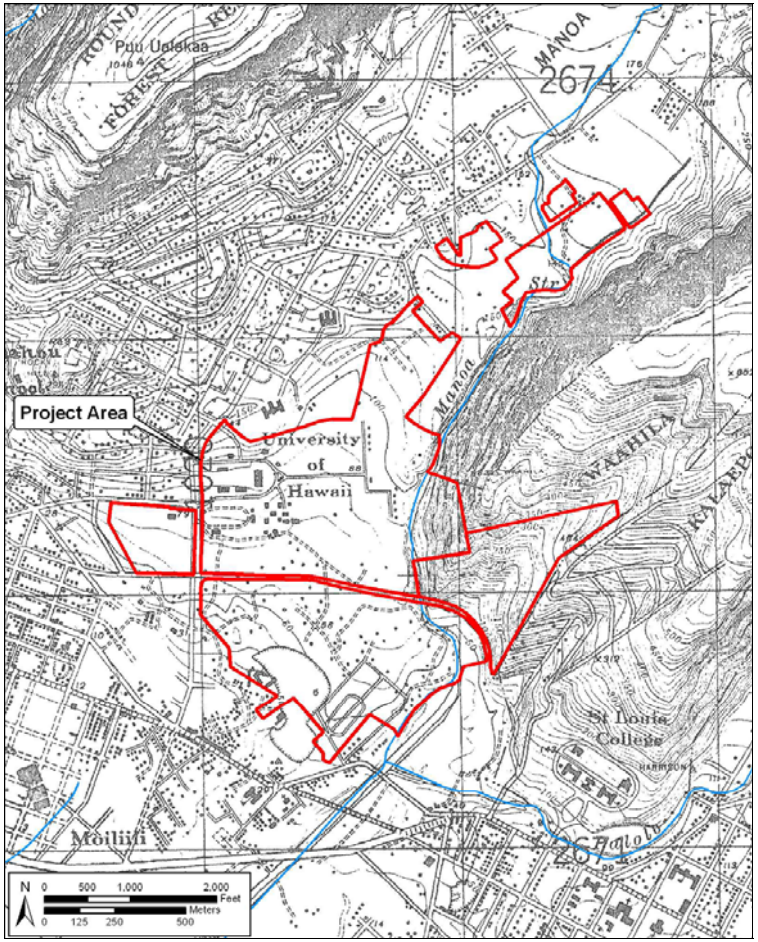


Figure 29. 1943 War Department map showing vicinity of project area

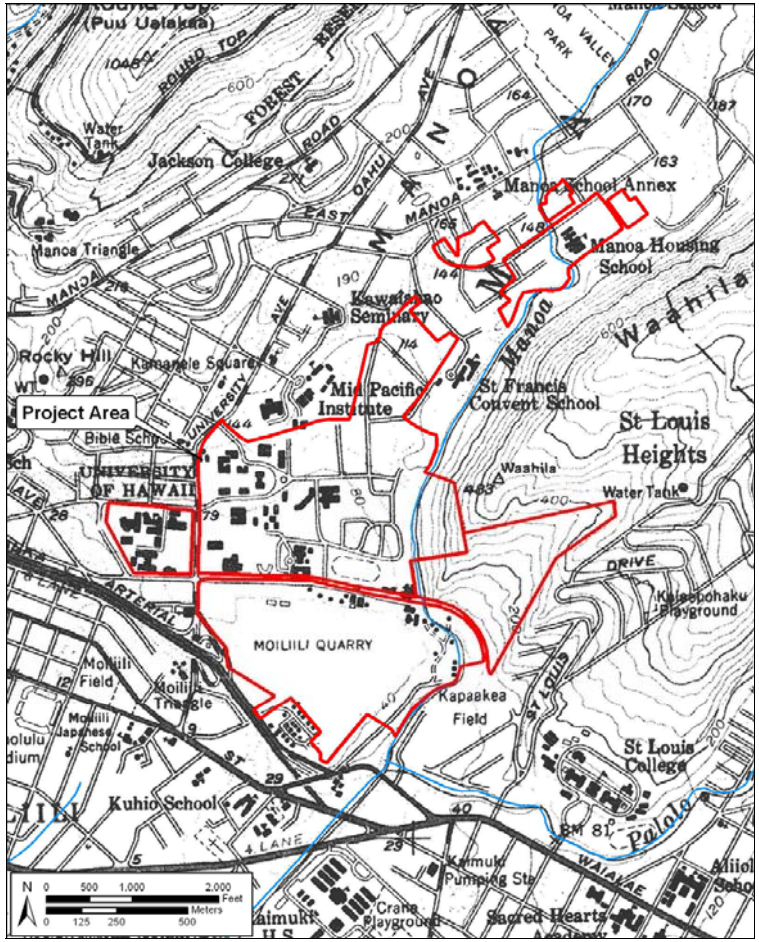


Figure 30. 1953 U. S. Geological Survey map showing vicinity of project area

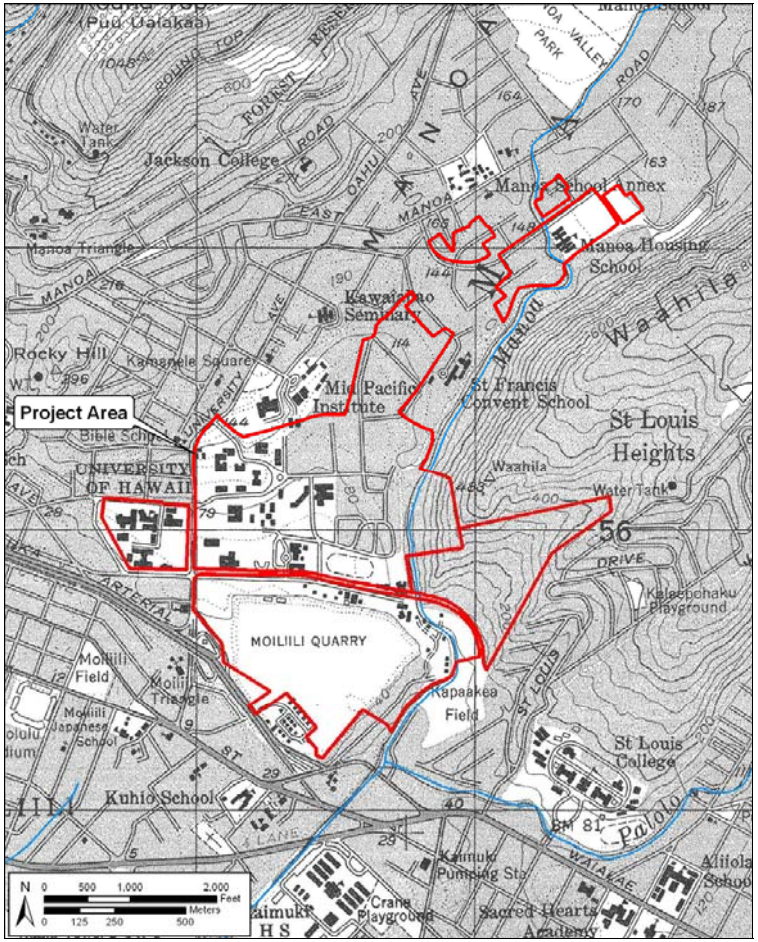


Figure 31. 1956 map showing vicinity of project area

4.5 Prominent Historic Structures

4.5.1 Mānoa Chapel and Cemetery of Kawaiaha‘o Church

In 1832, the missionaries Hiram Bingham, Abraham Blatchely, Levi Chamberlain, and Elisha Loomis hiked into Mānoa Valley to look at two parcels of agricultural land that had been appropriated for the use of the Mission by Kalanimōkū, the Prime Minister of the Hawaiian Kingdom. One plot was on the western side of ‘Ualaka‘a in West Mānoa; the other was an acre and a half of low taro ground with thirty to forty taro patches in East Mānoa; this land was probably at the site that later became the Mānoa Chapel and the Mānoa Hawaiian Cemetery. At Ka‘ahumanu’s residence in Puka‘ōma‘oma‘o, there was a “kind of village of forty of fifty huts, the houses of the chiefs, a schoolhouse and a chapel” (Diary of Elisha Loomis, cited in Bouslog et al. 1994:153). The cemetery, which may have predated the chapel, is said to have been established by Ka‘ahumanu for a Christian cemetery.

In 1846, Reverend Richard Armstrong wrote: “In the beautiful valley of Mānoa, there is an encouraging state of things . . . . A substantial stone meeting house has been erected under the direction of Bro. William Harrison Rice, intended also for a school house.” This stone church may have been built on land once owned by John ‘Ī‘ī, who had early bought fee simple land near the present junction of the upper ends of Mānoa and East Mānoa Roads. In a letter from Armstrong to the Honolulu Mission in May of 1848:

> Brother Rice has had charge of the meeting in Manoa Valley and I hope he will present an account of his labors there to the Mission. A substantial stone meeting house has been erected there under the direction of Brother Rice, intended also as a school house, and an adobe building for the same purpose at Waikiki. . . . While erecting the houses we feared they would prove too large, but during the present year they have been filled with attentive worshippers on Sabbath afternoons and, frequently, during the week. (Gulick 1918:235)

This building was destroyed in 1876 by a severe storm, but a wooden structure with some stone work was quickly rebuilt to replace the chapel. In 1914, the lot was granted to Kawaiaha‘o Church, which managed it as an *‘āpana*, or branch church. In the 1930s, a third church was built to replace the termite-eaten second church. This church, called Luakini Hou O Mānoa (The New Church of Mānoa) was dedicated in 1935. This building was a wooden structure over a lava rock foundation. The stones for this foundation may have come from Hipawai Heiau, which may have been destroyed around 1819 when Queen Ka‘ahumanu broke the old *kapu*. As membership began to fail, the remaining congregation began to meet at a center on Mānoa Road instead. The old chapel was used as a baby clinic, a community center, and then as a theater. The theater proved popular, so the old building was razed and the Mānoa Valley Theater was completed in 1987. The church also has a small cemetery; the earliest grave can be dated to 1903 (Williams 1980:1).

4.5.2 Punahou School (Originally O‘ahu College)

As previously noted, the Punahou lands once belonged to the High Chief Boki and his wife Liliha. They were given to Hiram Bingham in 1849 until Chief Boki’s return. When Boki did not return, Bingham retained possession. He built a small adobe and thatch house on the property as early as 1831, where he worked on a Hawaiian translation of the bible. It was near this time that

many walls were built on the property, to keep out roaming cattle, and two large stones were placed along what is now known as Punahou Street. One of these stones is still at the main gate of the school. In 1837, the idea of a school to educate the children of the missionaries was proposed in a letter (Foster 1991:17-21). The original building for the school was built in 1841 (Figure 32), and the first fifteen students began to study in the structure in 1842.

4.5.3 Sacred Heart Church at Punahou

In 1823, Kamehameha II, his wife, and entourage sailed to London. With this party was a Frenchman, named Jean Rives, a close friend of the king, and his servant, a young Hawaiian boy named Kanui. After the king and queen died in London, Rives left the party and traveled to France where he visited the Sacred Hearts Fathers in Paris. Rives left Kanui at the church and urged the fathers to send missionaries to Hawai‘i to convert the natives to Catholicism. The fathers sent three brothers in 1827, and Kanui, now known as Father Maigret, returned home in 1837.

There is some evidence that Kanui may have had a grass-thatched chapel somewhere in Mānoa Valley, but most of the converts probably traveled to the Catholic Mission on Fort Street in downtown Honolulu. Kanui died in 1842, and many of his converts may have reverted to the dominant Congregational Church. The American missionary Richard Armstrong visited the area in 1846 and noted:

> . . . in the beautiful valley of Manoa, there is an encouraging state of things. Meetings are full and interesting and some 18 papists have returned to the “old paths.” (Armstrong 1846)

In 1883, Father Clement Evrand decided to establish a permanent church in Mānoa, a wooden structure built on Wilder Avenue. In 1910, a new Gothic-styled stone church was planned on land on Wilder Avenue across from the Punahou campus. The Sacred Heart Church was completed on 1914, with stained glass windows shipped from France. In 1923, a parish hall was completed, on 1927 a parochial school was built, and in 1953 a new high school was built on Punahou School (Bouslog et al. 1994:32-33).

4.5.4 Wai‘oli Tea Room of the Salvation Army

In 1909, the Salvation Army purchased 28 acres in Mānoa on lands in Ka‘aipū once owned by Kauikeaouli, Kamehameha III. On this land the Salvation Army built a home to shelter and educate needy children. In 1922, they built the Wai‘oli (meaning “happy water”) Tea Room and a bakery, so that the girls could learn “cooking, baking, and the arts of gracious living.” “High Tea” was served at Wai‘oli and later luncheons. The tearoom rapidly became a focal point of the community. In 1929, a grass hut once occupied by the famed writer Robert Louis Stevenson during his visits to the islands (in 1889 and 1893) was moved from its original location at ‘Āinahau, the Waikīkī home of Princess Kai‘ulani and her parents, to the Wai‘oli Tea Room property (Bouslog et al. 1994:32).

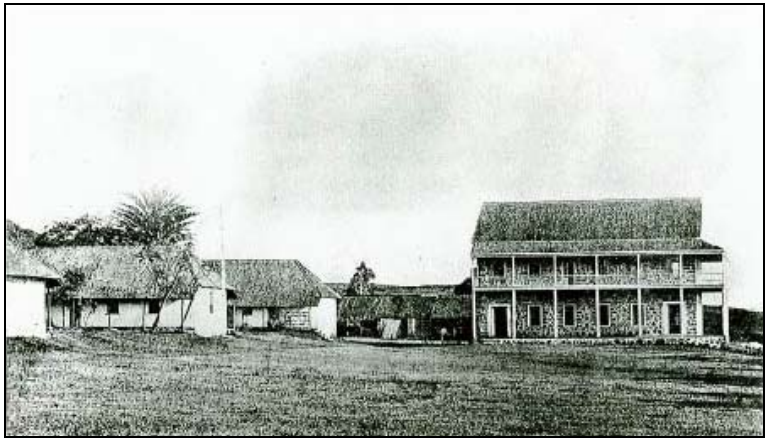


Figure 32. 1866 Photograph of Punahou School, Photograph attributed to Charles Burgess (photograph from Foster 1991:32)

4.5.5 Chinese Cemetery

The society called Lin Yee Chung was organized in 1851. The purpose was to buy burial land, to conduct Chinese funeral rites, and to arrange for the return bodies to China for final burial, if requested. In 1852, a group purchased the first lot of land in Mānoa from a Hawaiian called Moehonua. In 1854, they bought Land Grant #101, but disputes with the lot boundary delayed construction of the cemetery until 1896 (Figure 33).

In 1852, a man name Lum Ching, a practioner of the astronomy/geology study called "kum yee hok", or geomancy (the art of divination by means of lines and figures), visited Mānoa Valley. When he climbed Akāka Peak, his instruments (including an astronomy-based compass and a light-reflecting mirror), told him he was at an:

> . . . extraordinary spot. It is the pulse of the watchful dragon of the valley. People from all directions will come from across the seas and gather here to pay homage. Birds, too, will come to sing and roost. It is a haven suitable for the living as well as the dead. The Chinese people must buy this area and keep it as sacred ground. (Thom 1985:5)



Figure 33. Entrance to Line Yee Chung Chinese Cemetery in Mānoa (photograph from Bouslog et al. 1994)

4.5.6 Lyon Arboretum

In 1919, the Hawaiian Sugar Planters' Association (HSPA) purchased the 124-acre Haukulu 'Ili, which had once been owned by Charles Kana'ina, father of King William Lunalilo. It was later owned by Fred Harrison, who built a country home and stable. Dr. Harold L. Lyon was the plant pathologist for the HSPA and head of the Department of Botany and Forestation for the Territory of Hawai'i. He leased 325 adjoining acres of land from the Territory and the Bishop Estate to use as a reforestation area and as an experimental station for the growing of sugar cane varieties. The HSPA gave the 124-acre arboretum to the University of Hawai'i in 1953 for the purpose of research, education, and public service (Bouslog et al. 1994:200-201).

Near the Lyon Arboretum, above 'Aihualama Stream, is a cul-de-sac known as "The Pen," which became famous during the overthrow of the Queen Lili'uokalani and the Hawaiian monarchy. In 1893, the Provisional Government was declared by several businessmen; and in 1894, they established the Republic of Hawai'i. Revolutionists who wished to restore the monarchy soon began to stockpile weapons. One of these was Robert W. Wilcox, a former member of the government. He and his associates planned to form an army large enough to overthrow the illegal government, capture 'Iolani Palace, and restore Lili'uokalani to her throne.

The new government found out that the Royalists had a cache of weapons at the house of H.F. Bertelmann at Waikīkī Beach, and they sent a squad of government police to secure the weapons

and arrest the rebels. Some of the Royalists escaped to Diamond Head where they held out for several days, but finally running low on ammunition and food they retreated into Pālolo Valley, and then finally climbed through a pass into Mānoa Valley, ending at “The Pen.” Many of the rebels surrendered, and others scattered towards Pauoa Valley and on to Honolulu. Eventually all of the rebels surrendered or were rounded up.

4.6 Mō‘ili‘ili Quarry

A major feature of the lower campus is the quarry that was operated by the Honolulu Construction and Draying Company, Ltd. (HC & D; now Ameron HC & D). A quarry was established there as early as 1889 (Kobayashi 1983:169) to exploit the thick dense deposit of epheline-meililite “blue rock” basalt. HC & D leased the Bishop Estate land from W. C. Cummings starting on June 1, 1910 and enlarged operations by buying out the neighboring Mō‘ili‘ili Quarry in 1914. Although Portuguese masons worked the rock into building blocks, curbing material and tombstones, most was used for road construction base course and general aggregate. Mō‘ili‘ili residents kept track of the time by the regularity of the blasting schedule. Quarry operations ended on November 15, 1949, but the crusher continued to process rock from a Pālolo Valley quarry until 1951, when Ameron HC & D moved operations to Kapa‘a in Kailua. After extensive negotitation over price, a final order of condemnation for the approximately 95 acres of Bishop Estate land was finalized in 1953 and the University took over the area.

4.7 Early Years of the University of Hawai‘i at Mānoa

The University of Hawai‘i at Mānoa developed out of the 1862 U.S. Federal Morrill Act funding for “land grant” colleges. In 1907, “an act to establish the College of Agriculture and Mechanic Arts of the Territory of Hawai‘i” was passed by the Hawai‘i’s Territorial Legislature and was signed into law by governor George Carter on March 25th. The regents chose the present campus loxcation in lower Mānoa on June 19, 1907. Regular classes began in September 1908 with ten students and thirteen faculty members at a temporary Young Street facility near Thomas Square. In 1911, the name of the school was changed to the “College of Hawai‘i” and in the following year the college moved to the present Mānoa location.

The future campus was a relatively dry and scruffy place: “The early Mānoa campus was covered with a tangle of *kiawe* trees (algarroba), wild lantana and *panini* cactus” (Kobayashi 1983:7). It appears the first structures built were a poultry shed and a dairy barn. The indications are clear that there were many stone walls and almost certainly other archaeological sites in the core area of the future campus:

> The area that was to become the university farm (located on what is now the area east of Hawai‘i Hall) was made up of small fields, from one-tenth to one-forth of an acre, each surrounded by loose rock walls. Each area had been farmed by individual Chinese and Hawaiian tenants. All of the rock had to be removed. There was also much rock both on the ground and buried in the soil. It took ten years to clear 22 acres. The late Dr. Frederick Krauss estimated that 5,000 cubic yards of stone were removed from the stone walls alone…The rock was piled in an area just east of Hawai‘i Hall and covered almost an acre, with rock piled five feet high. The rock was sold to builders and contractors for ten cents a wagon load. (Kobayashi 1983:7)

The reference to “5,000 cubic yards” sounds like a lot of archaeological sites! The accounts cited above indicate fairly intensive agricultural use of the area just east of (the present) Hawai‘i Hall. Residential use is suggested in an account that: “ On May 15, 1911, the Regents discussed what to do about seven groups of Hawaiian squatters, including one group that tilled the land, on the College’s Puahia lot” (Kobayashi 1983:7). It appears that all seven groups were resident in the immediate vicinity of the campus but that only one group was involved in farming on campus. They were evidently evicted the same year.

An eyewitness account from Arthur L. Dean documenting conditions after June 1914 noted:

> Immediately in front of [the present] Hawaii Hall was a strip of lawn perhaps 75 feet wide. The wooden building moved up from Young Street, stained a dull brown, was the only other building on what is now the Campus. Dirt roads, which were impassable in wet weather, straggled through the grounds and disappeared among the trees and bushes in the direction of the farm. A neighboring dairyman paid a small monthly rate for the privilege of running his cows through the lands and they wandered about at all hours and places. (Kobayashi 1983:7)

Development of the campus was restricted by a lack of funding in the early years. An early donation of $1,500 for Alexander and Baldwin in 1915 allowed the college:

> To clear and grade a large area of wild campus land approximately bounded by what is now University Avenue, Campus Road [running east-west on the seaward side of Hawai‘i Hall], the Campus Center Building, and the parking lots behind Sinclair Library, converting it into the first Cooke Field…(Kobayashi 1983:7)

That the grading of this relatively small area cost $1500 1915 dollars suggests that, like the first portion of the campus to be cleared to the northeast, this area also included “much rock.” While the first conceptions of a campus plan in 1909 were for major campus buildings to define an elongated east-west esplanade extending east from Hawai‘i Hall, by 1915 the campus had started to take on a more ad-hoc style with the H-shaped Young Engineering Quadrangle starting to be developed to the southeast (four of the five structures remain, the southwestern one having been torn down for the building of the present Campus Center) (Figure 34).

The College of Hawai‘i was started with a clear focus on studies in agriculture and engineering to address local needs. In 1920, with the formal establishment of the University of Hawai‘i, the vision changed to a much broader curriculum reaching out to countries of Asia and the Pacific.

In 1922, the construction of the third permanent building on campus, Gartley Hall, began the “old quad” that was subsequently expanded by construction of George Hall in 1925 and Dean Hall in 1929. The old gymnasium was built in 1928/29 (just northwest of the present Bachman Hall) and remained until 1959 when it was razed following the construction of Klum Gym. The depression years significantly slowed development. In 1930, the Normal School (today’s “Wist

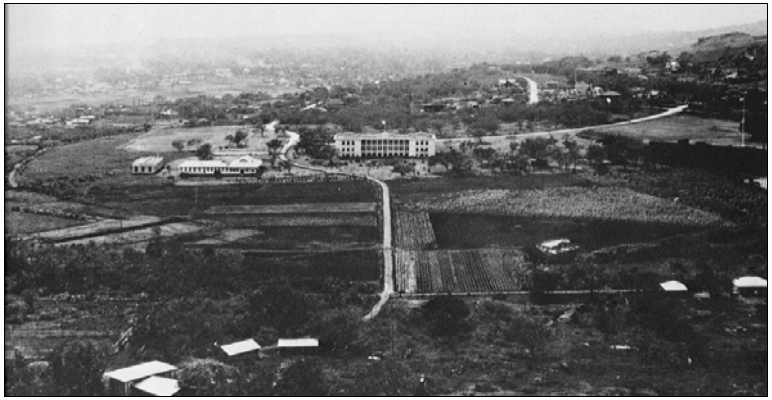


Figure 34 View of the campus in 1917 from Wa‘ahila Ridge (Adapted from Kobayashi 1983:23) showing the two permanent buildings, Hawaii Hall (1912) is at center, the beginnings of the Young Engineering quad (still 4/5 intact by the present Campus Center) is at left of the relocated wooden building moved up from Young Street

Hall") was opened on the west side of present University Avenue. In 1931, with the merging of the Normal School with the Universty's School of Education (forming what was then Teachers College and what is now the College of Education), this western land became part of the University campus. The 1930s were also the time of the construction of many of the campus' most iconic structures, including Founders Gate (1933), Varney Circle Fountain (1934), Andrews Outdoor Theater (1935), George Hall (1936), Crawford Hall and Hemenway Hall (both 1938), and Miller Hall (1939) (Figures 35 through 38).

WWII brought such impacts to campus life as Hawai‘i Hall becoming the U.S. Armed Forces Institute and the construction of fourteen wooden barracks up near the present Spaulding Hall. The army took over the gym, soldiers ate at the Hemingway Hall cafeteria, and bomb shelters were built. A portion of the campus was designated as a temporary military cemetery but fortunately no graves were ever dug (Kobayashi 1983:80).

The Bachman Hall administration building, designed by Honolulu architect Vladimir Ossipoff, and built in 1949, was the first permanent post-war building. A construction boom has been on-going more or less continuously ever since. The core area of the campus was expanded in 1968, when approximately 30 acres were obtained near the Mānoa Library and Mānoa Marketplace; this land was developed in 1975 for the present Astronomy Institute at 2680 Woodlawn Drive.



Figure 35. 1926 aerial photograph showing seaward end of present University Avenue ending at Metcalf St. (extreme left), George Hall (1925) inland of Gartley Hall (1922; center), with Hawai‘i Hall (1912) at right and the Cooke Field Track (vicinity of present Sinclair Library) in the fore. The future Bachman Hall area is still in farm plots.



Figure 36. 1929 aerial photograph showing the western half of the present campus still in fields but University Avenue has now been extended seaward (extreme left, middle) and there has been significant clearing seaward of the Cooke Field track associated with construction of the original Gym (1928) just NW of the present Bachman Hall.

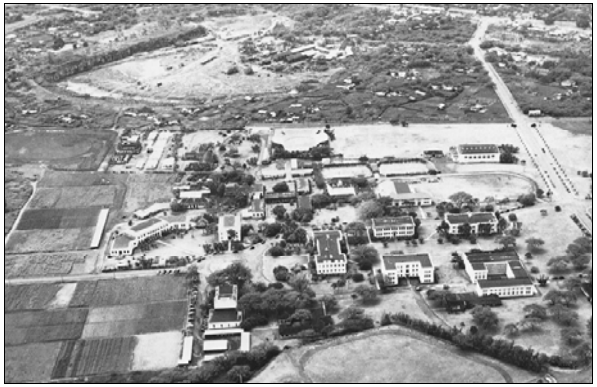


Figure 37. 1939 aerial photograph showing the campus dominated by the old quad (lower right) of Hawai‘i (1912), Gartley (1922) George (1925) and Dean (1929) and the new Crawford Hall (1938). The brand new Hemenway Hall (1939) is just seaward and old Gilmore Hall (1935-1973) with its two wings anchors the east end of campus at left



Figure 38. In this 1949 aerial photograph the campus is dominated by the central Hemenway Hall (1938), the old Gym and the on-going construction for Bachman Hall are near University and Dole streets, the University Farms still dominate the eastern campus

Section 5 Archaeological Research

5.1 Overview

In general, the vast majority of archaeological sites once located in the Mānoa Valley have been destroyed by modern development, including the construction of the university campus in the lower valley and residential / commercial centers elsewhere. The campus is located in what would have been the prime wet taro-growing area of the entire valley, and many *lo‘i* (stone terraces) and *‘auwai* (irrigation ditches) were located here; this agricultural heartland of the valley (i.e., the present-day campus) also would have been home to many small stone enclosures, terraces and platforms used by *maka‘āinana* (commoners) as house sites. The valley also was home to numerous *heiau,* some of which have been preserved into modern times, and burials (see below).

5.2 Heiau of Mānoa

The first recording of information regarding archaeological sites of Mānoa was by Thomas G. Thrum in his informal study of Hawaiian *heiau*. It was presented in a number of short articles in his *Hawaiian Annual* between 1892 and 1909. Thrum (1907a, b) briefly described five *heiau* in Mānoa. In the early 1930s, McAllister (1933) reprinted this information in his *Archaeology of O‘ahu.* McAllister could relocate only one of these *heiau*, Kūkaō‘ō Heiau, which he mapped and described in more detail.

Emma Nakuina (1907:24) also describes a *heiau*, named Kauala‘a, and a sub-*heiau*, named Kauwalomalie, on the site of the Mid-Pacific Institute near Wailele Spring (possibly in the ‘*ili* of Kauwala‘a). These *heiau* were not listed by Thrum in his report on O‘ahu *heiau*, but may be mentioned in a different article by Thrum (1892:112), which lists forts built by the high *ali‘i* Kuali‘i, who built “a system of heiaus, extending from Mauoki, Puahia-luna and lalo, Kumuohia, Kaualaa, Wailele, and one or two other points between Kaualaa and Kukao‘o.”

The possible locations of these six *heiau*, and place names associated with them mentioned in their descriptions, are shown in Figure 39. This figure is a modern O‘ahu street map, with an overlay of the outline of the 1822 E.D. Baldwin map of Manoa Valley (see Figure 8). The overlay was created by lining up several major peaks (Round Top, Makani, and Wa‘ahila) plotted on both maps; however, since this is a comparison of one map created in the nineteenth century and a more exact map created in the twentieth century, the correlation between the two maps may not be exact.

5.2.1 Kūkaō‘ō Heiau

According to legend, six *heiau* on the island of O‘ahu were built by the *menehune*, but only one, Kūkaō‘ō Heiau, was built for their own use (Luomala 1951:20). The *menehune* were said to have built a fort and a temple at Kūkaō‘ō, a place above (inland of) the hill called Pu‘u Pueo (Westervelt 1963a:131). They were driven away from their fort by the high chief Kuali‘i during his reign (sometime in the 1700s). Kuali‘i rebuilt it after his seizure of the fort.

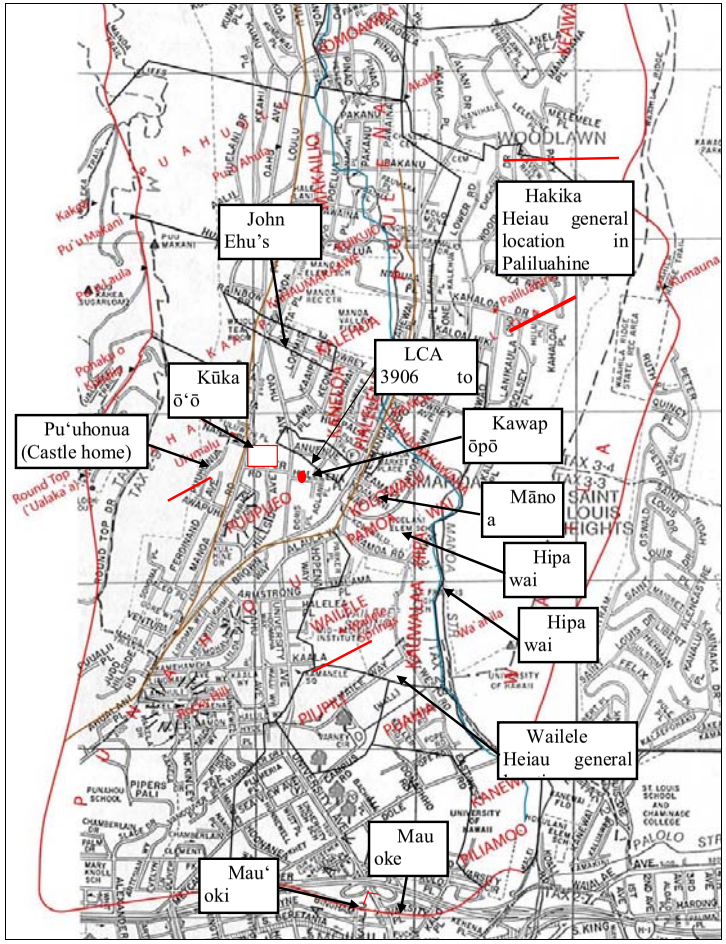


Figure 39. Overlay of 1822 E.D. Baldwin map of Mānoa Valley on modern street map, showing possible *heiau* locations

In 1892, Thrum described this still-standing *heiau* of Kūkaō'ō on the hill called 'Ulumalu:

> A few hundred feet from the house, on a vast rock pile, still stands a walled enclosure known as the heiau of Kukaoo, now overgrown with lantana and night blooming cereus. This old heathen temple dates back many hundred years. Its erection is credited to the Menehune's—or class of pigmies—but was rebuilt during the reign of Kualii [circa A.D. 1700s], who wrested it from them after a hard fought battle. The Menehune's fort was on the rock hill, Ulumalu, on the opposite side of the road, just above Kukaoo. Previous to the battle, they had control of all upper Manoa. (Thrum 1892:112)

McAllister located Kūkaō'ō Heiau during his inventory of O'ahu in the early 1930s. He described it as a "small heiau 50 by 40 feet," built on a natural elevation about 30 feet high. "There remain[s] a small inclosure and two terraces to the west" (McAllister 1933:79). He located the *heiau* on the premises of the residence of C. M. Cooke, Jr.

This *heiau,* which is still standing and located at 2859 Mānoa Road, has been recorded during several subsequent archaeological surveys (Kennedy 1991; Cleghorn and Anderson 1992; Tomonari-Tuggle 1998). Various portions of the *heiau* have been recorded in TMK 1-2-019: 035, 036, and 043, in a large area between Mānoa and O'ahu Roads and *mauka* of Cooper Road. In addition, a burial has also been recorded from 2859 Mānoa Road (Jourdane 1994).

Although there is no confusion over the present-day location of the *heiau*, there is some disagreement regarding the number of structures, the name of the surrounding area, and the name of the hill on which the *heiau* and/or fort was built. In Thrum's 1892 account of Mānoa Valley, he described Mānoa Road as if he was traveling from the *makai* boundary to the upper valley. He states that Kūkaō'ō Heiau was built on a rock pile, and the *menehune* fort was built "on the opposite side of the road on the rock hill, Ulumalu, just above Kukaoo." This suggests there were actually two structures on 'Ulumalu hill: a *heiau* on the east side of Mānoa Road and a *menehune* fort on the west side of Mānoa Road.

In the legend of Pueo Ali'i, the king of the owls, Westervelt states that Pueo Ali'i "was thought to be a chief leading his army along the hillside below Pu'uhonua Temple." In a footnote on the same page of his book, he states "This place is now the site of the Castle home" (Westervelt 1963a:131). William and George Castle built a large mansion in Mānoa in 1898 for their ailing mother Mary Tenney Castle, the widow of Samuel Northup Castle, one of the group of the eighth missionary party to Hawai'i. They called the house Pu'uhonua, which means "place of refuge." It was built in a land area called Kaulumalu (Ka 'Ulumalu) on a hill called 'Ulumalu, at the place that would later be the end of Ferdinand Street. George Castle remembered that near the house was a "sacrificial stone and some ruins of the *heiau* to Kū'ula and above on the hillside the Pōhaku Kū'ula, a rock on which the watchman stood to command a view of the entire valley from mountain to sea" (Bouslog et al. 1994:88).

A hill labeled "Ulumalu" was plotted on the 1882 Baldwin map of Mānoa Valley on the west side of Mānoa Road. This map also shows that the hill was part of Grant 4166 to Mrs. Mary Castle. A *pōhaku* called Pōhaku o Kūkalia is also plotted on the 1882 Baldwin map of Mānoa Valley (see Figure 8) just *mauka* (northwest) of the hill labeled 'Ulumalu. This may be the "sacrificial stone" that George Castle called Pōhaku Kū'ula. The question remains if there was a fort also on 'Ulumalu hill, or if the *heiau* ruins Castle is referring to is actually Kūkaō'ō Heiau, on the east side of Mānoa Road. As mentioned previously, Westervelt refers to a structure called

Pu‘uhonua Temple at the Castle residence. However, the presence of such a “temple” at the Castle residence would be inconsistent with George Castle’s reminiscences, since he refers to a sacrificial *heiau* dedicated to the war god Kū, not a *heiau* dedicated to “refuge.”

Joseph Kennedy (1991) concluded that there was only one structure, that acted as both a *heiau* and fort, and that it was located on the east side of Mānoa Road (location of Kūkaō‘ō Heiau). He believed that the surrounding area was called Kūkaō‘ō and the hill that the *heiau* was built on was called ‘Ulumalu (east side of Mānoa Road). The resolution to at least some of this confusion may have been addressed in a 1982 article on the Castle home. In this article, the author states that the location for the house was chosen in 1898 on the western side of the valley.

> This is the *alii* (or noble’s) side of Manoa, rich in legend and folklore, known to Hawaiians as Kaulumalu (Breadfruit shade). . . . One of the Castle sons, George (1851-1932) recalled “there being a beautiful grove of breadfruit and ohia trees where native birds congregated in great numbers.” The man who planted the grove was very old and I was a boy. Sand [volcanic cinders] came down . . . and choked the trees. . . .
>
> Another son, William (1849-1935), gave the name Puuhonua to the property. *Pu‘u*—hill or protuberance, and *honua*—of earth, but also meaning a place set apart for refuge and safety. . . .
>
> The 8.16 acres had been purchased at auction on May 12, 1898, for $6,250. A government survey station on the site had already been given a name from the past, *Ulumalu*. (Robb and Vicars 1992:173-174)

These passages suggest that the specific association of the place name ‘Ulumalu with the hill on which the Castle home (west of Mānoa Road) was built may only date from the late nineteenth century; therefore, a hill on the east side of Mānoa road may well be the original (older) Pu‘u ‘Ulumalu. It seems to have been a mistake for Westervelt to call the Castle home “Pu‘uhonua Temple” or to associate it with Kūkaō‘ō Heiau, which was a sacrificial *heiau* dedicated to the war god Kū, and not a “place of refuge.” The name Pu‘uhonua was probably given to the house to represent that the place was a refuge for the Castle family (Stokes 1941:2). McAllister (1933:79) also showed some skepticism to the Westervelt reference for Pu‘uhonua Temple stating, “I doubt that this was a heiau.”

The *heiau* is also mentioned in Land Commission records as “LCA 3906 to K. Neki, *Heiau* of Kūkaō‘ō, fence; house in” (see Table 1). On the 1882 Baldwin map, there is a property labeled “Gr. 638 Haalilio, see LCA 3906 W Neki.” Land Commission documents reveal the following information regarding this award:

> No. 3906, Neki, Honolulu, January 17, 1848
>
> N.R. 187-188v4
>
> To the Land Commissioners, Greetings and thanks: I, Neki hereby state my claims /at/ the land fence, mauka in Manoa, at the heiau of Kukaoo on the side below the heiau.
>
> These two fences of which I tell you were from my makuas - they expended a great deal of revenue in making these fences, and I also did, and they are mine at this time - no one else has a right to them. That is my explanation to you.

> I am, with thanks.
>
> NEKI
>
> To the Land Commissioners - House lot, also. Greetings to you and thanks: I, Neki, hereby state my claim for a house lot which is mauka in Manoa in the Land of Kaloiiki. I have two house lots at this time. That is my explanation to you.
>
> Aloha,
>
> NEKI
>
> N.T. 378v10
>
> No. 3906, Neki (from page 306), 1 September 1854
>
> Maki, sworn, I have seen his claim in Kaloiiki in Manoa of two lots with enclosures and in one piece.
>
> Mauka, Mahune’s land
> Waialae, Kaahaloa, Kalanikahua’s land
> Makai, T. Tute’s land
> Ewa, Mr. Marshall’s land.
>
> This land was given to Neki by J. Haalilio when Kaahumanu was yet alive before 1832. No objections.
>
> Kahanaumaikai, sworn, I have seen this place since 1842 to the present time. I have done farming under Neki and that place is for Neki. Mahi's statements above are true.
>
> Kana, sworn, I have known in the same way as they have stated since 1845 to the present time.
>
> [Award 3906; R.P. 6502; Kolowalu Manoa Kona; 1 ap.; 7.25 Acs]

On the overlay map (see Figure 39), this LCA seems to be in the general location over Anuenue Street rather than between Mānoa and O‘ahu Roads (where Kūkaō‘ō Heiau is standing). From the description, Neki says that his lot is “on the side below the heiau,” so it is possible that the *heiau* was not in this actual lot; rather the lot was *makai* of the *heiau.*

5.2.2 Kawapōpō Heiau

> Upper Manoa, on premises formerly of Haalilio; a small *heiau* said to have been torn down prior to 1850 (Thrum 1907a:45].

McAllister (1933:80) could not relocate this *heiau*.

In 1975, Margaret Luscomb (1975) conducted an inspection of the Maretzki property on 2626 Anuenue Street. This property was a portion of Grant 638 to Hana Haalilio and K. Neki (LCA 3906), Royal Patent 6502, signed by Lunalilo. The Native Testimony for this award was presented above in the discussion of Kūkaō‘ō Heiau. Luscomb recorded a raised platform, 7 by

6.5 m on the property. Since this structure was on Ha'alilio's land, Luscomb concluded that this platform might be Kawapōpō Heiau. In the description of his land, Neki says it was below Kūkaō'ō Heiau; there is no mention of the name Kawapōpō or of a second *heiau.*

One problem with assigning this structure as Kawapōpō Heiau is that Ha'alilio was granted other lands in Mānoa, before the *Māhele*, and the location given by Thrum may refer to these other lands. Thrum described the location of some of these lands as *mauka* of John Ehu's homestead:

> The site of the various houses that once sheltered Haalilio and his retinue is pointed out just above the old Ehu homestead, known later as the 'Charley Long' premises and, till very recently, part and parcel of Montana's Kaipu Diary. Rev. H. Bingham, of early Hawaiian Mission fame, is also referred to by old timers as having had a residence adjoining the Haalilio premises, though his history makes no mention thereof. (Thrum 1892:114)

On the 1882 Baldwin map, two properties (Grants 15 and 54) are shown in the *'ili* of Ka'aipu awarded to John Ehu (see Figure 39). If Thrum is referring to land owned by Ha'alilio that is above John Ehu's homestead, Kawapōpō Heiau may have been located much farther *mauka* of the structure recorded by Luscomb in LCA 3906 to Neki. This would suggest that the structure recorded by Luscomb may be part of Kūkaō'ō Heiau instead. Because of Thrum's imprecise location and the fact that McAllister could not relocate Kawapōpō Heiau, it is impossible at this time to determine whether Luscomb correctly identified the structure on the Metzinger property as Kawapōpō Heiau.

5.2.3 Hakika Heiau

> Paliluahine, east side of valley.-A round heiau of not large size. Foundations now barely traceable. (Thrum 1907a:45)

McAllister (1933:80) could not relocate this *heiau*, but according to Thrum's description, it was on the east side of the valley, in the area called Paliluahine (near the modern-day suburb of Woodlawn). On the 1882 Baldwin map (see Figure 39), there is a peak labeled Paliluahine; therefore, the *heiau* was probably in this general location, but the specific location is not known.

5.2.4 Hipawai Heiau

Thrum described Hipawai Heiau as:

> Makai of Church, Manoa.-Of large size and pookanaka class, partly destroyed many years ago, then used as a place of burial. Remaining walls subsequently torn down. (Thrum 1907a: 45)

This *heiau* was possibly described in 1823 by Levi Chamberlain, when he and other missionaries came to inspect a lot of three acres given to them by the Hawaiian government. The official report of the Sandwich Island Mission described the structure as:

> On one side of this secluded valley they visited an old *heiau* or place of worship of Kamehameha's time, consisting now simply of a stone wall enclosing a small area about 20 feet square. (cited in Bouslog et al. 1994:12)

In his own journal for June 6th, 1823, Levi Chamberlain described in more detail "the ruins of a moreai [heiau]" as:

> It was a regular wall built of loose stones about twenty four feet square from three to four feet high on the inside & from two and an [sic] half to three feet in thickness. On the north the outer side of the wall was much higher owing to a declivity at the foot of which were a few *kou* trees. The tall grass within and around was evidence that it is a long time since it had been frequented for the purpose of superstitious ceremonies. It is probably fifty years since it was erected. (cited in Bouslog et al. 1994:11-12)

The Mānoa Church was built in 1846 as an *'āpana* (branch) of the Kawaihao'o Church. A newspaper article says that Hipawai Heiau was torn down in 1819 and some of the stones were used to build the rock foundation of the Mānoa Congregational Church, a building that replaced the Mānoa Church in 1935. Some stones may also have been used in the Mānoa Hawaiian Cemetery. A new church was built in 1968 on nearby Huapala Street, and the old building, on 2833 E. Mānoa Road, was used to house the Mānoa Valley Theater (Williams 1980:1).

Hipawai is also the name of a cave.

> There is a large underground cavern with much of the water of Manoa passing through it under the area of Woodlawn Drive where the new (1975) astronomy building of the University is. People went down into the cavern in former times. (Mary Pūku'i, cited in Sterling and Summers 1978:287)

The former location of the 1846 Mānoa Church is plotted on the 1882 Baldwin map (see Figure 39). The present day location of the astronomy building of the University of Hawai'i, and thus the possible location of Hipawai Cave, is shown on the base map of the same figure.

Hipawai Heiau was reported as *makai* of Mānoa Church. In 1968, Francis Ching recorded a rock mound, two to three feet high, 30-40 feet long, and 18 feet wide, with some remaining facing on the *makai* side. A platform was also present on the *makai* side. This *heiau* was located on the Magoon property on land donated to the University of Hawai'i. Ching identified this structure as a possible *heiau*, but did not suggest a name for the structure. Ching also stated "I was also told that there was another site similar to the one discovered a little further makai" (Ching 1968:1).

In 1988, a field check was conducted at the St. Francis High School campus (TMK 1-2-9-04:01), which is *makai* and adjacent to the northeastern corner of the campus (Kawachi 1988a). Carol Kawachi recorded several walls and terraces in this area, but the place was heavily vegetated. An inventory of the features was not made, and no map was drawn. Kawachi also reported on a 1908-1909 military map that showed a *heiau* in the general area. She then suggested that this *heiau* could be the same as the one recorded by Ching on the Magoon property, but since Ching did not give the TMK of the parcel he investigated, it was difficult to determine the exact location of this structure. According to a Land Court Map of 1926, Magoon once owned property in several locations, including upstream of the St. Francis campus.

The exact 1908-1909 military map referred to by Kawachi could not be determined, but a 1908-1913 Corps of Engineers map (Figure 40) does show an L-shaped structure *mauka* and upstream of the St. Francis campus. This map was made before the construction of the high school, which was founded in 1924 by the Franciscan Sisters of the Third Order. Although this

structure is not labeled as a *heiau*, it may be the structure recorded by Ching, and may be Hipawai Heiau. A further confirmation of this attribution can be found on the 1822 Baldwin map (see Figure 39); the area where this L-shaped structure would be on this map (*mauka* of St. Francis High School) is in the *‘ili* named Hipawai (literally, water foolishness). In fact, the street just *mauka* of the high school is called Hipawai Place, which was “named for an O‘ahu land section” (Budnick 1989:43).

5.2.5 Mau‘oki Heiau (Kamō‘ili‘ili Heiau)

Mau‘oki was a *heiau* of the *po‘okanaka* type (large *heiau* for the paramount chief of the district or island), as discussed by Samuel Kamakau:

> There were many heiaus and *luakini* heiaus in Honolulu in the ancient days. . . . Of *heiau po‘okanaka* there were Pakaka and Kaheiki in Honolulu, and Mau‘oki, Kupalaha and Le‘ahi [Papa‘ena‘ena] at Waikiki. Mau‘oki was a *luakini heiau* built by the Menehune, a numerous race of men often spoken of in the traditions of *ka po‘e kahiko*. Kahanoniualewa [Kahano-a-Newa] is said to have brought them here; his arms were the bridge. Mau‘oki was made of stone from Kawiwi in Wai‘anae, and there were so many Menehene that each brought one stone, and Mau‘oki was completed. *Ka po‘e kahiko* called these people Menehene; it is said the came from the east. (Kamakau, *Ka Nūpepa Kū‘oko‘a* March 3, 1870; translation in Kamakau 1991c:144)

The association of the *heiau* with the high chiefs in O‘ahu is illustrated in the story of the birth of Kiha-a Pi‘ilani. Lā‘ie-lohehoe was an *ali‘i* born at Helumoa and raised at Kaluaokau in Waikīkī. She was betrothed to Pi‘ilani, the son of the *mō‘ī* (island-wide chief) of Maui and moved to his Pi‘ilani’s father’s residence at Lāhainā in Maui for her wedding. They had four children; for the birth of her fourth child, a son, she returned to O‘ahu. Samuel Kamakau reported that Kiha-a-Pi‘ilani, the son of Lā‘ie-lohehoe and Pi‘ilani of Maui, was taken to Mau‘oki Heiau after his birth at ‘Āpuakēhau in Waikīkī.

> No Kihapiilani. Ua laweia oai e ke kahuna e hanai i ka moku. O Mauoki hoi ka heiau i ku i ka moku ma ka olelo a ke kahuna. Ua hanai ia oia a nui, a ua ao ia i ke koa me na oihana, kakaolelo, me ke akamai hoi i ka oihana hana. (Kamakau, Ka Nūpepa Kū‘oko‘a, August 26, 1865)

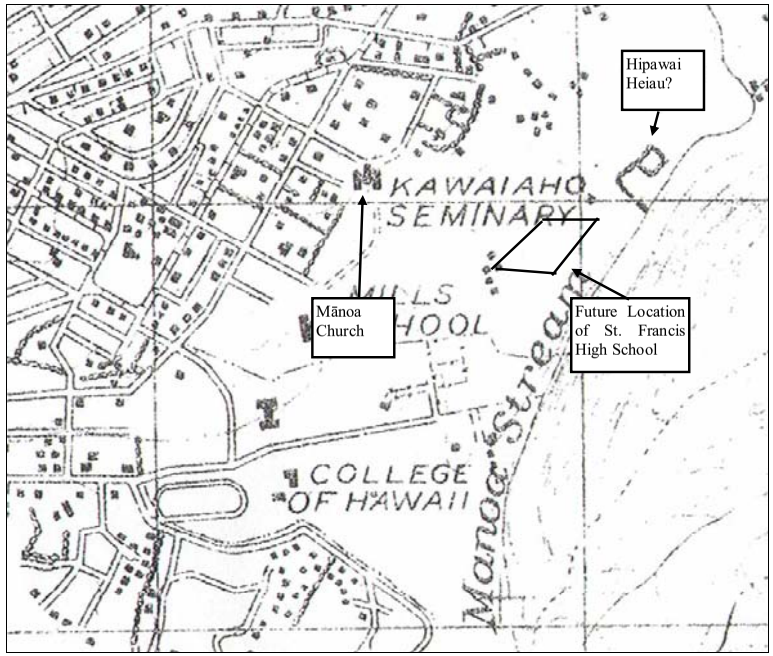


Figure 40. 1908-1913 Corps of Engineers Fire Control map, showing L-shaped structure, possibly Hipawai Heiau, on land later *mauka* of the St. Francis High School Campus

> Kiha-a-Pi‘ilani was taken by the *kahuna* and raised at the *heiau* of Mau‘oki at Kamō‘ili‘ili [Mō‘ili‘ili]. He was raised there until he was grown and taught to be a warrior and an orator; he was skilled in those professions. (Kamakau 1991c: 50)

The *heiau* was described by Thrum (1907a:44) as:

> It is said to have been of traditional Menehune construction with stones brought one by one from Kawiwi, Waianae. It was a heiau of good size, walled on three sides and open to the west that stood at the foot of the slope dividing the Manoa and Palolo valleys, Kamoiliili.

Thrum also referred to this *heiau* as the Kamō‘ili‘ili Heiau.

> Kamoiliili. Heiau and luakini [sacrificial heiau]; erected according to tradition by Menehunes with stones from Kawiwi Waianae. Torn down about 1883 by the Minister of Interior for street work. (Thrum 1907a:44)

According to Thrum, the *heiau* was in Mō‘ili‘ili, at the border of the *ahupua’a* of Mānoa and Pālolo. According to C. S. Stewart (Sterling and Summers 1978:279), Mau‘oki Heiau was located possibly at the junction of Wai‘alae Avenue and Third Street, which would place the *heiau* just south of Chaminade University in the *ahupua‘a* of Pālolo. McAllister also located the *heiau* (Site 62) in Pālolo Ahupua‘a, just *mauka* of Site 61, the Mō‘ili‘ili petroglyphs.

Dr. Richard Bordner, who was familiar with the Chaminade University area, said he believed a large agricultural *heiau* was once just north of an area of petroglyphs along Pālolo Stream. This *heiau* was on a relatively flat area on the west edge of Pālolo Stream near where there is presently a 22-caliber rifle range. Dr. Bordner’s account of the relationship of these petroglyphs and a *heiau* are consistent with McAllister’s (1933:57) description of Mau‘oki Heiau (McAllister’s Site 62), which was just *mauka* or north of the Mō‘ili‘ili petroglyphs (McAllister’s Site 61). According to Dr. Bordner, until relatively recently, there were still some large boulders in the immediate vicinity that may be remnants of this *heiau* (Hammatt et al. 2002b: 23). A search for this *heiau* was made during the recent Ala Wai Watershed survey, but no *heiau* or cluster of boulders was found. In a recent conversation with Dr. Bordner, he stated that he believed that the remains of the *heiau*, and the petroglyphs, have been destroyed.

All of these reports have placed Mau‘oki Heiau within the current boundaries of Pālolo Ahupua‘a, near Chaminade University. McAllister (1933) located the *heiau* just north of the petroglyphs, which seem to be definitely near Pālolo Stream; however, McAllister never personally saw the *heiau,* since it had been destroyed in 1883.

On an 1883 survey map (Figure 41) by S. E. Bishop (traced by E. Kealoha in 1958), a structure labeled “heiau” is shown near a feature labeled “Mauoke Spring,” both of which are *mauka* of “Moiliili Road” and King Street (along the present day alignment of Wai‘alae Avenue) in the *‘ili* of Pa‘akea. In a comparison of this map with the 1882 S.E. Bishop map of Mānoa Valley (see Figure 8), this location is south of the *‘ili* of Pilipili and west of the *‘ili* of Kānewai (the present day athletic field for the University of Hawai‘i at Mānoa). If the pictured *heiau* is Mau‘oki Heiau (as suggested by its proximity to “Mauoke Spring”), then Mau‘oki Heiau was actually once located much farther west than Chaminade University, near the *makai* border of Mānoa Ahupua‘a (south of the University of Hawai‘i) rather than near the *makai* border of Pālolo Ahupua‘a (south of Chaminade University).

This location seems to be near the Mō‘ili‘ili Quarry, but the correlation of the 1882 map and the modern map is probably not exact. This also means that the agricultural *heiau* noted by Dr. Bordner near the Mō‘ili‘ili petroglyphs may be a different *heiau* than the *luakini* (sacrificial) *heiau* of Mau‘oki. It is also possible that Mauoke spring was another name for Kumulae Spring, an ancient legendary pool that is associated with the extensive karst caves of Mō‘ili‘ili.

5.3 Early Archaeological Surveys of Mānoa Valley

In J. Gilbert McAllister’s island wide archaeological survey (1933), he recorded five sites in the vicinity of Mānoa including Site 61 petroglyphs, Mō‘ili‘ili, Site 62 Mau‘oki Heiau, Site 63 Hipawai Heiau, Site 64 Kūkaō‘ō Heiau, and Site 65, which seems to refer to the whole valley (Figure 42).

Under McAllister’s Site 65, “Mānoa Valley,” he discusses “Pu‘uhonua Heiau,” the sweet potato fields of Pu‘u Ualaka‘a, Thrum’s sacred stone, a cave on the east side of Mānoa Valley, which Westervelt (1904:2) associates with Kamehameha the Great, and the Kawapōpō and Hakika Heiau. Little new information is presented regarding the other sites.

Until 1900, Punahou School had a small collection of Hawaiian artifacts in a glass cabinet in the Old School Hall. Some of these artifacts are shown in a circa 1900 photograph (Figure 43). In the foreground of the photograph is a carved wooden figure that may be the wooden figure found by Punahou students on Rocky Hill. Foster says this was found “on Rocky Hill” (Foster 1991:35) in one section and “in a cave on Rocky Hill, a vestige of the *heiau* that once stood in that area” (Foster 1991:128).

> Samuel Armstrong mentions exploring its caves for wooden idols and ghosts, and Thomas Gulick tells in detail how the boys, climbing the slope, once came upon a cavern between the cliffs and, by excavating, penetrated to a point where they required torches to see their way. There they discovered a little idol. It must have come from the small *heiau* that once stood on Rocky Hill. Probably it and a large wooden idol brought to Punahou from a taro patch at Waialua had both been hidden at the time the edict had gone forth to destroy all the idols [Alexander and Dodge 1941:122].

Other early site designations in Mānoa included the Bishop Museum’s designation of the former home of Queen Ka‘ahumanu, “Pukaomaomao,” in upper Mānoa as Site 405 and the designation of a complex of agricultural terraces in extreme northern Mānoa Valley (State Site #50-80-14-3953).

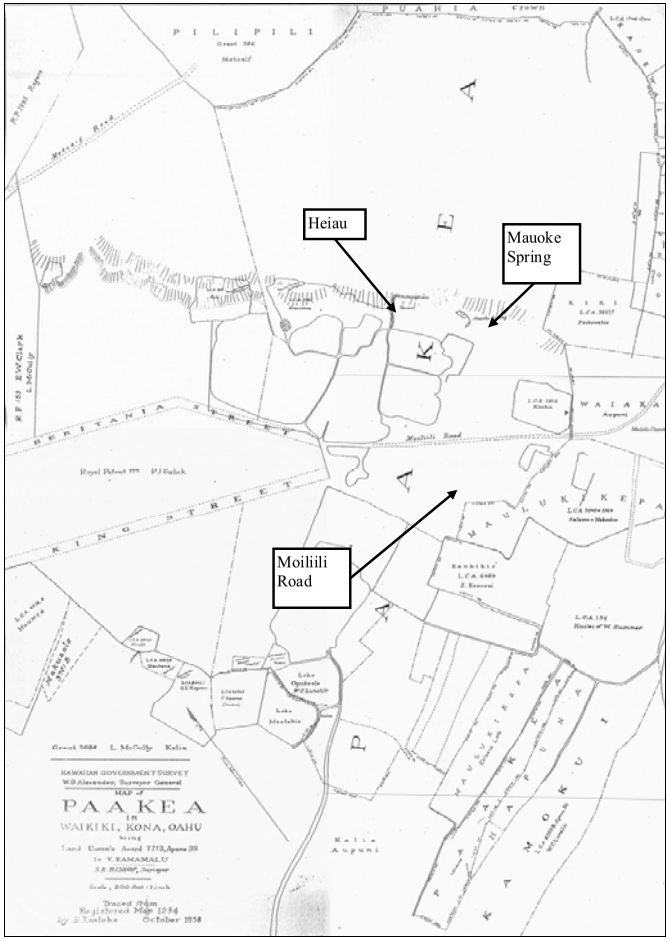


Figure 41. 1883 S.E. Bishop map of Pa'akea, showing location of a *heiau* near Mauoke Spring

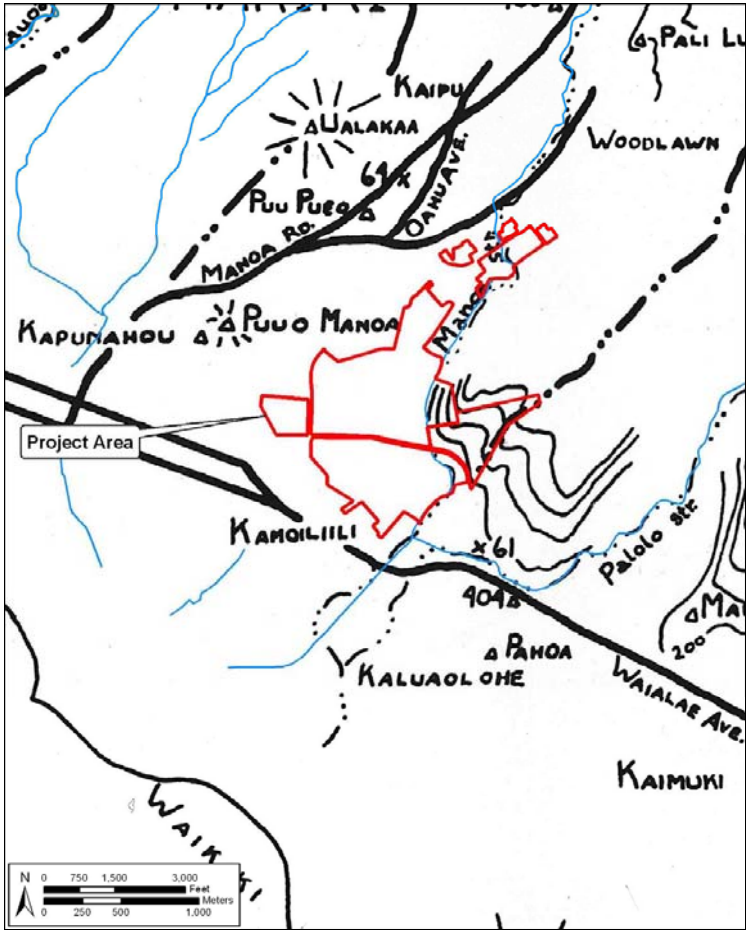


Figure 42. Project area (in red) in relationship to archaeological sites identified in Sites of O'ahu (Sterling and Summers 1978)

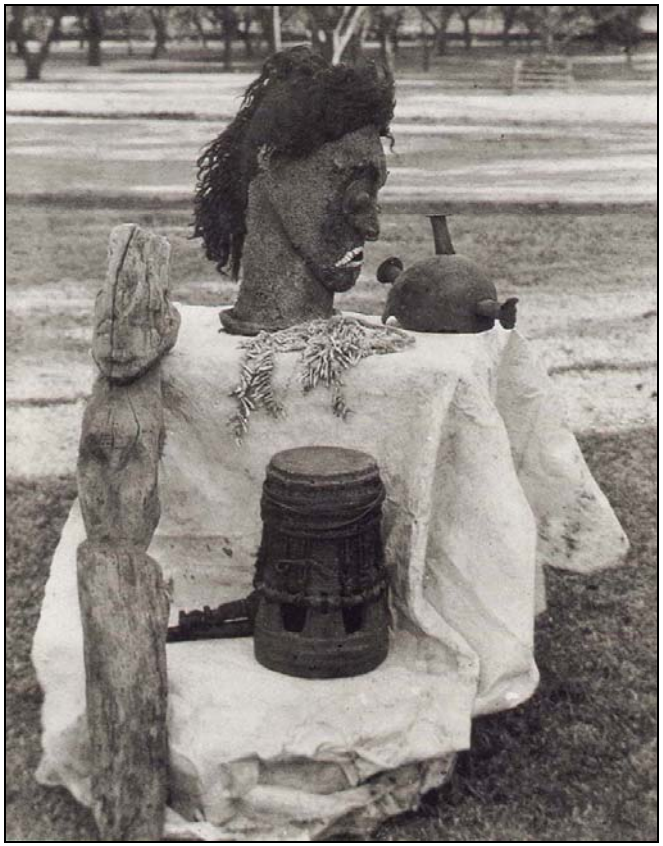


Figure 43. Circa 1900 photograph of artifacts displayed at Punahou College including the wooden idol (left foreground) possibly found in a cavern in Rocky Hill

5.4 Post 1960 Surveys of Mānoa Valley

Between 1963 and 1990 there were at least thirteen other archaeological studies in the Mānoa area, which are summarized in Table 2 and plotted in Figures 44 and 45. Of particular interest is the recovery of a total of 25 presumed prehistoric burials from six other areas (Sites 3743, 4038, 4134, 4191, 4266 and the Koana Cave Site). The oldest report of burials in the Mānoa area of which we are aware concerns the discovery of human bones in a cave site located approximately 50 m *mauka* of the Dole Street burial site (4266). This cave is almost certainly the “cave called Koana” on a 1916 Podmore map (Figure 46). A neighboring resident informed us that she had taken human skeletal remains discovered in the cave to the B.P. Bishop Museum (she thought it was in 1953), and that subsequently archaeologists from the Museum had visited the cave and indicated that they felt the site had little potential. The Bishop Museum has no record of such a visit; however, they have an accession of an adult female crania (osteological catalogue #2863) dated 7/10/1964 from St. Louis Heights, O‘ahu giving a person with the same last name (different first initial) as the source. Typically a Museum archaeologist would have investigated such a discovery. A habitation or burial function of the cave is suggested by one possible translation of *ko‘ana* – “to stay or settle in one place, as people” (Pūku‘i and Elbert 1986:157).

The five burial sites (3743, 4038, 4134, 4191 and 4266) were all interpreted as “prehistoric or early historic” (Bath and Smith 1988; Bath and Kawachi 1989; Bath and Kawachi 1990; Hammatt and Shidleler 1991; Smith and Kawachi 1989). With one exception (the Dole Street burials), there were no associated cultural materials with any of these remains, nor was there any chronological dating. The Dole Street burials were associated with three formal artifacts of traditional design and with cultural layers dated to the fifteenth century A.D. (Hammatt and Shideler 1991).

Three of the archaeological studies bear upon *heiau* at Mānoa. Luscomb (1975) may have correctly dentified the remains of Kawapōpō Heiau. Ching (1968) and Kawachi (1988a) both discuss possible identifications of a *heiau* on what appears to be two different properties located on the west side of Mānoa Stream just north of University of Hawai‘i at Mānoa. It seems highly probable that Hipawai Heiau, where human sacrifices were offered, was in the immediate vicinity of these two study areas, but whether either report indeed describes remains of this temple is not altogether clear. There appears to have been no discussion of the other two known Mānoa Heiau: Kūkaō‘ō Heiau (2859 Mānoa Rd.) and Hakika Heiau (near Paliluahine-Chinese Cemetery hill) since McAllister (1933). Other archaeological reports discuss minor agricultural sites or report no sites at all.

Archaeological data recovery was conducted at the Kāpapa Lo‘i ‘o Kānewai (a.k.a. Kānewai Cultural Garden) in association with construction of the University of Hawai‘i Center for Hawaiian Studies building (Liston and Burtchard 1996). The project area was located adjacent to the east bank of Mānoa Stream, immediately *makai* of the Dole St. bridge. The Kāpapa Lo‘i ‘o Kānewai, designated Site 50-80-14-4498, consisted of a 1.7-acre parcel including active cultivation of taro *lo‘i* and native Hawaiian plants. The area had been restored in the early 1980s by a group including community members, University students, and alumni. It was also noted by the Hawaiian Botanical Society that the garden was home to 69 varieties of taro, including 60

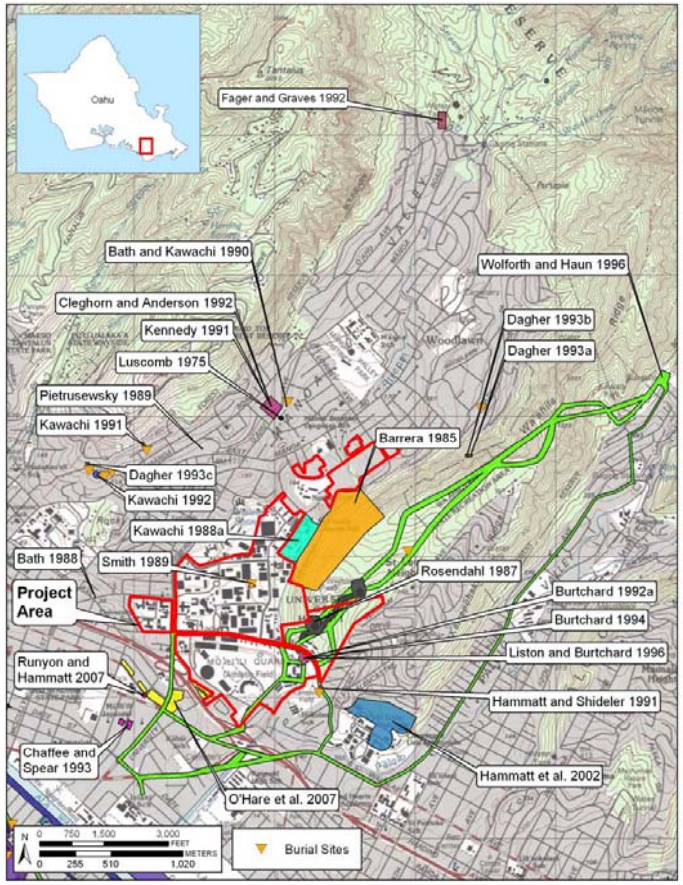


Figure 44. Previous archaeological studies in the vicinity of the project area

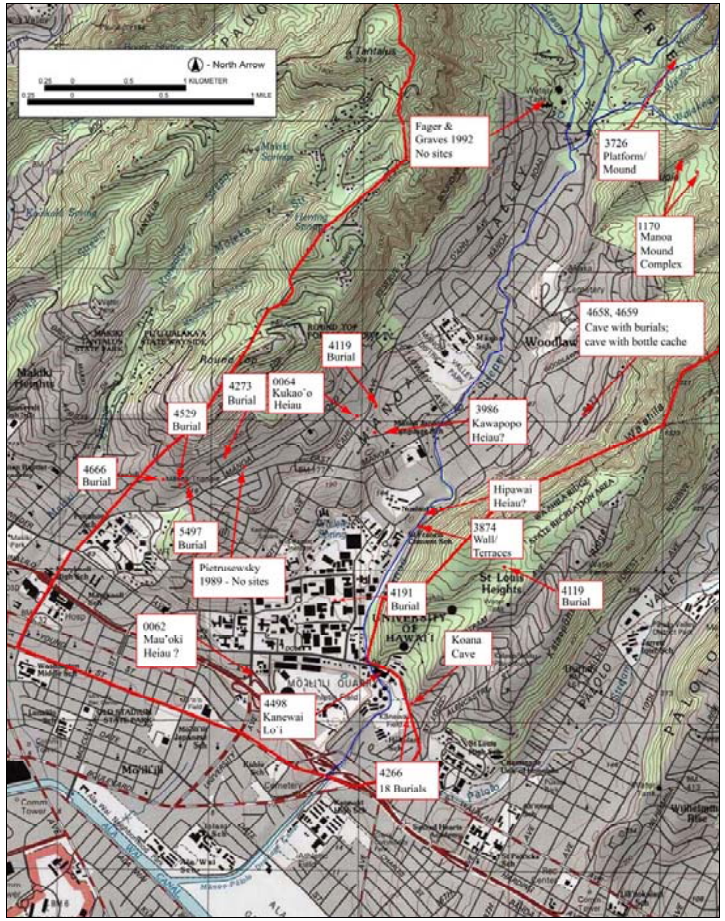


Figure 45. Previously identified archaeological sites in Mānoa Ahupua'a (project areas with no identified sites are denoted by author and year of report)

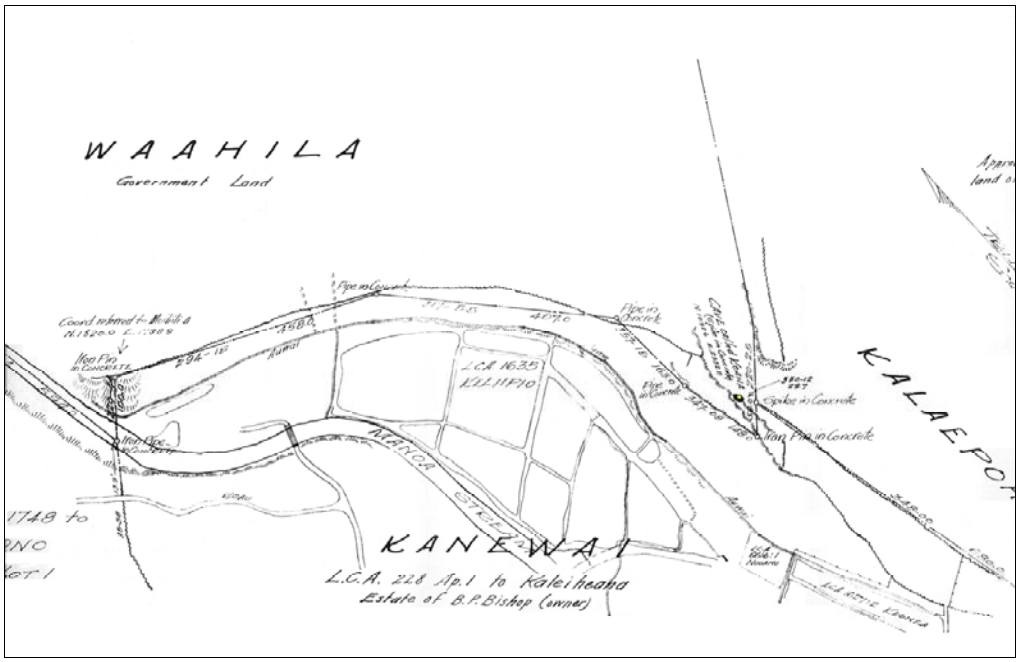


Figure 46. Podmore map (1916 or 1917) of the boundary between the *'ili* of Wa'ahila and Kānewai showing an *'auwai* and a "cave called Koana"

Table 2. Previous Archaeological Investigations in Mānoa Ahupua'a

Reference	Type of Investigation	Site 50-80-14-	Findings
Thrum 1907a, b McAllister 1933	Heiau Study Island-wide Study	0063	Briefly describes Hipawai Heiau, reportedly destroyed at the time Reprints Thrum's description
Thrum 1907a,b McAllister 1933 Kennedy 1991a Cleghorn & Anderson 1992 Jourdane 1994a Tomonari-Tuggle 1998a	Heiau Study Island-wide Survey Arch. Investigation Inventory Survey Burial Report Historical Research	0064	Thrum briefly describes Kūkaō'ō Heiau (rebuilt around 1700) McAllister repeats Thrum's description and adds new information Investigation of Kūkaō'ō Heiau Inventory Survey of Kūkaō'ō Heiau and Preservation Plan Inadvertent discovery of human skeletal remains at 2859 Mānoa Rd Historical background pertaining to Kūkaō'ō Heiau
McAllister 1933	Island-wide Survey	0065	Designates Mānoa Valley as Site 65.
Smith 1988a	Site Description	1170	Description of previously identified Mānoa mound complex site
Smith 1988b	Site Description, Reconnaissance	3726	Inspection of Pu'u Pia trail alignment. Description of a new site with a platform and mound.
Bath & Smith 1988	Burial Removal	3743	Burial removal from 2034 Round Top Drive
Ching 1968 Kawachi 1988b	Reconnaissance Survey Field Check	3874	Survey of sites on the Magoon Property given to the Univ. of Hawai'i. Site (3874) probably located near St. Francis High School grounds; possibly a pre-contact agricultural *heiau*. Field check of walls and terrace facings; St. Francis High School grounds may be location of a *heiau* shown on 1909/10 military map
Soehren 1963	Field Notes	3953	Notes in B.P.B.M. files on agricultural terraces
Thrum 1907a, b Luscomb 1975	Heiau Study Inspection Report	3986	Kawapōpō Heiau Examination of site at 2626 'Ānuenue St., probably Kawapōpō Heiau
Bath et al. 1988	Burial Removal	4038	Burial removal from 2030 Wilder Ave. at Circle K convenience store.
Bath & Kawachi 1990	Burial Report	4119	Inadvertent discovery of human skeletal remains on O'ahu Avenue
Bath et al. 1989	Burial Removal	4134	Burial removal from 2030 A Makiki St. (site 50-80-14-4134)
Smith & Kawachi 1989 Douglas 1990	Burial Report	4191	Burial Removal Near Keller Hall on the campus
Hammatt et al. 1991	Burial Report	4266	18 human skeletal remains found on Dole Street, C14 dating, perhaps a village cemetery; includes osteological analysis.

Reference	Type of Investigation	Site 50-80-14-	Findings
Kawachi & Douglas 1991	Burial Report	4273	Burial found at Lower Mānoa, 2414 Sonoma St; includes osteological analysis.
Burtchard 1992a	Data Recovery	4498	Letter to Tom Dye regarding test trenches at Kapapa *lo'i* Kānewai.
Burtchard 1992b	Testing		Letter report on trenching conducted to mitigate adverse effects of Hawaiian Studies Institute construction at Kapapa *lo'i* Kānewai
Burtchard 1994	Data Recovery		Paleoenvironmental samples, stratigraphic profiles at Mānoa stream.
Liston & Burtchard 1995	Site Description, Historic Literature		Prehistoric irrigation system that supported agriculture between A.D.1443-1681 at Kapapa *lo'i*, Kānewai
Tomonari-Tuggle 1998b	Historical Research, Arch. Assessment		Recommends subsurface testing or archaeological monitoring at Kānewai for the National Marine Fisheries Service Laboratory
Pietrusewsky 1992c Kawachi 1992b	Burial Report	4529	Inadvertent discovery of human remains at 1908 Judd Hillside Road
Dagher 1993a	Burial Report	4658	Inadvertent discovery of cave containing multiple burials in Mānoa Valley.
Dagher 1993b	Site description	4659	Historic bottle cache found in Mānoa Valley Cave
Dagher 1993c	Burial Report	4666	Discovery of human skeletal remains at 2048B Ualaka'a Street
Jourdane 1997	Burial Report	5497	Inadvertent discovery of skeletal remains at Wo/Sullivan House construction, 1908 Judd-Hillside Road. Skeletal remains are of undetermined age and ethnicity
Bishop Museum (Bowen?) 1964	Field notes		Visited Koana cave in response to discovery of human remains. No report.
Barrera 1985	Survey and Testing		No sites reported in project area within the Mānoa Hillside Subdivision.
Rosendahl 1987	Reconnaissance Survey		No sites found at the Wa'ahila Reservoir Project Area; no further archaeological work necessary.
Pietrusewsky 1989	Burial Report		Cremated dog and cat remains found at 2462 Mānoa Rd, no site number assigned to burial.
Fager & Graves 1992	Inventory Survey		No sites found at prospective well site project area
Grune 1992	Archaeological Synthesis		Synthesis of sites in Mānoa Valley
Dixon 1993	Reconnaissance Report		Absence of cultural remains at proposed Board of Water Supply well within Mānoa Valley Park, recommended an archaeological monitor be present during construction.
Spear & Chaffee 1993	Archaeological Assessment		No sites located at 2 Vancouver Drive lots; Vacant lots, some evidence of 1900s house foundations and walkways on surface.
Hammatt & Chiogioji 1998a	Archaeological Assessment		No sites found on a 2.4 Long portion of the H-1 Highway from the Punahou Street Overpass to Vineyard Blvd. Off-Ramp

native Hawaiian cultivars (Fenstemacher 1989). Controversy arose when construction plans would have allowed encroachment into the garden area. Final plans limited disturbance to the recently restored southeastern portion of the garden area. The data recovery work was later conducted in a portion of the *lo'i* area that would be impacted by construction. Backhoe testing revealed evidence of a prehistoric irrigation system and pondfield agriculture. Radiocarbon dating of recovered samples indicated a period of prehistoric usage (A.D. 1443-1681), abandonment, and later reconstruction in the early historic period (Liston and Burtchard 1996).

5.5 Division of Mānoa Valley

Mānoa Valley was once divided into two sections, one for the *ali'i* and their retainers and one for the commoners. The *ali'i* lived on the high, cooler western slopes; the commoners lived on the warmer eastern slopes and on the valley floor where they tended their irrigated taro fields (Bouslog et al. 1994 12). Mary Kawena Pūku'i (in Sterling and Summer 1978:283) has stated:

> In Mānoa valley a low hill at the head of the valley and Rocky hill above Punahou are said by a kinswoman of mine to have marked the division between the chiefs and the commoners in that valley. The chiefs lived on the west half, the commoners on the east. The chief's excrement was buried secretly in the commoners' ground by the keepers...The imaginary line from Puu-o Mānoa to Ka-pali luahine marks the division of Mānoa; on the left called Mānoa-alii, and on the right, Mānoa-Kanaka.

Pu'u Mānoa is best known as Rocky Hill on the Punahou Campus. It seems that Kapaliluahine - the *mauka* reference point - is the small green hill in back of the Chinese cemetery (as illustrated by Sterling and Summers 1978).

Such a cognitive division of the valley suggests that the commoners - the vast majority of the populace - would have been buried on the east side of the valley. It also seems probable that the remains of the aristocracy would be buried on the east side as well, in as much as both corpses and excrement would have shared certain cultural values of dangerousness and defilement. It may well be that the division of the valley into Mānoa – Ali'i and Mānoa-Kanaka was drawn because the west side of the valley was generally higher and less swampy than the east side. It may have been drawn with regards to the experience of sunlight. The Mānoa Ali'i of the valley would have the experience of the rising morning sun which was associated with values of ascendancy, tumescence, vigor and fertility, while the decline of the sun which illuminates the Mānoa-Kanaka side would have been associated with values of decay, senescence, and death.

The four known sites of prehistoric burials in Mānoa proper (Bath and Smith 1988; Smith and Kawachi 1989; the Koana Cave site; and the Dole Street site) all fall in Mānoa-Kanaka, as defined by Pūku'i.

Perhaps significantly two prehistoric burials have been reported just to the west of Mānoa Valley (Bath and Smith 1988; Bath 1989), standing in relation to Makiki Valley much as the Kānewai burials relate to Mānoa Valley. This suggests a possible pattern of prehistoric burial practices that may have been widespread - interring the dead near the east border of south facing valley mouths.

Section 6 Community Consultation

Throughout the course of this CIA, an effort was made to contact and consult with Hawaiian cultural organizations, government agencies, and individuals who might have knowledge of and/or concerns about traditional cultural practices specifically related to the project area. This effort was made by letter, e-mail, telephone and in person. In most cases, letters and emails were sent along with a map and aerial photograph of the project area with the following text:

> At the request of Group 70 Inc., Cultural Surveys Hawai‘i Inc. (CSH) is conducting a cultural impact assessment (CIA) for the 2007 update to the Long Range Development Plan (LRDP) for the University of Hawai‘i, Mānoa Campus. The proposed project area occupies 304 acres of land in lower Mānoa Valley, bounded by the Mānoa, St. Louis Heights, Mō‘ili‘ili and McCully communities and is identified as Tax Map Key: (1) 2-8-15,23,24,29;various.
>
> Group 70 Inc. proposes that the purpose for the updated LRDP is to reflect current and upcoming educational priorities. Future buildings and projects that are on the Capital Improvements Program and/or are anticipated for development within the next 5-10 years are projected into the Plan. Please see attached USGS maps and aerial views of the project area.
>
> The purpose of this cultural study is to assess potential impacts to cultural practices as a result of the University of Hawai‘i’s proposed development within the Mānoa area. We are seeking your *kōkua* and guidance regarding the following aspects of our study:

- **General history and present and past land use of the project area.**
- **Knowledge of cultural sites which may be impacted by future development of the project area - for example, historic sites, archaeological sites, and burials.**
- **Knowledge of traditional gathering practices in the project area, both past and ongoing.**
- **Cultural associations of the project area, such as legends and traditional uses.**
- **Referrals of *kūpuna* or elders and *kama‘āina* who might be willing to share their cultural knowledge of the project area and the surrounding ahupua‘a lands.**
- **Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the project area.**

Several attempts were made to contact individuals, organizations, and agencies apposite to the CIA for Mānoa. The results of the community consultation process are presented in Table 3 below. Summaries of more extensive interviews are presented in Section 7.

Table 3. Community Consultation

Name	Affiliation, Background	Comments
Ah Mai, Karen	--	Karen was referred by Paul Holtrop. CSH called on May 22 and July 3, 2008. After speaking briefly with Karen on July 3 CSH emailed a letter and corresponding figures.
Andrade, Carlos	Professor, Kamakūokalani Center for Hawaiian Studies	In an email sent to CSH on May 27, 2008, Mr. Andrade recommended that CSH speak with Ka Papa Lo‘i o Kānewai director Makahiapo Cashman, current staff member, Alapaki Luke, Uncle Maka, and possibly former director, Pōmaika‘i Crozier.
Cashman, Makahiapo	Director, Ka Papa Lo‘i o Kānewai	See interview summary in Section 7.
Cooke, Sam and Mary	Mānoa Heritage Center	CSH sent a letter on February 14, 2008. A second letter with project information was sent on May 28, 2008. The Cookes declined to respond.
Freitas, Konia	Faculty, Kamakakūokalani Center for Hawaiian Studies and member of Hui Mālama I Nā Kūpuna o Hawai‘i Nei	See interview summary in Section 7.
Harrington, Al	Mānoa *kama‘āina*	See interview summary in Section 7.
Holtrop, Paul	Mānoa Neighborhood Board, Sub-district 3 Chair	CSH sent a letter on February 14, 2008, and left a phone message on May 22, 2008. Mr. Holtrop returned the message that day and referred CSH to Karen Ah Mai.
Hughes, Clair	Kūpuna and long time resident of Mānoa	See interview summary in Section 7.
Kame‘eleihiwa, Lilikalā	Professor at Kamakakūokalani Center for Hawaiian Studies	CSH sent letter on February 14, 2008. CSH spoke to Kame‘eleihiwa at Kamakakū on May 29, 2008 and scheduled an interview for June 4, 2008. Kame‘eleihiwa could not make it to the interview. A follow up email was sent by CSH on June 5, 2008. No response.
Kikiloi, Scott Kekuewa	*Kama‘āina* and resident of Mānoa	See interview summary in Section 7.
Lucas, Paul Nāhoa	A founding member of Ho‘okahe Wai Ho‘oulu ‘Āina and an attorney at Kamehameha Schools	See interview summary in Section 7.
McGregor, Davianna	Professor, Ethnic Studies at UH Mānoa	See interview summary in Section 7.

Name	Affiliation, Background	Comments
Nāmu'o, Clyde	Office of Hawaiian Affairs, Administrator	See comments below (and see Figure 47).
Osorio, Jon	Professor at Kamakakūokalani Center for Hawaiian Studies	See interview summary in Section 7.
Paik, Kaleo	Cultural Specialist State Historic Preservation Division	Ms. Paik responded to CSH's January 18, 2008 letter of invitation to comment via an email sent to CSH on April 6, 2008. The full text of the email is reproduced following this table (below). Ms. Paik recommended that CSH speak with Dr. Clair Hughes.
Vaughn, Palani	Mānoa Kama'āina	See interview summary in Section 7.
White, Kahi	Professor at KCC, Hawaiian Studies & Mānoa *kama`āina*	Interview results are pending, and will be included in future drafts of this report, if available
Wilson, Scott	Mālama o Mānoa President	Mr. Wilson responded to CSH with an email response dated March 30, 2008. The full text of the email is reproduced following this table (below). Mr. Wilson noted that Mālama o Mānoa recommended that CSH speak with faculty from UH Mānoa's Hawaiian Studies and Anthropology Departments'.

6.1 Office of Hawaiian Affairs (OHA) Response

OHA's response letter (see Figure 47) contained three main comments:

(1) A recommendation that CSH conduct "…a thorough review of all archaeological and cultural reports related to the larger area which will be subject to the cultural impact assessment."

(2) A caution that as-yet undiscovered cultural sites may still be located within the project area in subsurface deposits, despite the long history of ground disturbance and development.

(3) A request for the opportunity to review the completed CIA.

6.2 State Historic Preservation Division (SHPD) Response

Ms. Linda Kaleo Paik, Cultural Specialist, SHPD, kindly contributed the following response by email (see Table 3, above, for details):

> My *mana'o* for the UH Mānoa Long Range Development Plan: I would not like to see development encroach upon the valley walls. Already so much of the upper valley and front of the ridgelines have been developed. A university should incorporate the beauty of its surroundings and make sure the buildings and planning for the entire campus conforms to a large degree with the environment or natural beauty of the area. The campus changes in geography and climate within a relatively short distance. There is no uniformilty at present to the entire campus with the exception of several clusters of buildings. I do not believe Mānoa can handle too much more growth in student population without impacting the nearby community and the very environment of the campus itself. There are parking issues, facility maintenance issues and lack of funding to upkeep the demands of such a large institution. There are also historic properties in the area that have and are being impacted by the student population whether it be traversing areas with a larger number of foot traffic or parking along side streets with little or no room and using pedestrian areas to park. Though these may not translate to cultural issues, they contribute to the overall well being of the environment in Mānoa.

6.3 Mālama o Mānoa

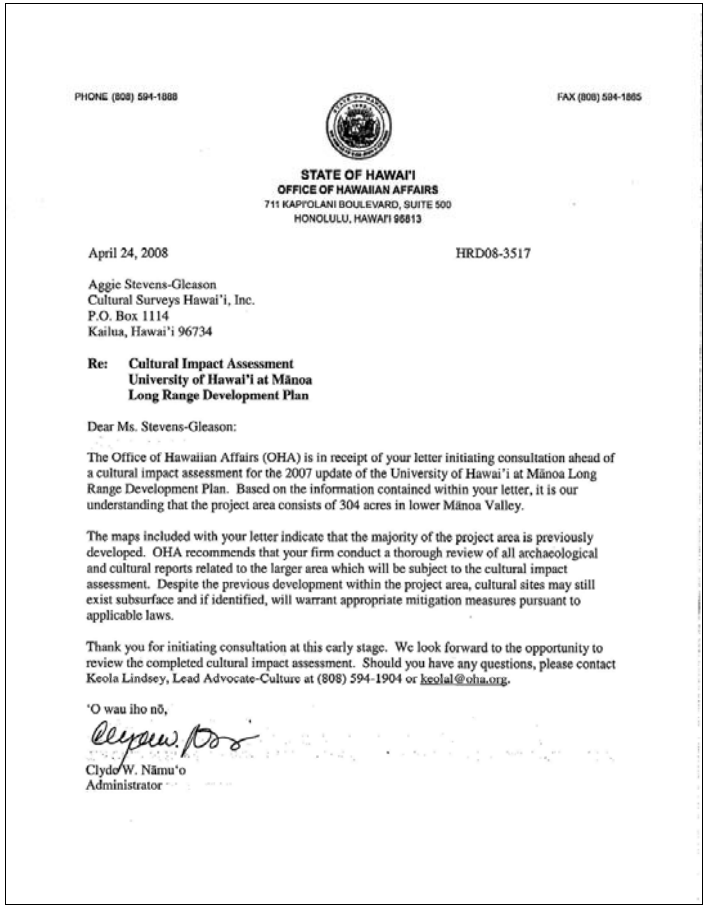
Mr. Scott Wilson, President of Mālama o Mānoa, contributed the following response by email:

> I'd love to help with your project, but I am no expert on the history of the Manoa ahupua'a. I am an architect by training and know only the basics about

Manoa valley and the ahupua'a it is part of. (I have lived in the valley only 10 years and before that St. Louis Heights for 20 years).

Our community group (Malama o Manoa) is geared to preserving and enhancing the social and physical assets we presently have in the valley, so we don't get into the natural history or the early Hawaiian history of the valley that much. We have our hands full just trying to prevent the valley from turning into another Kahala full of McMansions.

I would suggest consulting the book Manoa: the Story of a Valley, which was published in the 80's. That book may list some resources for further research. Also, have you spoken with faculty members in the Department of Hawaiian studies or the Department of Anthroplogy (Archaeology division) at the UH? I would think they could direct you to scholars who have studied the land tenure systems of pre-contact Hawaiian society.



PHONE (808) 594-1888 FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

April 24, 2008 HRD08-3517

Aggie Stevens-Gleason
Cultural Surveys Hawai'i, Inc.
P.O. Box 1114
Kailua, Hawai'i 96734

Re: Cultural Impact Assessment
University of Hawai'i at Mānoa
Long Range Development Plan

Dear Ms. Stevens-Gleason:

The Office of Hawaiian Affairs (OHA) is in receipt of your letter initiating consultation ahead of a cultural impact assessment for the 2007 update of the University of Hawai'i at Mānoa Long Range Development Plan. Based on the information contained within your letter, it is our understanding that the project area consists of 304 acres in lower Mānoa Valley.

The maps included with your letter indicate that the majority of the project area is previously developed. OHA recommends that your firm conduct a thorough review of all archaeological and cultural reports related to the larger area which will be subject to the cultural impact assessment. Despite the previous development within the project area, cultural sites may still exist subsurface and if identified, will warrant appropriate mitigation measures pursuant to applicable laws.

Thank you for initiating consultation at this early stage. We look forward to the opportunity to review the completed cultural impact assessment. Should you have any questions, please contact Keola Lindsey, Lead Advocate-Culture at (808) 594-1904 or keolal@oha.org.

'O wau iho nō,

Clyde W. Nāmu'o
Administrator

Figure 47. Office of Hawaiian Affairs response letter dated April 24, 2008

Section 7 Summaries of Kama‘āina “Talk Story” Interviews

A total of ten *kama‘āina* (born in Hawai‘i) and/or *kūpuna* (elders) with knowledge of the Mānoa area participated in “talk story” sessions for this CIA. The approach of CSH to cultural impact studies affords community contacts an opportunity to review transcriptions and/or interview notes and to make any corrections, deletions or additions to the substance of their testimony.

CSH employs snowball sampling, an informed consent process and semi-structured interviews (cf. Bernard 2005). A total of 18 individuals and / or institutions were contacted for this CIA (see Table 3, above); two did not respond or chose not to particpate; two (OHA and SHPD) responded in writing (see Sections 6.1 and 6.2, above); several people provided referrals to other individuals; and nine participated in formal “talk story” interviews. Presented below are brief backgrounds of participants “talk-story” sessions and their comments and concerns about the proposed project area. At the time of this writing, one of the “talk story” participants (Ms. Kahi Wight) was unavailable to review and approve the interview transcripts, for reasons unrelated to its content; thus, there are currently nine interview summaries presented below, with one possible additional (Wight) for future drafts of this report.

7.1 Al Harrington

While meeting with Palani Vaughn in Mānoa, CSH had the opportunity to speak with Al Harrington a kama‘āina of Mānoa. Mr. Harrington was originally born in Sāmoa but moved to Hawai‘i as a young child. He spent his childhood in Mānoa, and like Mr. Vaughn, remembers swimming in a water hole near the present site of Noelani Elementary. In 1954 Mr. Harrington graduated from Punahou High School. After residing on the U.S. continent for sometime he returned to Mānoa where he now resides.

Mr. Harrington’s main concern is that “markers” be used to delineate *wahi pana*. These “markers” would ensure that storied places and the wisdom that is incorporated in those stories be remembered generation after generation. In addition, the naming of streets and buildings should reflect names historically associated with the area.

7.2 Konia Freitas

CSH conducted an interview with Konia Freitas at Kānewai Lo‘i on May 30, 2008. Ms. Freitas is a faculty member at Kamakakūokalani Center for Hawaiian Studies and a member of Hui Mālama I Nā Kūpuna o Hawai‘i Nei. As a planner, she assisted Ka Papa Loi o Kānewai develop their Long Range Plan in 2007.

Freitas pointed out that burials have been found at Keller Hall and Dole Street, and believes that more burials will be found. UH is in a position to take proactive steps regarding the treatment of burials. Discussion of what should happen when human remains and burial goods are found should happen on the front end of the planning process. Procedures should be developed before any construction begins. UH is also in the position to develop progressive curation measures for any artifacts that may be found during construction.

Freitas also remarked that the current design of the campus is fragmented and disconnected from a sense of place. In thinking about the UHM Long Range Development Plan, there should be emphasis placed on integrating a meaningful sense of place into planned projects beyond just vernacular. Planners should ask “how can each project in the UHM LRDP honor what was in Mānoa before?” There are many *mo‘olelo* (oral histories), *wahipana* (legendary or storied places), and *akua* (gods) associated with the area. “How can a building reflect the character of a deity, for example, as opposed to just naming the building?” It would also be important to incorporate plants into the landscape that can be utilized for gathering practices and are associated with the place.

7.3 Davianna McGregor

CSH met with Dr. McGregor for two talkstory sessions. The first meeting was on April 23, 2008, and the second on May 8, 2008. Dr. McGregor is a professor in the Ethnic Studies Department at UH Mānoa. Dr. McGregor had the following concerns about the proposed project:

> The specifics of the Long Range Development Plan need to be clearly stated. For examples, how is “expansion” of buildings and building “replacement” defined? One main concern voiced by those contacted was whether a Cultural Impact Assessment of Mānoa Valley completed at this present date be applicable for development in Mānoa proposed for least the next twenty years.
>
> The discovery of burials is very probable. There has been multiple burials discovered on the UH Mānoa campus already. Keller Hall is the location of one repatriation site. It is unmarked and is located on the NE side of the building. There used to be ginger planted on top of it, but there is nothing there anymore that distinguishes the site.
>
> Are the trees on the campus going to be protected? Find out when the trees were planted and by whom. Many of these trees are rare and they have significance to particular sites and people (i.e. They were planted to commemorate someone or in memory of someone). Some of these trees have a function more than just to beautify the campus.
>
> Much of the proposed project area is already developed, although there is the possibility that cultural sites still exist in the area and could be impacted by development. If impacted, appropriate mitigation should take place. Also, a thorough review of previous archaeological and cultural reports related to the area should be undertaken. There is knowledge of a habitation heiau with possible human remains located a few meters from, if not within, the boundaries of the proposed project area. Hipawai Heiau is also situated within Mānoa, possibly within the boundaries of the proposed project area.

7.4 Jon Osorio

On June 4, 2008, CSH met with Dr. Jon Osorio, professor at UH Mānoa's Kamakakūokalani Center for Hawaiian Studies to discuss the UHM Long Range Development Plan. He shared his knowledge of the area and *mana'o* about the project. In reference to the overall project, Dr. Osorio mentioned that burials are likely to be found, and that UH should be proactive in doing assessments before any disturbance takes place. In other words, the University "should take the steps necessary to avoid an inadvertent find."

Dr. Osorio also had specific comments regarding the proposed Wa‘ahila Faculty Housing expansion, and the Hawai‘inuiākea School of Hawaiian Knowledge.

7.4.1 Wa‘ahila Faculty Housing

Dr. Osorio offered the following comments:

(1) The faculty housing is built on the *kula* (dry-land) area.

(2) The trails behind the housing have are being degraded and are currently being accessed for recreation (i.e., bike riding and hiking). Trash from recreational users and debris from housing along St. Louis heights (e.g., golf balls) is found along the trail.

(3) Native medicinal plants are found along these trails.

(4) There are one or possibly two *heiau* sites located behind the current faculty housing at Wa‘ahila. Access to these sites is currently unrestricted. Dr. Osorio has observed bikers using the area as a launch point.

(5) A plan should be developed concerning the use and protection of resources along lower Wa‘ahila ridge.

(6) The School of Hawaiian Knowledge would like to be contacted should any action be considered on the hillside above Wa‘ahila faculty housing.

It is worth stating at this point that a recent archaeological field inspection by CSH of the Wa‘ahila ridge area behind and above the faculty housing shows extensive evidence of tents and other living shelters and associated materials and debris (a.k.a. "homeless" or "houseless" people).

7.4.2 Hawai‘inuiākea School of Hawaiian Knowledge

> According to Dr. Osorio, it is an important cultural statement that any building being built by the University be sensitive to the environment. Facilities should take advantage of the wind and sun and consume less non-renewable forms of energy.

7.5 Makahiapo Cashman

Mr. Makahiapo Cashman is currently the Director of Ka Papa Lo‘i o Kānewai. Ka Papa Lo‘i o Kānewai is an important cultural site within the project area. It welcomes approximately

15,000 visitors a year and acts as a repository for different varieties of *kalo*; it is considered by many to be a contemporary *pu'uhonua* (place of refuge or safety). It is also one of the three departments within UHM's Hawai‘inuiākea School of Hawaiian Knowledge.

Mr. Cashman's involvement with Kānewai began in the mid 1980s as a Hawaiian language student. Since that time he has maintained his relationship with Kānewai, as a volunteer, *limahana* (worker), and now as Director of the newly-formed center, under the Hawai‘inuiākea School of Hawaiian Knowledge. Mr. Cashman kindly met with CSH staff on two occasions during the assessment process to discuss the history and importance of the *lo'i* and to offer his *mana'o* (concerns or ideas) about the proposed project. The following exerpts are most relevant to the subject CIA.

7.5.1 Hawaiian Language

In the mid 1980s, Mr. Cashman began coming down to Kānewai as a student in Larry Kimura's Hawaiian language class for Hui Kama‘ilio on Friday nights. Mr. Cashman remembers Hawaiian language always being a big part of the *lo'i*. The *lo'i* was once under Hui Aloha ‘Āina Tuahine, the Univeristy's Hawaiian Langauage club, because many of the members of Ho‘okahe Wai Ho‘oulu ‘Āina, were Hawaiian language students. As Mr. Cahsman remembers:

> This was very much Hawaiian language before. Yep, well because Hawaiian Studies eventually went off and became their own center it was easy, and close, the proximity was close, made sense to be with Hawaiian Studies. I think Lili [Professor Kame‘eleihiwa] would have a better grasp of why we went under Hawaiian Studies. Because even Hawaiian Language, they weren't their own center. They were still under Pacific Languages and only recently they broke away so. But it was very much Hawaiian language. Hawaiian language was always a major part of the *lo'i*, the students and the faculty too.

7.5.2 Kūpuna of Kānewai

Mr. Cashman also recalls the many revered *kūpuna* who have been connected to Kānewai throughout the years. Māui *kupuna*, Harry Mitchell, who was involved in the struggle to end the bombing on Kaho‘olawe, was extremely influential in the re-opening of the Kānewai Lo‘i. Uncle Maka is now the *kupuna* at Kānewai who remains *pili* to Kaho‘olawe. Over the years Kānewai has been a meeting place for many organizations including the Protect Kaho‘olawe ‘Ohana.

Eddie Ka‘anana, another highly-respected *kupuna* who was born and raised in Miloli‘i, also played a major role at Kānewai. According to Mr. Cashman,

> You know a lot of it was his Hawaiian language. He always came down, always gave *mana'o*. He was real instrumental in helping us with the *hale* [traditional house located in the center of the Kānewai Lo‘i], working in the *lo'i*, how we act in the *lo'i*, just act with each other. And always around, ya he was major here. He was major here. Not only here, all over. And he took on that *kuleana* [responsibility] and he's so *'olu'olu* [kind]. Always talking story. You know but still he wanted stuff certain ways too, you know. That things should be this way and done that way. Always respectful.

Mr. Cashman also recalls the times master navigator and teacher Mau Pialug spent at Kānewai:

> So Papa Mau used to come plenty too. He used to just hang out… ‘come pick me up’… so we used to go up, pick him up, we just hang out, the kids come. Ya, and then the school started coming. The charter schools started coming ‘cause they knew he was here. So he would go over the star compass with kids. People pull out their kids from school. Ya like…whoa, whoa, bring the kids down, Papa Mau is teaching!’ Even me, I call up my wife… ‘go pick up the two girls, bring ‘em down,’ ya just hang out down here for now. Ya, like hello? It’s a no brainer. Ya, that’s my two daughters in there too [referring to picture], Pili and Ulu. And then we used to take him doctor, dentist, you know, all that kine stuff when he comes down.

According to Mr. Cashman, Papa Mau also commented that the large albizia tree near the bamboo patch [note, this tree is scheduled to be removed for a streambank-protection project funded by the Federal Emergency Management Agency] was big enough to be used for a canoe, and suggested that should they oneday cut it down, he would come back.

7.5.3 The Hale

Mr. Cashman spoke specifically about the role of the central *hale* structure:

> And that’s what I really think the *hale* does. The *hale* shows the amount of people that come down, because it takes so many people to do it. So that was one of the things, when Charlie [Kupa, former coordinator at Kānewai lo‘i] went, he told Pō, make sure you put up another *hale*.

7.5.4 Kānewai as a Pu‘uhonua

From the time the gardens were reopened in 1980, Kānewai has been a *pu‘uhonua* (place of refuge and safety) for plants, people and culture:

> It’s a comfortable place. It’s a *pu‘uhonua*; for us, for the people, for the plants. So gives us a chance to be ourselves, practice our culture, our language. That’s what Kānewai is, connecting with the place but then again, you’re connecting with the people. Ya that’s even more important too ya. They both are important.

7.6 Scott Kekuewa Kikiloi

On June 9, 2008, CSH met with Kekuewa Kikiloi, a *kama‘āina* and current resident of Mānoa. Although originally from He‘eia (near Kāne‘ohe) in Ko‘olauloa, Kikiloi has lived in Mānoa for most of his life. His grandparents moved to the valley in the 1950s and he lived with them on occasion throughout his childhood. He currently resides in Mānoa.

7.6.1 Trails

Over the years Kikiloi has spent time hiking the valley and researching *mo‘olelo* and *wahipana.* When asked about the traditional use(s) of the trails accessed during contemporary times he responded:

> There’s only one way to go usually along ridgelines. But in terms of the middle of Mānoa…I looked at the old John Papa ‘Ī‘ī book, *Fragments of Hawaiian History,* and they have a map of Mānoa in there, where the trails actually correspond to the main roads in Mānoa. So Woodlawn, East Mānoa and Mānoa were the three trails. Makes sense, I think a lot of the trails in Hawai‘i are now roads, main roads.

7.6.2 Gathering

Kikiloi gathers non-native bamboo in the area but explains:

> Overall I don’t know, there’s not too many resources left in Mānoa because at one point, I think in the turn of the century, in the 1900s, a lot of it was deforested from the ranching. So when that guy Lyon, who the Lyon Arboretum is named after, he came and replanted the watershed in non-native plants just to restore the watershed. But I think since that time there isn’t really a lot of native plants in Mānoa. I mean you can go hiking and you won’t find too much stuff. Only on the ridgelines. Yeah I can’t even think of one native plant in the valley actually, except this *hō‘i‘o* fern, somebody planted a whole bunch of it at the head of the trail so that people could gather up. That’s about it I think.

7.6.3 Streams

When asked about stream resources in the valley, Kikiloi comments on the changes have been observed:

> I think overall the stream has diminished a lot, even since I was a kid. There was a lot more water in it. And my mom said even more when she was a kid. But it’s all fed by the tributary streams that go up the valley. I think there was about seven of them. The first one being ‘Aihualama where Lyon Arboretum is. That one still flows and it feeds the *lo‘i* that Hālau Kū Mana takes care of. Waihī, I think that’s Mānoa Falls, Waihī. That one still flows. Waihī Iki flows sometimes. I haven’t seen Lua‘alaea or Nāniu‘apo flow. And I haven’t hiked all the way in there. There’s actually a trail that goes back there but I always go to the Waiakeakua side. Waiakeakua still flows.

Despite changes in the stream, Kikiloi continues to gather water for *‘awa* (also known as kava, *Piper methysticum*) ceremonies. Oral tradition describes how certain springs in Mānoa are connected with the gods Kāne and Kānaloa who are credited for bringing *‘awa*:

> So in terms of water resources, that place is still really important because it’s tied to the story of Kāne and Kanaloa. Much like Kānewai and Punahou. All these places that they went to are sacred spots for water. At least for me and my friends that do *‘awa* ceremony we get our water from Waiakeakua sping. ‘Cause it’s the only really clean spring.

Kikiloi expanded on why Mānoa waters sources are so valued for their use in *‘awa* ceremonies:

> You always want to try to go to springs or heads of water where it originates from. You know places that Kāne and Kanaloa went to are ideal places because they're the ones that brought the *'awa.* So their water source and their *'awa* are the best. And there isn't too many places mentioned in the stories where they went specifically, place names linked to the travelings of Kāne and Kanaloa. But Mānoa has a lot.

Other springs that Mr. Kikiloi pointed out to CSH are Wailele, located on the Mid Pacific Institute campus, and Ka Punahou located on the Punahou campus (see Figures 48 and 49).



Figure 48. Wailele Spring.



Figure 49. Punahou Spring.

7.6.4 Wahipana

Although recognizing that the valley seems to have changed significantly since photographs were taken of *lo'i* covering entire valley floors, Kikiloi has still been able to identify *wahipana* through out Mānoa area. Many of these cultural properties are connected to the story of Kahalopuna (see Section 3.3.17):

> I think overall it's always important to reference that story 'cause that's the story of the valley pretty much. The cultural landscape is based off the names and characters that were in the story, historical figures. There's important place names. I think of the story of 'Akāka, which is the hill area by the Chinese cemetery. If you go up that hill, that ridge line that stretches up to Wa'ahila, that's called Nālehua. The ridgeline that stretches back to Mount Olympus, Wa'aloa, is called Pali Tuahine. The names of the wind and the rains of the valley- Ka Ua Tuahine [the Tuahine Rain], Makani o Kahaukani [the Kahaukani wind] are the names of the parents of Kahalaopuna. I mean its kinda neat to me because like the rain and the wind are the parents of her, she's the rainbow right, and the *ua* Tuahine is the rain that comes straight back through the valley kind of like in a slow kind of motion, real kind of fine misty kind of rain that creeps down the valley. You can see it come down and it's blown by the Haukani wind. And when it's the right conditions and those things happen then you see the rainbow yeah. So it's like a story for one, but it's also the natural phenomenon that occurs daily.

> In Wailele, which is the Mid Pac School area, there's the stone called Ka U‘i o Mānoa. Which is a reference to Kahalaopuna, the beauty of Mānoa. And that stone is still there, right next to the football field. I have a picture of it in *‘Ōiwi*. I took a picture next to it. And then I wrote a story about Haukani because it's the name of the wind, but it's also the name of a tree that used to be back in valley. Kind of a super natural tree.

In previous years Kikiloi has observed Ka U‘i o Mānoa being used as a grafitti rock (Figure 50). Reflecting on this activity, he notes:

> They used to use it as the graffiti rock. And I just find it ironic that they're graffiting the beauty of Mānoa- the rock that's representative of the story of the valley.



Figure 50. Ka U‘i o Mānoa.

There is another *pōhaku* near Lyon Arboretium that Kikiloi believes may be connected to the story of Kahalaopuna:

> So I checked it out and then it kind of occurred to me in the story of Kahalaopuna, in the Nakuina version, he was talking about how, you know she's buried at different places when she dies and the only place in Mānoa where she's buried is ‘Aihualama actually. And up there next to a big rock is the burial place they said.

> So there is a small little platform next to this really big rock which is weird, standing out in the middle of nowhere.

7.6.5 Concerns Regarding the Proposed Project

In reference to the Long Range Development Plan, Kikiloi commented that he:

> Would like to see some consideration of the style and the feel of the buildings that are constructed; whether they create a Hawaiian sense of place or ones that are consistent with the architecture of the valley. And then also the incorporation of native plants through out the campus. I mean there's a lot of different types of botanical specimens all over the place, but there needs to be more Hawaiian plants.

7.7 Nāhoa Lucas

Nāhoa Lucas is one of the founding members of Ho‘okahe Wai Ho‘oulu ‘Āina and an attorney at Kamehameha Schools. In 1980 as a student at UHM, Lucas, along with Keoni Fairbanks, found the remnants of an old *‘auwai* near the student dormitories in the *‘ili* of Kānewai. As discussed in Section 3.6, the *‘ili* of Kānewai was given to Kaleiheana by Kamehameha I after the battle of Nu‘uanu in 1795. When Kaleiheana died the land was deeded back to the descendants of Kamehameha and finally became part of the Bernice Pauahi Bishop Estate. In 1945, the land was deeded to the University of Hawai‘i, which evicted several farmers who were still growing taro. Ho‘okahe Wai Ho‘oulu ‘Āina was formed to preserve and protect Kānewai Lo‘i. Excerpts from CSH's interview with Mr. Lucas, divided into several thematic categories, are provided below. Nāhoa Lucas' testimony is abbreviated as "NL." Questions and comments by Cultural Surveys Hawai‘i are abbreviated as "CSH." The following exerpts are most relevant to the subject CIA.

7.7.1 Kānewai

> **NL:** This is called Kānewai Waikīkī, as opposed to Kānewai Kahala. What was called Kānewai Kahala is what we call Kahala today. So that was the *makai* portion of it, and this was the *mauka* portion of it. But if you look at some of the old land histories, the native testimony of John Papa ‘Ī‘ī, when he files a claim for Kānewai he says there's actually several other *leles* [typically a discontinuous but related unit of land]. So not only Kahala and this area, but Helumoa, which is [where the] Royal Hawaiian Center is, where the Royal Hawaiian Hotel is, that was also an *‘ili* and Pahoa is another *‘ili* in between this and Helumoa. And he [‘Ī‘ī] said there were others that were in the back of Mānoa valley.

7.7.2 On Opening Kānewai

> **NL:** We were walking around. We went to Kaho‘olawe in 1980 and were very excited about…that was after the bombing had stopped. They [the military] were allowing accesses. The island was still not cleared [of unexploded ordnance]. You still had to go with EOD from the Navy…un-exploded ordinance man. And so we went and we met Uncle Harry Mitchell from Keanae. His son, Kimo Mitchell, was with George Helm. And so he would be taking young Hawaiians over. And

he noticed there was a lot of interest in rediscovering who we are. And at the time we were excited about Kaho'olawe, things Hawaiian. And then we started talking about taro because he came from Keanae, a big taro community. And eventually one thing led to another and so we went…actually as part of the Hawaiian language club, we went to Keanae, Māui.

And I can't remember if this was before we found it [Kānewai] or after, but we took a tour of this area and we were talking to him in Hawaiian and stuff like that. But we came back and Keoni and I were roommates in the dorm. We were at Noelani. And we'd always drive by this area and we just knew that anything next to the stream was probably *lo'i*. And so one day we just jumped down here and started walking up the stream and then we saw the '*auwai* there running along the base of this cliff going all the way up…we followed it up and there was a *po'owai* [upstream head of the irrigation ditch]. And so from there we started to dig it out. We dug out the *po'owai* and it was covered with roots and everything. We just kept coming back on Saturdays and actually the water flowed down. And in areas where it was broken, the walls were broken, we fixed it up and repair[ed] it, and we brought it all the way down to the Dole Street Bridge. And right when it got to Dole Street Bridge there was a remnant of a huge rusted pipe that I guess the farmer had put in. So we couldn't get it past that, so then what we did was we looked around, we became very resourceful, and we found these pipes that some of our friends had. One guy worked for…was it Gas Pro…Kilgos or something. He brought these huge, used PVC pipe, and we put it down there and we locked them in.

By that time Uncle Harry had come over [to Kānewai]. So we kept moving the water down. And that whole area that is now the *lo'i* was all California Grass [*Brachiaria mutica*], covered in California Grass, and the house had fallen down. It was just a mess over there. So with the Ethnic Studies help, we just kept moving the grass, kept pushing it back and rolled back the California Grass. And there was a *kuāuna* [border of a taro patch]. You know the Okinawan farmer had basically redesigned the patches 'cause when he was there he wasn't raising it for *kalo,* he was raising it for *lū'au* leaf. So he just had little concrete walkways that the water would just flow. So he wasn't caring about holding the water in. So we followed some of that. Others we modified, but we took out all that rock and then put in one after one. Each time we'd open up one, Uncle Harry would be there and we'd give it a blessing. We'd give it a name. Each of those patches has a name.

CSH: Yeah, how did you guys name it?

NL: For different events or different things that would happen. And we got that all written down somewhere. But, eventually we kept going, kept going, kept going until we came down to the halfway point where the tool shed is. And along

the way other people would come down and see what we're doing and say "oh this is cool." And we'd always work on Saturday. Try to make it a Saturday**.**

CSH: So they still have First Saturday…

NL: And they still have First Saturdays. And at the end of getting together, we'd have lunch, we'd have a meal. We'd cook food or people would bring up food. And eventually when we got *kalo* we'd cook it. Then the *imu* [underground oven] started. So it just kept getting bigger and bigger.

CSH: Did you guys have funding from the school or was it all on your own?

NL: It started off with people just bringing tools from home. You know, taking your mother's rake and your dad's shovel. Eventually getting money from donations…like the Hawaiian Language Club would donate some money for tools…you know rent a 'weed eater.' Then we saw how much interest there was and people were really starting to get into it. And they'd come down and we'd have big groups and we'd have 50 people show up and say, "okay, what do we do?" And we'd go, "oh, we don't know."

So we had to get organized, and then eventually we just tried to look for…well we tried to make it into the University system. And so for the most part the faculty knew what we were doing 'cause they would come down. We'd invite the classes to come down. And so we really built this ground swell of community support. Groups would come down and have a great time and they would go, "what is this project connected with?" And we say, "oh its UH." "What groups?" "Oh, Hawaiian Studies." And so our director back then, who was Abraham Pi'ianaia, he said "oh, this is a great project but let us know what your doing 'cause you know we're getting all these calls and I don't know what to tell them." And so it was fun. It was a lot of fun.

7.7.3 Land Use

CSH: So from where the *lo'i* are now to down where Kānewai Street is, was all *lo'i*?

NL: Right. Because the '*auwai* ran along the base of this cliff here. So if you look at the present day Wa'ahila, when it comes down…where Dole Street is, is pretty much the base of the mountain, yeah. So that's where the '*auwai* followed. The '*auwai* basically followed Dole Street all the way to Kānewai, and then it irrigated all of that area. So Kānewai field, Hōkūlani, all of those areas…these were all *lo'i*. You can see them all here. And then the road, Kalei Road came up here. This is another '*auwai.* When Kamehameha Schools had it, they had leased it out to

various farmers. They grew taro and then rice and then over the years it became truck farms. So there's a lot of truck farming up in here where the circle dorms are.

7.7.4 Fresh Water Resources

NL: This area has been, like all urban areas, pretty depleted. So there may be an occasional *'o'opu* [general name for different varieties of goby fish], but we haven't seen it during our times there. One time, though, this huge *'o'opu* washed down stream. It was a dead one but it was a big one. It was stuck at the *po'owai*. And it was kind of amazing because, you know, you see all kinds of things floating down stream, ducks, chickens, all kinds of things. But that was something interesting. I'm sure probably the upper regions of Mānoa there still lives '*o'opu, 'opae kuahiwi* [a kind of shrimp, *Atyoida bisulcata*], all those. The others may have seen some of those but we haven't. Mostly its crayfish, dojo, all of the common ones…guppies.

CSH: Not stuff that you would gather or eat?

NL: No, but the plan was always to try to reintroduce that and restore it. We wanted to have Hawaiian ducks, we wanted to have all that stuff but a lot of times you have to just worry about maintaining. we've had ducks, not native Hawaiian ducks, but we've had.

7.7.5 Kānewai Spring

NL: The legend of Kānewai spring. Well, the earliest map that I can find is of…actually from Kamehameha Schools…it's the very first map that was done by Princess Ruth Ke'elikolani. This was in 1883, I think either before she died or right when she died they were trying to inventory all of her lands. …she owned Kānewai because it was originally through a series of different things… this says Kaleiheana but they had it out with Kaleiheana's heirs and finally it was given to Victoria Kamāmalu because she had filed a claim for this land along with Kaleiheana. So there were competing claims. Anyway, Kamāmalu ended up getting this. So when she died it eventually went to her half-sister, Princess Ruth. So they did this inventory and on that map…let's see the only place I've been able to find it. This says it. So this is maybe from the 1883-84 map. You can see Kānewai Stream over here. And that's the only place there's something that actually puts this feature on it.

CSH: Do you remember seeing it though when you guys were clearing out?

NL: No. Not it the sense of if you were looking for a bubbly Board of Water Supply, in front of their office, kind of spring. It wasn't a *kikīwai* [spouting water]. It wasn't a *pūnākikī* [spouting spring]. When we surveyed this area in maybe 1980-81 they had just built, I think, the storm drains for Dole Street, and they had put on either side, or one side next to it…they had dug it up. They had already filled a portion of this, where Keli'ipio's award is, they had taken that. This whole land was still low, all the way to the Kānewai field. It was still low but it was overgrown. The part up here was in California Grass and then as it gone down further over here it was in *Koa Haole* [*Leucaena leucocephala*]. And so we walked around this because it was a very small land-fill. And then as the Dole Street…as they dug it so they could lay the pipes down, they started to fill in here and the fill got bigger and bigger. But we would walk around this small area, this small field area, and it was still low inside here. And this whole area was wet, was very wet. We were walking along…it was very *pulu* [moist] and there was water on the ground. So maybe this was Kānewai.

CSH: So this is where what is today?

NL: Center for Hawaiian Studies, the parking lot area.

7.7.6 The Holowai

NL: The plan was always to have…right where this area is…we called this the *holowai* [water course]. And the *holowai* was… before they filled in that area that they were going to have it for operation Kua'ana, student services center. I don't know what they have it now…some more classrooms…but the building kind of comes into there. The original plan was to follow this line. Because this line was still there. The fill had gone and had just stopped right over here. And this was like a little collection area. It would never go dry. It was always full of water. And so people were saying that was Kānewai. That wasn't Kānewai Spring. But it was an area that we wanted to connect the '*auwai* down to, then have the remaining area go out. So now the water doesn't…the *'auwai* gets smaller and smaller and smaller, then trickles through here and goes out there. But that was the original plan to have these as our border.

7.8 Claire Hughes

On May 29, 2008, CSH met with Dr. Claire Hughes, a long-time resident of Mānoa Valley, to discuss her knowledge of the valley and the project area.

7.8.1 Background

Dr. Hughes shared with CSH her personal connection to Mānoa:

I have lived in Mānoa since 1970. I came to the University to get my Master's degree in 1966. I loved walking to and from my car, which was parked on the streets of Mānoa.

Then, as a child in 1940's, I remember coming to Mānoa to my visit at my aunt's home (we lived on Kaua‘i, so it was adventure to visit Mānoa). Her mother -in-law was Mrs. (Ella ?) Harris, who we called Kuku (not, Tutu). Kuku had farmed taro in the area and produced poi for many years. My aunt and her family lived at the *makai* end of Loomis Street. Kuku lived nearby in a two-story home on O‘ahu Avenue. Kuku's house had a poi mill downstairs, although she was no longer making *poi*. We would visit Kuku, who sang and spoke to us in Hawaiian. She was wonderful. She was very old, but could walk up and down those many steps from her front door. We loved to go and see her, cuz she would sing a song about Honolulu to my older brother (that is his Hawaiian name). She always greeted us little ones with lots of aloha.

7.8.2 Destruction of Cultural Sites

Dr. Hughes was concerned about the continued destruction of cultural sites in Mānoa. She spoke about Pu‘uhonua Heiau, the site of the Castle home (see Section 5.2.1 Kūkaō‘ō Heiau for discussion), and the use of *wahipana* connected with Kahalaopuna as examples:

One of example is the *pu‘uhonua*, excuse me, the *pu‘uhonua* I was just mentioning, there is one that's on that map of O‘ahu. The map shows the *pu‘uhonua*.... it's up against the slopes of Ualaka‘a [also known as Round Top], on Pu`uhonua Street.

Anyway I've walked up there to see if anything remains of it. Its on, it's on the map [Sites of O‘ahu map] with one of the indications-numbers. I walked up there and there's just homes. And there are lots of homes. And, in the last big rain that we had… Remember we when we had the 40 days and 40 nights of rain? Well, people (homeowners) that had altered hill back of their lots a little bit. And so the rains brought the earth down through their homes and down across that road into other homes on the other side of the street [Pu‘uhonua Street] down the hill side, and then down across couple more homes at the end of my street. Homes were badly affected by mud. The mudslide went all the way down to Mānoa Road. The rainwater just came all the way down with mud and rubble. So anyway you cannot see it, the *pu‘uhonua*. You have no idea when you look around up there, where that place was. So it's been obliterated. They've put up yards and yards of additional rock after that rain. So people have destroyed even further what ever was there.

And I think, I'm not an engineer, but I certainly think they are front loading that hillside a lot. The weight of that stone will only serve to bring more of the hillside down [with the next big rain] because, there's no way they can build the rock walls appropriately [retaining walls] to hold it all back. They're just putting

stone on like this because there's no easement on the roadside its very narrow. So, my concern is that we're allowed destruction of the *pu‘uhonua* to happen. In addition, there are many tales/mo`olelo about the mountain at the end of this valley, about it being the grandmother of the Mānoa maiden. You know the story about her? So Joe Pao, the developer came up here years ago and built a whole bunch of houses and, in the process he bulldozed down half of that mountainside.

7.8.3 Mo‘o

Through out the interview Dr. Hughes made reference to the different *mo‘olelo* connected to Mānoa. The story of Kahalopuna was of particular significance; however, she also spoke about the famous and well-known *mo‘olelo* of Pele and Hi‘iaka and its connection with lower Mānoa:

Cause you know right over here where they made the freeway overpass [Lunalilo]? That's the back of the *mo‘o,* Kamō‘ili‘ili, who was slain by Hi‘iaka. There is a statue of that *mo‘o* on the grounds of the elementary school [Kūhiō] right over there.

So the school knows about it [the *mo‘o*]. But in order to make the freeway they cut right through the back of the *mo‘o*. And then there's supposed to be an opening in the mountain, a tunnel [where there is water] that comes in here [Kānewai Park}.

7.8.4 Hōlua Sledding at Pūowaina

Dr. Hughes was also disappointed that the *hōlua* sled paths at Pūowaina [Punchbowl] are no longer identifiable because of development:

So did you know that on the slopes of Punchbowl there were sledding areas? I went up there one day and I said oh this is about where one slide is supposed to be. I guess you could go down on a Hawaiian sled about thirty feet and then slam in to the side of that fifteen-story building. So many apartment houses have been developed up there. So you know the sledding paths are destroyed.

7.8.5 Graveyards

Although Dr. Hughes noted that there are a number of sites that have already been destroyed, she believes that there continue to be places that should be protected:

Far back in the story, the projecting spear of Akaaka shows in the head of Mānoa valley. Well that was the one site they let be destroyed for houses. The point is we've already lost these [*pu‘uhonua* and hillside]. There are some other sites I think that we need to discover/research a little bit more about and retain them if they are significant. Some sites are more modern actually. I think this little graveyard down here is one. I attended meetings before they worked on cleaning it up. And you know in the old days Hawaiians didn't have money to put up granite headstones, so they just put rocks, circling graves of their family

members. And everybody knew which rock circles were theirs, parents and grandparents, etc. And so when they wanted to clean up the graveyard, Families came out and said you have to be very careful how you move the rocks, as they feared the volunteer crews could just go in there and tear stuff out and then destroy the stone markers for the families. So the clean up crew was very good, I must say. You can look in there now, I've gone to the service station next door recently and its really visible compared to the old days. So, it's being maintained. It's been at least a year maybe… if not, a year and a half, two years.

It was just awful before. They have built a theater on the other side of it. One of the stories was that they built the theater over part of the graves. And the theater people were very adamant that they had not covered anything. And I guess they proved it that night in the discussion. They quieted down the fears of the woman who complained. Maybe they were able to show her some markers, I guess. But they have a concession stand that's built there. People wondered who's place the concession stand is standing on? And Kawaiha'o Church is the one who has the records of who was buried there. So their lawyer was involved in discussions preceding the clean up. I have an aunt who was buried there. So I called up my cousin to tell him I was going to represent the family. But I didn't have much to contribute except to tell them that the rock walls over there are not like other rock walls. There very easily damaged because there not made with reinforcing innards like most rock walls. They are piled up stones with cement put over. So there are no reinforcing rods, so you can't pile rubbish on top of the cement wall.

7.8.6 Natural Environment

When asked about other cemeteries in the valley, Dr. Hughes spoke about land use and the natural environment:

Actually I don't know where they would have been buried. Cause this part of the valley was all taro. If you are familiar with this supermarket parking lot, they can't keep it smooth because there's so much water underneath. I mean they just resurfaced it and the area by the stream is all gone already. Big pukas. Big pukas are all along that area. So you know that our soil for taro requires a lot of underground water, and there's lots, apparently. There's a story in this about being an underground river in that area [Sites of O'ahu].

And that's why UH sustained so much damage [in the October storm]. It's the natural path for the runoff from the stream...the surface stream but also the under ground one. So there's stories in Sites of O`ahu (here) about that. So that... you know, I've read that thing in and out about Mānoa, but I brought this (The Legends and Myths of Hawai`i) for you to see, and that the story about the princess of Mānoa is told by one of the by a highest of authorities [referring to Kalākaua]. His story is much more detailed than any other you're going to read about the Manoa...what does he call it?...Kahalaopuna, the princess of Mānoa, .

And then did you know that up there is Kauhi's body. Did you know that? [Referring to ridgeline across from Mānoa market place].

His *ōpū* is over here and his toes are down here. So the project that Hawaiian Electric was going to do, to put those huge, gigantic, enormous, immense poles across Wa'ahila ridge. It would have put the poles across Kauhi's profile.

7.8.7 Trails

Dr. Hughes remembered hearing about a cave at Wa'ahila, which connected Mānoa to Pālolo. Although never actually seeing it herself, she has frequented the Wa'ahila trails:

Oh that's a beautiful hike. I love it. I did it many, many times.

It requires a lot of athleticism because there's some places where you have to climb up where there's no foothold to go up. You have to really be able to pull yourself up and down. So I'm too old to do it now. But I loved it. I loved that hike. It was really one that was very exciting. So that's another area over there that I think we should maintain. And make sure nobody puts another theater over there.

Dr. Hughes also remembered hearing about an old horse path around Pūowaina [Punchbowl:

My mother who remembers coming up there as a young girl, she said the upper road that goes around Punchbowl was a horse path. Wide enough so two horses could pass by each other, and that's all. And then down below, right above the cemetery ['Auwaiolimu Street], between the Chinese and the other cemetery, was a cart path. Meaning, that two carts could barely pass each other- horse drawn carts. So, now we have a four-lane highway there. If you wanted to you could make four lanes there. So yes, they did put the easement probably over some of the graves. So I think that's a bad thing. I think that's really bad. Yeah, so from that perspective, I think we all have a responsibility to call out historical sites and things that we know are of value and make sure that, even if it isn't named on any site maps, if it looks like something we should be saving, we should be saving it.

7.8.8 Aesthetics

The visual impacts of the proposed project were also a concern for Dr. Hughes:

And besides, that's the only open area [green space, referring back to the Manoa cemetery] your gonna find anywhere, [development surrounds it]. Who knows if their gonna put up 70 foot high buildings all over the place. Like the new Safeway sign? The Safeway changed their sign. They made it more than twice as large as it was. And look how far it's visible. It only goes one block. So why would we need that sign to be bigger? We have to really be aware that of this kind of development, like the big sign there. How far away do you need the signs to be read from less than a block away? When you go out to sea off the Kona coast you

can see Home Depot and all the “big box store” signs from two or three miles out at sea.

7.8.9 Preservation of the Atmosphere

Dr. Hughes was also concerned about the increasing air traffic that can be heard through out the valley:

> I have great concerns that Mānoa has become a freeway for airplanes now. The large planes used to fly very high and were unobtrusive. Now that they’re saving gasoline, they’re flying very low and they make so much noise. You know when they shift down to make an approach for landing, you hear them shifting down and that whining sound is very loud.
>
> I notice it a lot more. They’re lower. And you don’t have to tell me they’re saving gas by being lower. I know it, yes. And, up until 10:30, 11 o’clock at night, you hear them shift down.
>
> No you can’t feel it but they’re very close, you can tell by the roar. And one night when the weather was *kona*, at 3:30 in the morning, a huge plane took off from the airport. It was scary because they took off very low and slowly. Previously, they used to take off in a very steep climb and the noise would be above us. Now they take off and stay very low, so you hear their engines echoing and echoing. I thought it was going to crash on Diamond Head. It was frightening. So I’m upset about that. That’s not preserving our atmosphere, let alone avoiding the noise nuisance and potential crashes.

7.8.10 Puka‘ōma‘o

During the interview Dr. Hughes described a number of cultural sites found in Mānoa. One was Puka‘ōma‘o:

> Another important site is Ka‘ahumanu’s home, Puka‘ōma‘o. It is over near Wai‘oli Tea Room. It was a large grass house where she came in her last hours of life. There is a beautiful description of this in the Sitse of O‘ahu. Ka‘ahumanu died there. That house or area should be restored and saved.

7.8.11 Cultural Sites On Mid Pacific Institute

A number of the *wahipana* that Dr. Hughes mentioned were located on, or near the campus of Mid Pacific Institute:

> There are several sites on the grounds of Mid-Pacific Institute that need to be recognized and preserved. I believe that the school knows where some of the sites are and have been respectful in preserving their existence. However I don’t think that the Hawaiian public knows about them nor has the history of them been written. These sites belong to the collective history of Hawai`i.
>
> There is an area in the park that I believe is a *heiau*. I was told that a UH course for teachers identified it as Pu‘u Pueo, although it is not a marked site. It is very

> small and faces destruction. It is in Kamanele Park. The Board of Water Supply contractor, Heron, is using the area for their dumping ground and equipment base area for about 4 or 5 years. And, it is an eyesore now. The large banyan and African Tulip trees threaten the rock formation there. It was previously used by homeless types, who put an old sofa and other things to sit on.
>
> I hope that there will be some research into the sites in this area and preservation of them.

7.8.12 References

> I would also like to recommend that you contact Dennis Kawaharada, who has written a couple of books that tell of Mānoa sites. I have two books of his and some of the research that he has done and is on available on a website. “Storied Landscapes – Hawaiian Literature and Place” and “Ancient O‘ahu” are two of books that he has written.

7.9 Palani Vaughn

Palani Vaughn is a noted composer and musician as well as historian and *kama‘āina* of Mānoa for 57 years. CSH met with Mr. Vaughn on July 28, 2008 to talk-story about his experience and knowledge of the valley. Mr. Vaughn also shared his concerns and recommendations concerning the project. The following are excerpts from an email response to questions CSH sent regarding Mr. Vaughns knowledge of the Mānoa Valley area.

7.9.1 General Comments

> I firmly believe in preserving and protecting legendary and historic sites, or *wahi pana*, of Mānoa Valley, particularly because of it was treasured by the ancient ones through the reign of Kamehameha I, during his residency here following his conquest and unification of the kingdom. Particularly in light of the increased development and modernization of our *‘āina*.
>
> I say this, particularly, in light of the UH Mānoa’s plans to develop land areas that fall under it purview. It seems to me that these historic *wahi pana* sites and the rich legendary and cultural assets of Mānoa Valley and this valley’s place in the evolving political history of the Kingdom of Hawai‘i during the post-Kamehameha-the-Great Era is of immense educational value to the university and to the general educational systems, both public and private, but of particular importance to our native-Hawaiian population, who would hopefully enjoy the intangible benefits of renewed national pride through re-identifying with their Hawaiian history, legends and culture.

7.9.2 Wahipana

> **Heiau ‘O Kūka‘ō’ō** is situated near the center of the valley. There is another heiau located nearby but I haven’t had much time to research its exact location and history. Unfortunately, this *heiau* is situated on land that was owned by the Sam Cooke family, whose home overlooks and adjoins this *heiau.*

In 1993, the land was developed into a new residential area. The process of developing the area, I personally deplore, because DLNR, apparently allowed the *heiau* mound to be cut into around which a retaining wall was built at its' base. One home is only three-feet away from the retaining wall of the *heiau*. This is just the kind of disrespect for our Hawaiian culture that current and future re-development of Mānoa Valley threatens (more comments re- DLNR's negligence).

I, personally, take my 2 granddaughters to visit Kū Ka ‘ō‘ō Heiau and to other historic sites to educate them about the above Mānoa *wahi pana* sites and to respect these sites.

“Ka Punahou” Spring, on the Punahou School grounds which Mānoa legend tells us that it was created by the Hawaiian god Kāne, although another legend exists.

“Pu‘u o Mānoa”, called “Rocky Hill”, on the campus of Punahou School, situated behind the school's tennis courts

“Puka ‘Ōma‘oma‘o” site in upper Mānoa on the ‘Ewa- side of the valley, known as **Mānoa Ali‘i**, where only Ali‘i” could reside---the other side was Mānoa Kānaka. Puka ‘Ōma‘oma‘o, which translated as, “The House of Green Shuttered Windows”, was the chosen residence of former Queen Ka‘ahumanu, who, following the demise of King Kamehameha I, had become the self-appointed *Kuhina Nui*, or Premier, of the Kingdom of Hawai'i who shared the rule with both of the sons of Kamehameha-the-Great, namely Liholiho and Kauikeaouli. Ka‘ahumanu selected her house-site because it gave her a commanding view of “Waikīkī” and “Leahi”, now called “Diamond Head”, so that she could see anby ships sailing to and from Honolulu, and she could also see anyone walking up the Mānoa trail to her home, and as a high-ground residence, it afforded Ka‘ahumanu both privacy and security from attack, because she had, indeed, experienced rebellion among certain powerful chiefs in what was referred to as the *Pahi Kaua War*, led by chief Boki's widow Kuini Liliha and Princess Bernice Pauahi Bishop's father Abner Pākī.

Puka Ōma‘oma‘o is where the legendary *ali‘i wahine* Ka‘ahumanu passed away in the presence of King Kamehameha III and all of the other important chiefs of the kingdom. It is said that Ka‘ahumanu's bed and the walls of the room were bedecked with fresh-scented *maile* and ‘*awapuhi*. Kamehameha's yellow featherd cloak lay beside the bed draped over a setee, symbol of her station as *Kuhina Nui* (Together with Kamehameha I's feathered war helmet).

Mānoa legend tells us that there is a **Cave network and fresh-water Spring** situated underground in and around the Mō‘ili‘ili area, the healing waters in which, Kahalaopuna, “The Rainbow Maiden” daughter of Mānoa's wind, Kahaukani and Mānoa's rain, Ka Ua Tuahine, was immersed to resuscitate her from a death-state. There are, purportedly, other underground water springs according to other accounts.

Perhaps these healing waters, if we are to believe in the claims of the Kahalaopuna legend, could be of possible importance to UH Mānoa if it chose to research the claims of the legend in the future. An account that speaks of a **Cave and Natural Tunnel** that connects Mānoa Valley with Pālolo Valley. Apparently, it was used by Kamehameha and his warriors.

Ka Wai-a-Ke-Akua-‘o-Kāne pool and stream, were also created, according to Manoa legend, by the god Kane. This water was revered and protected by King Kamehameha-the-Great, who placed the prostrating *kapu* upon the water as it was conveyed by his runners to his court.

There is also the legend of an ancient ***Mo‘o***, or “lizard”, whose petrified severed remains are said to be in the grounds now occupied by the Hawai‘i Humane Society, across from Kūhiō Elementary School, according to Pele legend.

“Kamanele Park” dedicated by our beloved deposed Queen, Lili‘uokalani.

Location of the last home of Hawaiian scholar and preservationist, **Kawena Pūku‘i**, who attended school on Mānoa in her youth, where the Mid-Pacific Institute is today.

7.9.3 Burials

I am not familiar with any burials, but I would bet that there are many---I would presume that such burials could be in and around the Puka ‘Ōma‘oma‘o. I would also guess that there may be burials within the underground cave-network in and around Mō‘ili‘ili mentioned above. Or, even at and around “Kū Ka ‘Ō‘ō”, although DLNR would have or should have conducted an archaeological survey.

7.9.4 Hula

My daughter, Allison-Ka‘ilihiwa, is an accomplished and award-winning hula dancer, and is now a practicing *kumuhula* whose *hālau* is named, “Hālau Hula Ka-lehua-Tuahine”. Her *hālau* excelled in the newest hula competition recently created, called the “Mokihana Hula Festival” on the Island of Kaua‘i and are now defending 2007 champions currently preparing to defend their *kāne* title this year's competition. She also led her *halau* to multiple title wins in the “2007 Invitational World Hula Competition” at the Waikīkī Shell in Honolulu.

She feels a deep affection for Mānoa, having lived there all of the 33 years of her life. She has told me that she is committing her life to keeping the flame of *hula* alive in Mānoa and identifies with the spirit guardian of Mānoa Valley, Tuahine, whose name she wove into the name of her *hālau*.

My daughter's *kumuhula*, Mae Klein, was a *haumana* of Māiki Aiu Lake, who was also my dear friend and one of my early cultural mentors.

My daughter's *hālau* is centered on the grounds of St. Francis School, which was also the original "home" for Māiki Aiu Lake's "Hālau Hula 'O Māiki". So, my daughter feels an identification with the spirit of Māiki Aiu both through me, her father, and through the location of her *hālau* on the historic original site of the legendary *kumuhula* Māiki Aiu of "Hālau Hula 'O Māiki".

I believe Māiki, who was Catholic may have attended St. Francis.

7.9.5 Trails

As children, we climbed around "Rocky Hill", where there are small caves, or at least there were, then, when I was 12 years old.

Like many others, we often walked the trails leading to the waterfall in the back of Mānoa Valley. There was a large housing area that covered the area which includes Noelani Elementary School and the surrounding buildings, including most of the Mānoa Shopping Center and extended up the valley where the newest housing next too and across the street of where the shopping center is located.

7.9.6 Recommendations

I would suggest that a learning center with a model of the valley in its olden state with *wahi pana* identified and related accounts of history and legend can be contained in recorded information that can be accessed by visitors to the learning center. Perhaps the learning center could or should be located at the Center for Hawaiian Studies on the UH Campus.

I have composed original music centered around the *wahi pana* of Mānoa and historical events and persons who were identified with the valley, which I have plans to record in CD format to help in the preservation of the legacy f history, *wahi pana* and legends connected with Mānoa Valley.

Section 8 Cultural Landscape of the Project Area

Discussions of specific aspects of traditional Hawaiian culture as they may relate to the project area are presented below. This section examines cultural resources and practices identified within or in proximity to the subject project area in the broader context of the encompassing Mānoa landscape.

8.1 Plant Resources

As discussed in Section 3.5, Handy's (1940) description of Mānoa suggests the valley was once home to a substantial Hawaiian population supported by vast taro gardens:

> In upper Manoa the whole of the level land in the valley bottom was developed in broad taro flats. The terraces extended along Manoa Stream as far as there is a suitable land for irrigating…About 100 terraces are still being cultivated [in the 1930s], but these do not constitute more than one tenth of the total area capable of being planted…Bennett…described the upper valley as "checquered with taro patches." (Handy 1940:77)

Presently there are few *lo'i* that still exist in the project area. However, several participants mentioned seeing old terraces in the forested uplands above the campus. Kekuewa Kikiloi, for example, tried to rehabiltate an old *lo'i* that he had identified while hiking in the back of the valley. During the converstation he also mentioned efforts being made to map old *lo'i* in the Mānoa area.

One area of active cultivation within the project area—and the primary exception to the generalization that the traditional practice of *kalo* cultivation has all but disappeared from the campuss—is the Kānewai Cultural Garden, also known as Ka Papa Lo'i o Kānewai. The abandoned taro *lo'i* were rediscovered, cleared and restored by Nāhoa Lucas (an interview participant for this study) and other students at the UHM in 1980. Ka Papa Lo'i o Kānewai serves as a living storehouse of different varieties of taro that are today utilized by farmers through out the islands..

In addition, Professor Jon Osorio describes seeing native plants that can be used for medicinal purposes along the trails behind the Wa'ahila Faculty Housing.

8.2 Streams and Fresh Water Resources

Mānoa Valley is watered by at least five tributary streams that merge to form the lower Mānoa Stream. The five tributary streams are 'Aihualama, Waihī, Nāniu'apo, Lua'alaea, and Waiakeakua. There are seven waterfalls in the back of Mānoa Valley, named Wai'ihī'iki, Wai'ihī nui, Lua'aulaia, Nāniu'apo, Wa'aloa, Kahuwai'iki and Waiakeakua.

Several individuals contacted during the community consultation process talked about the diminished stream life resulting from altered stream flow. Because of this, no respondents in the interview mentioned being able to gather stream resources for subsistance purposes. However, at least one participant (Mr. Kikiloi) continues to access the Waiakeakua Pūnāwai for *'awa* ceremonies; and Ka Papa Lo'i o Kānewai is dependent on the stream for cold, fresh water, which is necessary for successful *kalo* cultivation.

8.3 Wahipana

Section 3 discusses the many *mo‘olelo* and legendary accounts of Mānoa’s *pūnāwai* (fresh-water springs), which are directly associated with the exploits of two primary Hawaiian gods, Kāne and Kanaloa. These springs include Kānewai, Hualani, Wailele—located near the present day athletic field of the Mid-Pacific Institute and associated with Kūka‘ō‘ō Heiau, Punahou (a.k.a. Kapunahou), Ka‘aipū, Wa‘aloa and Waiakeakua. The valley is also home to many *pu‘u,* peaks, ridges and caves—all with associated *mo‘olelo* and legendary accounts; these include Wa‘ahila Ridge (which defines the eastern border of the valley) and its six peaks [Keanapoi, Pu‘u Pia, Pūkele, Paliluahine (also known as Kapaliluahine or Pali Luahine) Akāka and Kumauna], ‘Ulumalu, Pu‘u Pueo (“Roundtop”) and Pu‘u Mānoa. Mānoa is also associated with a variety of other *mo‘olelo* and legends, including “Pīkoi the Rat Killer,” “Maluae and the Underworld,” and “The Woman Who Died and Came Back to Life;” as well as famous events and people of the early historic era, including Kamehameha I (and his famous dog Poki), Ka‘ahumanu and Boki (Governor of O‘ahu under Kamehameha I and brother of Kalanimoku).

Many of the community members contacted for the report talked about the different places and natural phenomenon associated with *mo‘olelo* discussed in Section 3. In particular, references to the *mo‘olelo* of Kahalaopuna surfaced frequently throughout the community consultation process. Also, places associated with Kāne and Kanaloa continue to be of spiritual and cultural significance to a number of the participants.

8.4 Trails

As discussed in Section 3.7, several place names within Mānoa are located on a map of early nineteenth century trails as described by John Papa ‘Ī‘ī (Figure 14):

> Our description of the trails of the royal town is finished, but we have not yet told of the trails going to lower Waikiki, Kamoiliili, and Manoa. . . . At Kawaiahao a trail passed in front of the stone house of Kaina, late father of Kikaha. The trail went above Kalanipuu’s place, along the stream running down from Poopoo to the sea, close by Kaaihee in Makiki, to Puu o Manoa, then below Puupueo, where a trail branched off to upper Kaaipu and Kahoiwai, and another to go below Kaahulue, to Kapulena [Pu‘ulena] and Kolowalu. (‘Ī‘ī 1959:92)

Kekuewa Kikiloi pointed out that the present streets of Woodlawn, Mānoa and East Mānoa were all trails documented in ‘Ī‘ī’s work. Mr. Kikiloi, Dr. Osorio, and Ms. Clair Hughes all mentioned hiking different trails in Mānoa. Dr. Osorio also identified the use of trails behind the present site of the Wa‘ahila Faculty Housing for recreation (i.e., bike riding and hiking), but stated that much of this activity appears to be degrading the trail areas, which contain native medicinal plants. Dr. Osorio has observed these areas being littered with trash from recreational users and debris from housing along St. Louis heights. In discussions concerning Kānewai, participant, Nāhoa Lucas described Kalei Road as the old road that was used to access what is now Ka Papa Lo‘i o Kānewai prior to the construction of Dole Street. Kalei Road branched off the Old Waialae Road, near the quarry, and extended through what is now the UHM Dorms. There was a bridge that connected Kalei Road to the present site of Ka Papa Lo‘i o Kānewai. Remnants of the bridge can still be seen at Kānewai (see Figure 56). Regarding the topic of trails in Mānoa, Palani Vaughn talked about how, at the age of 12, he and others would climb around “Rocky Hill”

[behind Punahou School, formerly known as Pu‘u o Mānoa], where there were small caves, which may or may not still be there. Palani Vaughn also talked about walking “the trails to the waterfall in the back” of the valley, as did many others prior to much of the development in the lower and central valley (e.g., area of present-day Noelani Elementary School, Mānoa Shopping Center).



Figure 51. Old Kalei Road Bridge.

8.5 Cultural and Historic Properties and Burials

In general, the vast majority of archaeological sites once located in the Mānoa Valley have been destroyed and/or partially or entirely covered over by modern development, including the construction of the university campus in the lower valley and residential / commercial centers elsewhere. The campus is located in what used to be the prime wet-taro-growing area of the entire valley, and many *lo‘i* (stone terraces) and *‘auwai* (irrigation ditches) were located here; this agricultural heartland of the valley (i.e., the present-day campus) was also home to many small stone enclosures, terraces and platforms used by *maka‘āinana* (commoners) as house sites. The valley also was home to numerous *heiau,* some of which have been preserved into modern times, and burials.

Several partipants in this study mentioned the Dole Street and Keller Hall burials and felt that there will most likely be more burials found within the campus. Palani Vaughn believes additional (as-yet undiscovered) burials may be located in around the “Puka Oma‘oma‘o” and “within the underground cave-network in and around Mō‘ili‘ili.” According to Dr. Osorio, he has located at least one (and possibly two) *heiau* in the back of the Wa‘ahila Faculty Housing site..

Several respondants also noted the many cultural sites located on or near Mid Pacific Institute, including Ka U‘i o Mānoa, Wailele Pūnāwai, and possibly Pu‘u Pueo *heiau*.

Ka Papa Lo‘i o Kānewai is perhaps the best-known cultural site on the entire campus, noted for its ongoing and active practice of *kalo* cultivation. From the time the *lo‘i* were reopened in 1980, Kānewai has been a *pu‘uhonua* (place of refuge) for plants, people and culture. The *lo‘i* now serves approximately 15,000 visitors a year and acts as a repository for different varieties of *kalo*. At Kānewai students and community members learn and are able to practice many aspects of *nohona* Hawai‘i (Hawaiian lifestyle). A few examples of activities that occur at Kānewai include *kalo* cultivation, *imu* cooking, implement making, rock wall building, and *hale* construction. Kānewai allows people a space to practice a lifestyle that is difficult to carry out in much of the surrounding urban environment. As Mr. Cashman puts it, Kānewai “gives us a chance to be ourselves, practice our culture, our language.”

In additional to Kānewai, Mānoa has also been the home of other modern initiatives aimed as preserving and perpetuating the traditions of Hawai‘i Nei. For example, Palani Vaughn observed that St. Francis School—located immediately adjacent to the upper campus—was the “original ‘home’ for Māiki Aiu Lake’s ‘Hālau Hula ‘O Māiki.’” Kumu Hula Māiki Aiu was instrumental in reviving interest and knowledge of older, more traditional forms of *hula.*

Section 9 Summary and Recommendations

At the request of Group 70 International, Inc., Cultural Surveys Hawai‘i, Inc. (CSH) prepared this Cultural Impact Assessment (CIA) for the University of Hawai‘i at Mānoa’s Long Range Development Plan (LRDP). The project area consists of the entire approximately 304-acre campus located in Mānoa [Honolulu] Ahupua‘a, Kona District, Hawai‘i [TMK: (1) 2-8-015:001, 2-8-023:003, 2-9-004:005, 2-9-023:001 & 026, 2-8-029:001, 2-9-026:001 & 037, 2-9-027:054, 3-3-056:001 & 004] (see Figures 1-3).

The proposed LRDP focuses on projects that are on the Capital Improvement Program and/or are anticipated for development within the next 5-10 years (see Figure 4). At this time, at least seventeen (17) new buildings or renovation/expansion projects are proposed.

In addition to conducting background research into the traditional and historic importance of the project area, in the context of Mānoa [Waikīkī] Ahupua‘a and Kona District, including results from previous archaeological studies, CSH also made a substantial effort to consult with community members and organizations.

A total of 18 individuals and / or institutions were contacted for this CIA (see Table 3, above); two did not respond or chose not to particpate; two (OHA and SHPD) responded in writing (see Sections 6.1 and 6.2, above); several people provided referrals to other individuals; and ten participated in formal “talk story” interviews. At the time of this writing, one of the “talk story” participants (Ms. Kahi Wight) was unavailable to review and approve the interview transcripts, for reasons unrelated to its content; thus, there are currently nine interview summaries presented below, with one possible additional (Wight) for future drafts of this report.

9.1 Summary of Results

Background research conducted for this project yields the following results:

(1) Given its abundant natural resources—including several tributary streams that feed into the main stream and several *pūnāwai* (fresh-water springs)—Mānoa Valley has been an attractive place to settle and garden for as long as people have lived on O‘ahu (i.e., well over a millennium). Lower Mānoa Valley, within which the campus is located, represents the prime wet-taro-growing area and agricultural heartland of the entire valley.

(2) Mānoa is exceedingly rich in places names, *wahipana* (legendary or storied places) and associated *mo‘olelo* (oral histories), reflecting the valley’s elevated cultural and historical significance to Hawaiians, in particular. Important *mo‘olelo* focus on Mānoa’s many *pūnāwai*, which are directly associated with the exploits of two primary Hawaiian gods, Kāne and Kanaloa. These springs include Kānewai (location of the current Kānewai Cultural Garden), Hualani, Wailele—located near the present day athletic field of the Mid-Pacific Institute and associated with Kūka‘ō‘ō Heiau, Punahou (a.k.a. Kapunahou), Ka‘aipū, Wa‘aloa and Waiakeakua. The valley is also home to many *pu‘u* (hills, mountains), peaks, ridges and caves—all with associated *mo‘olelo*; these include Wa‘ahila Ridge (which defines the eastern border of the valley) and its numerous peaks. Finally, Mānoa is also associated with a variety of other *mo‘olelo*, including “Pīkoi the Rat Killer,”

"Maluae and the Underworld," and "The Woman Who Died and Came Back to Life;" as well as famous events and people of the early historic era, including Kamehameha I, Ka‘ahumanu and Boki.

(3) The archaeology of lower Mānoa is somewhat problematic in that most of the campus was developed before historic preservation awareness and laws were in place; thus many or most surface-level sites and features once present in the project area have been destroyed and / or damaged by being covered with sediments and structures. Before these historic impacts, however, the campus undoubtedly contained a patchwork of gardens, including many *lo‘i* (stone terraces) and *‘auwai* (irrigation ditches), and house sites, including many small stone enclosures, terraces and platforms. Undoubtedly, there are still subsurface cultural deposits within the campus containing signigicant historic and cultural resources.

(4) Burials have been documented near Keller Hall and along Dole Street, immediately adjacent to the Kānewai Cultural Garden and Kamakūokalani Center for Hawaiian Studies. The latter burials, representing the remains of at least 18 individuals, have been interpreted as a traditional Hawaiian cemetery. It is likely that more burials are located in subsurface deposits within the project area.

(5) A recent field inspection of the campus by CSH found a number of possible rock shelters and overhangs in the Wa‘ahila Ridge area. Additional study of these possible archaeological sites would have to be conducted in order to more fully understand their function, chronological age and archaeological significance.

Community consultation conducted for this project yields the following main concerns:

(1) Many participants voiced concern about the possibility of encountering as-yet undiscovered cultural and historic sites, including most importantly, human skeletal remains and burials in subsurface deposits. One participant (Dr. Davianna McGregor) also pointed out that the burial site preserve near Keller Hall, which used to be marked by a ginger plant, is no longer being maintained (i.e., the ginger plant is not there anymore).

(2) A few participants stated that existing undeveloped areas, including ridges and valley slopes, should not be developed or impacted in any way, given the already significant loss of such natural portions of the campus and given the importance of retaining a Hawaiian sense of place and landscape integrity. This concern about preserving the last undeveloped portions of the campus extends specifically to the Wa‘ahila Ridge area.

(3) Many participants voiced concerns about future buildings and projects being more harmoniously designed and integrated into the natural surrounding and themes inherent to the valley. It is important to note that this type of concern is fundamentally a cultural one for Hawaiians, in particular, whose 'world view' and deeper philosophical / spiritual beliefs are based on such concepts as *pono* (in this case, "right ways" of doing things) and *lōkahi* ("harmony"),

among other related concepts (e.g., *mālama ‘āina,* or "taking care of the land").

(4) A few participants talked about the importance of understanding and incorporating Hawaiian-language words, phrases and concepts that extends beyond the superficial (e.g., naming buildings).

(5) The current Director of Ka Papa Lo‘i o Kānewai (a.k.a. Kānewai Cultural Garden) shared his personal knowledge of a well-known master navigator and teacher who previously indicated the large albizia tree at Kānewai Lo‘i (which is scheduled to be removed in association with a stream-erosion-prevention project funded by the Federal Emergency Management Agency) could be used to construct a large traditional *wa‘a* (canoe).

(6) Many participants talked about the importance of using native plants in future projects.

(7) The Wa‘ahila Ridge area is an important natural and cultural resource, containing trails, native plants and other significant sites and features (e.g., possible rocksheleter and overhangs).

(8) A few participants provided detailed accounts of well-documented *mo‘olelo, wahi pana* and other cultural sites in Mānoa; in one case, one participant (Palani Vaughn) suggested there is another, alternative legend associated with the origins of the well-known spring (Ka Punahou, widely attributed to Kāne), but he did not elaborate further on this point.

(9) A couple participants called into question the State's (i.e., Department of Land and Natural Resources, Historic Preservation Division) poor record of protecting and preserving important cultural sites in Mānoa, including *heiau* that have been damaged or compromised by recent construction projects.

(10) One participant (Palani Vaughn) suggested the university has not done enough to promote education about the traditions of old Hawai‘i in Mānoa; and that it should build a "learning center" (perhaps located at the Center for Hawaiian Studies) that would integrate *mo‘olelo, wahi pana,* the landscape and other cultural and historical information about Mānoa.

(11) One participant (Dr. Davianna McGregor) pointed out that the Long Range Development Plan (LRDP) is not detailed enough for meaningful review and comment, and that descriptions such as building "expansion" or "replacement" are too vague. There is concern that the LRDP will be used to guide development 20 years from now, which, given the lack of detail, is problematic.

(12) Dr. McGregor also pointed out that there are many significant and commemorative trees on campus that should be systematically catalogued in order to ensure their protection during future development of the campus.

9.2 Recommendations

The following recommendations are based on a synthesis of all the information gathered during preparation of this CIA. Faithful attention to these recommendations, and efforts to

develop appropriate measures to address these concerns, will help mitigate the adverse impacts of the proposed action on Hawaiian cultural beliefs, practices and resources by the project:

(1) Community consultation participants and the wider Mānoa community should be afforded the opportunity to review the subject draft CIA and offer their input for the final version of this report.
(2) Given the fact that the LRDP presently includes seventeen different projects (i.e., new buildings, building expansions and other infrastructure improvements), and given the lack of specific plans for these projects at the present time, the community (including participants for this study) should be afforded the opportunity to review and comment on each individual project as details become finalized and as more specific potential impacts (both positive and negative) can be assessed.
(3) The University should proactively develop a plan to avoid disturbing as-yet undiscovered burials and other historic and cultural sites and features located in subsurface contexts. Such a plan may include archaeological inventory surveys prior to ground disturbance and / or archaeological monitoring of excavations during construction; specific decisions should be made on a case-by-case basis, in consultation with appropriate government agencies (e.g., SHPD, OHA) and Native Hawaiian organizations and individuals. In particular, every effort should be made to proactively avoid inadvertent finds of human skeletal remains and burials. The burial site preserve near Keller Hall, which used to be marked by a ginger plant, but which is no longer being maintained (i.e., the ginger plant is not there anymore), should be properly cared for (e.g., clear marking should be reestablished).
(4) Planning and design of proposed projects included under the LRDP should incorporate Hawaiian cultural and historical themes and concepts in order to restore and accentuate an authentic Hawaiian sense of place. Minimally, this should include (a) use of native and Polynesian-introduced plants for landscaping, (b) integration of *mo‘olelo,* Hawaiian language and other Hawaiian concepts and ideas that goes far beyond superficial applications of such information (e.g., building names) and (c) preservation and protection of undeveloped spaces and natural resources.
(5) The Wa‘ahila Ridge portion of the campus, one of the only undeveloped places in lower Mānoa Valley, should be carefully preserved and protected from future development, and from modern abuses and damage that have already taken their toll (e.g., soil erosion from “off-road” activities).
(6) Ka Papa Lo‘i o Kānewai, also known as Kānewai Cultural Garden, should be treated with the utmost care and respect; any plans for future improvemens, alterations or development in or adjacent to Kānewai Lo‘i should include comprehensive consultation with its director and with the Kamakakūokalani Center for Hawaiian Studies.
(7) The issue of removing the large albizia tree scheduled for removal in association with the stream-erosion-prevention project should be discussed

with the Director of Ka Papa Lo‘i o Kānewai, who has indicated the tree may be used to make a large traditional *wa‘a* (canoe).
(8) Project proponents should consult with the Outdoor Circle regarding the status of significant and commemorative trees on campus; these trees should be catalogued in order to preserve and protect them.

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APPENDIX G. UTILITY SYSTEMS REPORT

UTILITY SYSTEMS REPORT
UNIVERSITY OF HAWAII AT MANOA
LONG RANGE DEVELOPMENT PLAN
2007 UPDATE (CATEGORY I),
Manoa, Honolulu, Hawaii

October 24, 2007

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UTILITY SYSTEMS REPORT

University of Hawaii at Manoa Long Range Development

Plan 2007 Update (Category I)

Manoa, Honolulu, Hawaii



Exp. 4/30/10

This work was prepared by me or under my supervision.

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UTILITY SYSTEMS REPORT

University of Hawaii at Manoa

Long Range Development Plan 2007 Update (Category I)

Manoa, Honolulu, Hawaii

I. INTRODUCTION

The University of Hawaii at Manoa (UHM) is the main campus in Hawaii's state-wide higher education system. The campus is encompassed by 304 acres and serves approximately 20,000 students and 6,000 faculty and staff members.

A. Location

UHM is situated at the entrance to Manoa Valley, and is bordered by the communities of Saint Louis Heights, Moiliili and Manoa. Generally, the land is sloped from the mauka side of the campus towards Manoa Stream and the makai campus.

B. Project Description

The purpose of this report is to assess the impacts of the LRDP's short term development (5 to 10 years) on the University of Hawaii at Manoa (UHM) utility systems. The current plan includes numerous building and parking improvements, including:

- Law School Expansion
- Campus Center Expansion to the Northeast
- Instruction Building at Henke Hall Site
- Kennedy Theatre Expansion
- Parking Structure at Kennedy Theatre (480 parking Stalls)
- Parking Structure IIB/Bookstore (900 Parking Stalls)
- Research Buildings – North and East of Biomedical Building
- Research Buildings – Mauka Campus
- Instruction Building – College of Education
- I.T.S. – Bilger Hall Addition, Phase II
- Media Facilities at KHET Site
- Johnson Hall – Replacement Dormitory
- Hale Noelani – Replacement Dormitory
- Faculty Housing – Waahila Ridge or Mauka Campus
- Klum Gym Replacement
- School of Hawaiian Knowledge

II. DRAINAGE SYSTEM

A. Existing Conditions

1. Existing Drainage System

The Manoa Campus is part of the Manoa Watershed. A large amount of off-site drainage from portions of Manoa and Mid-Pacific Institute is conveyed through the City and County's drainage system on UHM's campus. As shown in Figure 1, UHM's storm drain system connects to the City's drainage system on University Avenue and Dole Street. The Makai Campus has several existing outlets to Manoa Stream as well as a storm drain system that is connected to the City's drainage system on Varsity Place.

2. Flood Zone

According to FEMA's Flood Insurance Rate Map (FIRM) dated September 30, 2004, the entire UHM Campus, other than the banks along Manoa Stream and two (2) adjacent areas to the stream are located in Zone X (500 year flood). The two (2) areas adjacent to the stream are at the Mauka Campus where Woodlawn Drive crosses Manoa Stream and at the Makai Campus below Dole Street where Manoa Stream passes the Taro Patch area adjacent to the Center for Hawaiian Studies. These two (2) areas are in Zone AE (100 year flood) and their

Base Flood Elevations are specified on the FIRM. No developments in the Zone AE areas are planned for this LRDP.

In October 2004, there was a 25-year storm event that flooded parts of Manoa, including a portion of the University of Hawaii Manoa Campus. According to the U.S. Army Corps of Engineers "Hydrology and Hydraulics Study, Flood of October 30, 2004, Manoa Stream" dated November 15, 2006, the flooding was caused by blockages in Manoa Stream and an inadequate channel capacity between Kahaloa Drive and Woodlawn Drive. The main buildings affected by the storm were Hamilton Library and the Biomedical Science Building.

3. Manoa Watershed Project

The flooding of Manoa Stream in October 2004 was caused by poor maintenance and inadequate capacities upstream of the Manoa Campus. The U.S. Department of Agriculture Natural Resources Conservation Services is currently investigating the flood mitigation and restoration of Manoa Stream in the Manoa Watershed Project. The project is a partnership between city, state and federal agencies as well as a consultant team led by Oceanit, Inc. They expect to have a final Environmental Impact Statement and implementation plan by the end of 2008 with design and implementation to follow thereafter. Through this project, the flood mitigation measures such as the measures suggested in the U.S. Army Corps' report (e.g., adding a flood wall or levee at the Woodlawn Drive Bridge) will be implemented. It is recommended that the University be represented at the Manoa Watershed Project meetings to review their recommendations and monitor the Project's implementation of the recommendations in order to coordinate improvements affecting the University's property.

4. Mid-Pacific Institute

a. Existing Concrete Ditches

There are two (2) concrete interceptor ditches outside of and along The University's common boundary with Mid-Pacific Institute that converge just above the Agricultural Engineering

Building. One of the ditches runs along the property line just mauka of Maile Way. The other ditch runs along the property line beginning near the Biomedical Science Building and ending near the Agricultural Engineering Building. A portion of UHM's drainage system ties into the concrete ditch near the Biomedical Science Building. Any connections to the ditch will need to be coordinated with Mid-Pacific Institute. The capacity of this ditch is also questionable as it was overwhelmed in the October 2004 flood. It is recommended that the ditch be evaluated in the Drainage Master Plan in concurrence with the recommendations from the Manoa Watershed Project.

b. Future Improvements

The City and County of Honolulu is planning drainage improvements on and near Mid Pacific Institute. These drainage improvements could increase the amount of storm water going through the University. According to the City and County of Honolulu, the types of drainage improvements are not known at this time. It is recommended that UHM planners periodically check on the status of the City and County's projects.

B. Current Improvements (Prior to this LRDP)

There are two major drainage improvements in the Central Campus that will be constructed in the near future. These improvements are being made to help protect UHM from future flood damage as sustained in the October 2004 storm event.

1. <u>Hamilton Library Ground Floor Renovation</u> - According to a memorandum dated November 1, 2006 from Chris Ball of Mitsunaga & Associates, "drainage options were examined to protect Hamilton Library from a flood of approximately 2,000 cfs." According to the U.S. Army Corps' report, the storm event was equivalent to approximately a 25 year storm. Three alternatives were suggested to protect Hamilton Library from future flooding in a similar event to the October 2004 storm.

a. Option 1 - Install a new box drain approximately 10' x 8' with a new inlet structure by the Agricultural Engineering Building and a new outlet at Manoa Stream. This drain would accommodate approximately 2,000 cfs, which is similar to the storm event that flooded the library in October 2004. The cost was approximated to be $8.7 million.

b. Option 2 - Install a 60 inch culvert from the library to Manoa Stream and a 2-foot high wall around the front and side of the library building and repair the existing improvements upstream at the entrance to the box drain, and lower a portion of the driveway at the ewa end of the library. This option would mitigate about 1,000 cfs, thus allowing approximately 1,000 cfs to pass through the McCarthy Mall and downstream areas.

c. Option 3 - Install a smaller drainage system and a 2.5 foot high wall around the front and side of the library, repair the existing improvements upstream at the entrance to the box drain and lower a portion of the driveway at the ewa end of the library. This option would mitigate about 500 cfs, therefore allowing approximately 1,500 cfs to pass through the McCarthy Mall and downstream areas.

For the short term, the University decided to do a variation of Option 3. This includes all of the items listed in option 3 above, plus covering the existing "moat" at the north, east and west sides of Hamilton Library with a concrete roof to prevent flood water from filling up the moat and entering the ground floor. The construction plans for this project is currently being finalized.

During the upcoming LRDP, UHM should evaluate the feasibility of building a large box culvert as described in Option 1.

2. Biomedical Science Building - To prevent future flooding of the building, several walls on the northern and eastern sides of the Biomedical Science Building are being designed. A concrete channel will also be installed adjacent to the northern wall to direct the flow to the existing ditch on the Mid-Pacific Institute/University of Hawaii property line.

Construction of these improvements is expected to begin in the near future. In addition to the floodwalls, the existing drainline will be extended in this LRDP as discussed in Section II.C.

C. Proposed Improvements for the LRDP

The improvements proposed in the LRDP will not have significant long-term impacts on campus drainage. The majority of the new buildings and parking structures will be in areas that are already paved; therefore the increase in impervious area should be minimal. In addition, the building slabs and paved areas will be set close to existing grades to minimize excavation and embankment, thus retaining the existing drainage pattern on campus.

There are three (3) drainlines which need to be designed and constructed as part of the LRDP building and roadway improvements to improve the overall drainage on campus. These include the following:

1. Parking Structure Phase IIB – Extend drain lines on the makai side of the parking structure to connect to existing drainage system. This drain line is referred to as "Project B" on Figure 1 and the 1990 Drainage Master Plan.

2. Proposed Road "A" – Extend Drain "C" to St. Francis School to convey the storm water through an underground drainage system. This drain line is referred to as "Project E" on Figure 1 and the 1990 Drainage Master Plan.

3. Research Buildings North and East of Biomedical Science Building – There is an existing 54" pipe that currently outlets at an energy dissipater into a small swale on the north side of the Biomedical Science Building. The swale runs to an existing 18" pipe that outlets to the concrete ditch on Mid-Pacific Institute's property. The existing pipe and swale will need to be re-routed around the new research building. The existing 54" pipe should be extended to the existing concrete ditch to improve the conveyance of storm water in that area. This design will need to be coordinated with Mid-Pacific Institute since they own the ditch. As discussed in Section II.A.iv.1, the capacity of the ditch needs to be studied.

In addition to these improvements, the installation of the large box drain (option 1 in Section II.B.i) should be studied to help alleviate the amount of surface drainage coming through the Manoa Campus. The alignment of this box drain will be challenging because of the existing infrastructure and new underground electrical lines being constructed on Maile Way and East West Road. This box culvert will also be conveying stormwater from Mid-Pacific Institute and other parts of Manoa besides UHM. The study of this area needs to be coordinated with the Manoa Watershed Project.

D. Stormwater Quality

Site erosion control measures and Best Management Practices will be utilized to reduce pollution from construction activities prior to entering the City and County's drainage system. Other permanent mitigation measures such as vegetated roofs, porous paving and stormwater separators with media filters may be used to reduce the amount of runoff and improve stormwater quality, as discussed in the LRDP's Sustainability Guidelines.

E. Future Drainage Master Plan

A new Drainage Master Plan should be completed in conjunction with the Manoa Watershed Project and City and County's future drainage improvements. The off-site improvements from these projects can greatly affect UHM's existing infrastructure.

III. Wastewater Disposal System

A. Existing Conditions

The UHM Campus wastewater is disposed through the City System which runs through the campus (see Figure 2). Through discussions with the City and County of Honolulu Department of Environmental Services Wastewater Management Branch, there are three areas with potential capacity problems on the UHM Campus:

- Dual sewer lines mauka of Agricultural Engineering Building
- Metcalf Street
- University Avenue near King Street

According to UHM Facilities Management, the existing sewer lines owned and maintained by UHM have no known problems at this time.

B. Proposed Conditions

Only one of the areas that the City and County is concerned about is affected by this LRDP. That area is the dual sewer lines mauka of the Agricultural Engineering Building. According to City and County Wastewater Management Division, the dual 24" sewer lines may be near capacity. These sewer lines are owned by the City and County and serve the Manoa Valley and UHM Campus. At this time, the Wastewater Management Division is not able to determine specific restrictions until they can assess the future flows from UH and upstream users. In order to inquire about specific future building connections to this line, such as the Research Building north of Biomedical Sciences Building, a formal request to the Wastewater Management Division would need to be initiated by UH. The Research Building north of Biomedical Sciences Building is also located in the vicinity of this line and UHM will need to work with the City and County to either relocate or avoid the existing dual 24" sewer lines in that location. As an alternative, the Sewer Master Plan should evaluate whether this building along with future buildings in the area can be connected to the existing sewer line on East West Road or any other location to provide relief for the City and County's dual sewer lines.

At the time of development, the City and County Wastewater Management should be contacted to ensure that the sewer system has the available capacity to handle any of the planned campus improvements.

IV. POTABLE WATER SYSTEM

A. Existing Conditions

The existing Manoa Campus is served by the City's Board of Water Supply system. There are several water meters on campus that connect to the BWS system. The two main meters on the central campus are located near Burns Hall on Dole Street and just north of Kennedy Theatre on East West Road.

Since the last LRDP, some of the water lines that were inadequate for fire flow have been improved. These areas include the Teachers College/Lab

School and Hemenway Hall. In addition, there were a few fire hydrants added to the Central Campus. A significant amount of water lines were installed in the Makai Campus to provide adequate fire flow and water service to the area.

B. Proposed Conditions

Although the additional buildings in this LRDP will be increasing the water demand for UHM, the water conservation efforts as discussed in Section C below should actually decrease the total water demand for UHM. With this in mind, the main focus of this LRDP should be to improve fire flow and provide redundancy for the existing water system. Improvements to be constructed in the next 5 to 10 years are as follows:

- Parking Structure Phase IIB/Bookstore – construct 12" water line to complete the loop on Makai Campus;
- Research Buildings North and East of Biomedical Building – construct 8" water line with fire hydrants to provide adequate fire protection;
- Upper Central Campus Roadway – construct 8" water line and connect to the existing "high service" BWS Main on Pamoa Road. This would provide fire protection for St. Francis Convent
- Consider making a new connection to the existing 20" transmission main near the Student Services Center and loop the system back to the existing 8" water line near Sakamaki Hall. This will improve water pressure and provide redundancy for the water system.

There was a significant amount of changes to the water system since its last Master Plan in 1990. An updated Water Master Plan should be completed to reevaluate the existing water system.

C. Water Consumption/Conservation

1. Background

Since 2002, the guiding principle of the University of Hawaii is sustainability – living in ways that meet our present needs without limiting the potential of future generations to meet their needs. As part of this philosophy, the University of Hawaii and the Honolulu Board of Water Supply signed a memorandum of understanding in 2003 to establish a program for reducing water and wastewater use at the Manoa Campus.

The goal of the program is to reduce water consumption by 10 percent annually.

2. Water Management Plan

A Water Management Plan (WMP) should be developed during this LRDP and incorporated by the Facilities Planning and Management Office (FPMO) to help incorporate and evaluate UHM's water conservation efforts. The WMP will consist of the following:

a. Analyze the existing water system on campus

- Sub-meters - There are a minimal number of water meters on the Manoa Campus. According to FPMO, the master water meter near East West Road serves over half of the campus. This makes it difficult to determine the optimal locations for improvements since there is no way of determining individual water uses. Sub-meters throughout campus could be installed to better monitor the water usage on campus.
- Determine the amount of fixture units and the daily demands for each building.
- Run a hydraulic model of the water system to check for adequate water supply and pressures.

b. Mitigation Measures

- Quarry Water Source – The "Makai Campus/Quarry Water Source Feasibility Study" prepared by Fukunaga and Associates was completed in March 1982. It determined that the quarry spring water in the Makai Campus is viable for either potable or non-potable water use. Currently, the water source has not been developed. This is a valuable resource to the Manoa Campus and the University should develop the water source for non-potable water use in the next 5-10 years if feasible. A pumping system, distribution system and possibly a storage system will need to be constructed in order to use the water for irrigation. Using the non-potable water for irrigation will help reduce the burden on BWS' water supply,

even with the additional buildings being constructed during this time period.

- Landscape and Irrigation – The water from the Quarry as discussed above could provide a large part of the irrigation water for the Manoa Campus. In addition to using this resource, the landscaping on campus should use native or adapted plants to reduce or eliminate irrigation requirements. The irrigation controllers should also be high-efficiency equipment and/or climate-based controllers as discussed in the Sustainability Guidelines.
- Low-flow plumbing fixtures – The Manoa Campus is currently renovating their campus buildings to use low-flow fixtures. This should continue through the 5-10 year period, if not already completed. In addition, all new buildings should be constructed with low-flow fixtures.
- Education – Research, curriculum and community service projects for water conservation are currently taking place at the University and should continue through this LRDP.

c. Monitoring

- The water usage should be monitored on a regular basis to determine if the mitigation measures are working. This can also help determine trouble spots in the buildings or water system.

V. CONCLUSION

The additional buildings in this LRDP do not have a significant impact on the City and County of Honolulu's infrastructure. Most of the recommendations in this report are to improve existing utility systems within the UHM Campus or improvements required for an increased amount of off-site drainage from the Manoa Watershed. It is important to note that this is not a comprehensive Utility Master Plan and many of the recommendations throughout this report were based on the 1990 Utility Master Plan and project information provided by FPMO and the City and County of Honolulu. It is UHM's intent to start a total Campus Master Planning effort in the Spring of 2008.

VI. REFERENCES

Information for the existing utility system and future utility improvements were compiled from the following references:

- University of Hawaii – Manoa Campus Utilities Master Plan, by Fukunaga and Associates, Inc., dated March 1982.
- University of Hawaii – Manoa Campus Utilities Master Plan – VI Makai Campus/Quarry Water Source Feasibility Study, by Fukunaga and Associates, Inc., dated March 1982.
- 1990 Utilities Master Plan Update, University of Hawaii – Manoa Campus, by Fukunaga and Associates, Inc., dated August 1991.
- Hydrology and Hydraulics Study, Flood of October 30, 2004, Manoa Stream, Honolulu, HI, by U.S. Army Corps of Engineers, Honolulu District, dated November 15, 2006.
- Memorandum from Chris Ball of Mitsunaga & Associates, Inc. to Dennis Kimura of Kimura Ybl Inc., dated November 1, 2006 regarding the Hamilton Library Ground Floor Renovation, University of Hawaii at Manoa.

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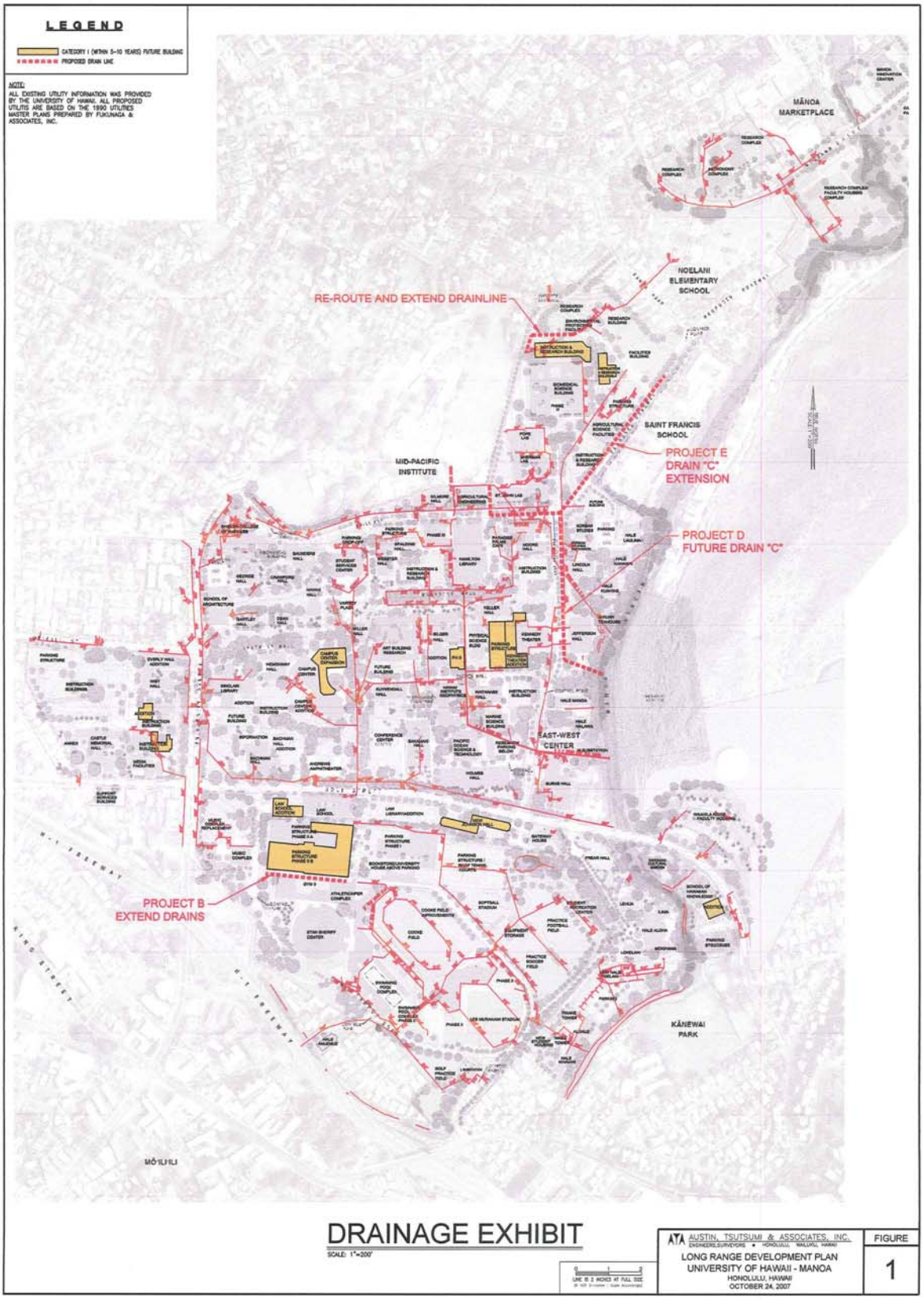
FIGURES



DRAINAGE EXHIBIT

SCALE: 1"=200'

LINE IS 2 INCHES AT FULL SIZE

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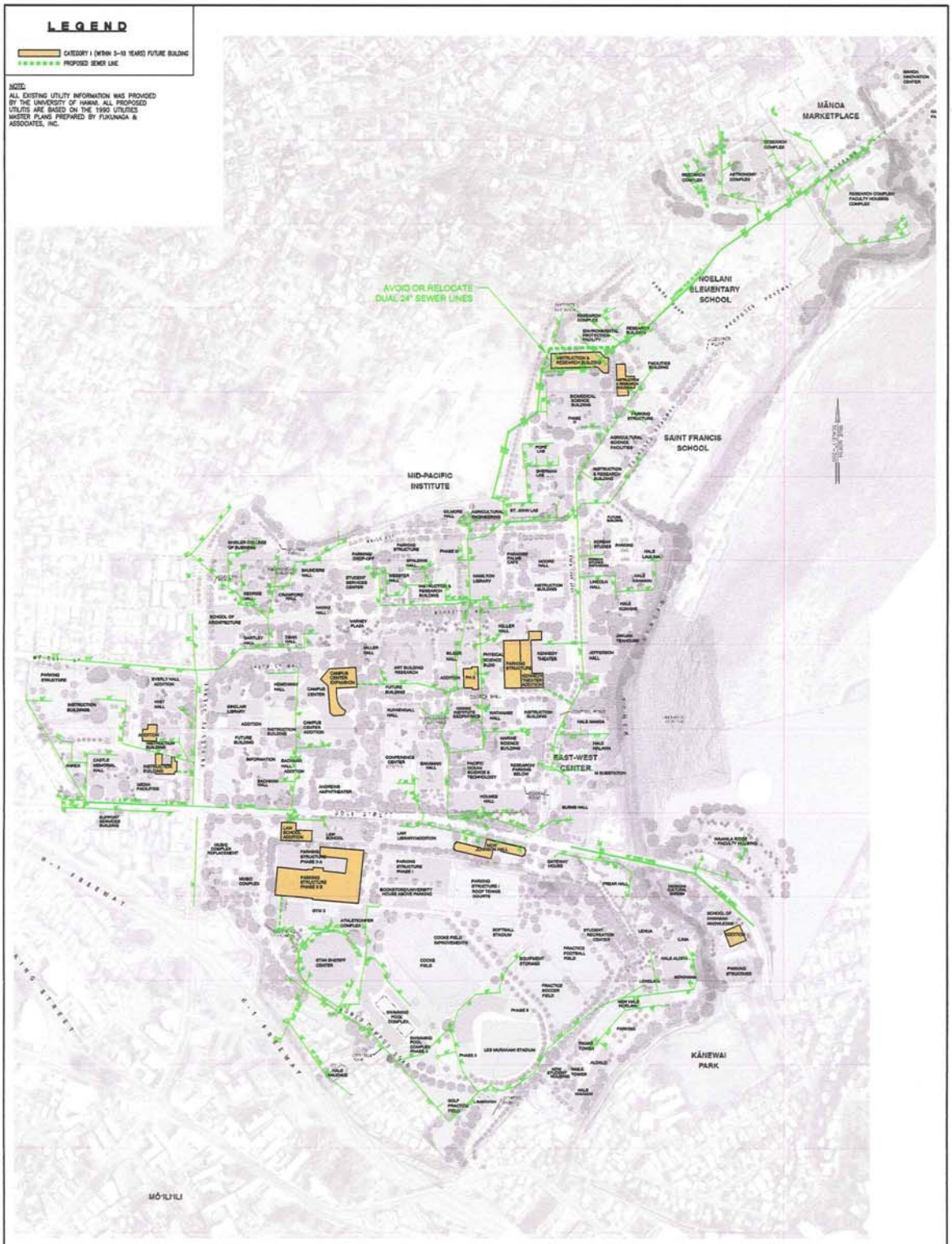
LONG RANGE DEVELOPMENT PLAN
UNIVERSITY OF HAWAII - MANOA
HONOLULU, HAWAII
OCTOBER 24, 2007

FIGURE
1



WASTEWATER EXHIBIT

SCALE: 1"=200'

LINE IS 2 INCHES AT FULL SIZE

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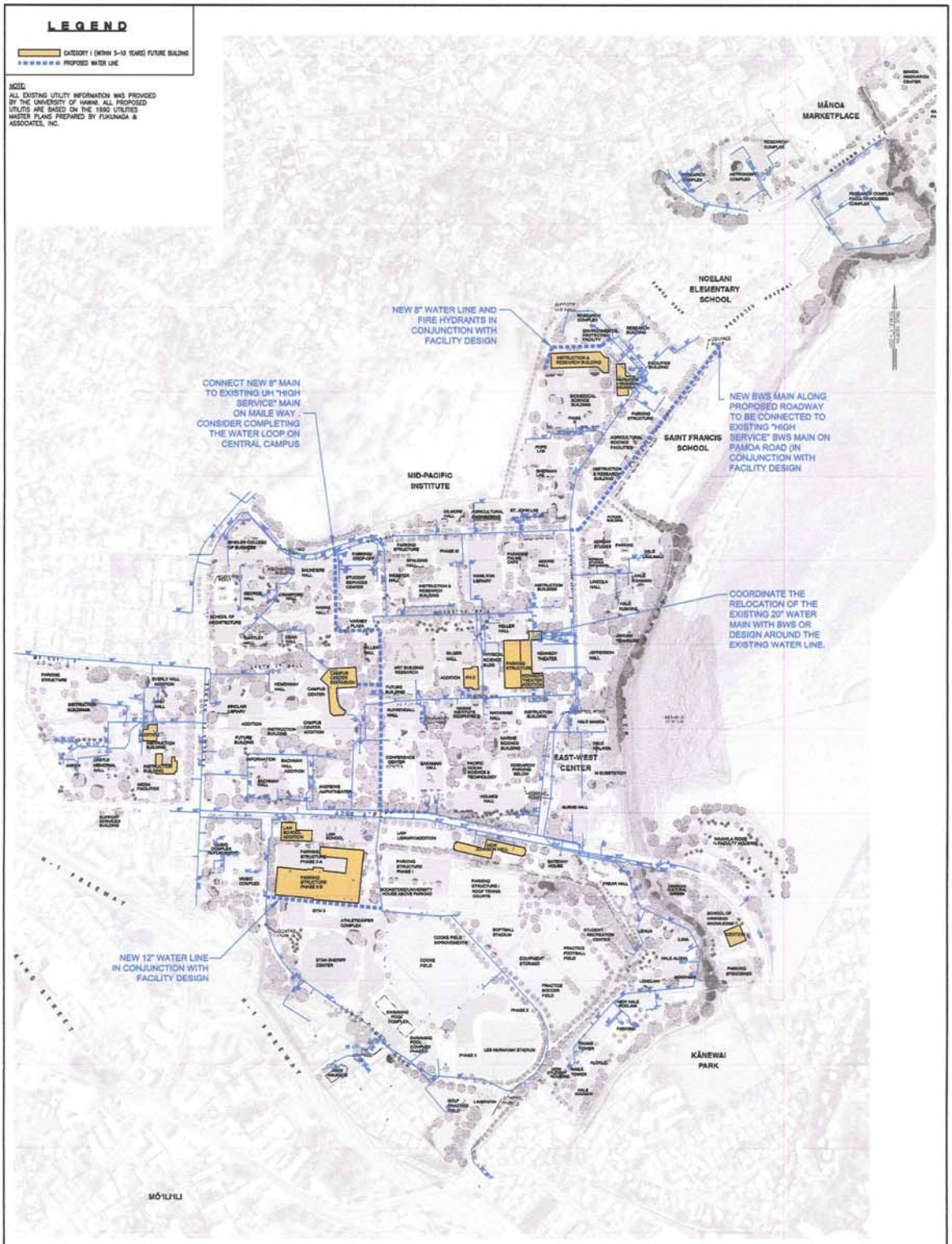
LONG RANGE DEVELOPMENT PLAN
UNIVERSITY OF HAWAII - MANOA
HONOLULU, HAWAII
OCTOBER 24, 2007

FIGURE
2



POTABLE WATER EXHIBIT

SCALE: 1"=200'

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UNIVERSITY OF HAWAII - MANOA
HONOLULU, HAWAII
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FIGURE
3

APPENDIX H. TRAFFIC IMPACT ANALYSIS REPORT

TRAFFIC IMPACT ANALYSIS REPORT
UNIVERSITY OF HAWAII AT MANOA
LONG RANGE DEVELOPMENT PLAN
2007 UPDATE (CATEGORY I)

Manoa, Honolulu, Hawaii

October 26, 2007

Prepared for:

Group 70 international

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TRAFFIC IMPACT ANALYSIS REPORT
University of Hawaii at Manoa Long Range Development
Plan 2007 Update (Category I)
Manoa, Honolulu, Hawaii

Prepared for

Group 70 International

Prepared by
Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
Honolulu • Wailuku, Hawaii

October 26, 2007

- University Avenue/Metcalf Street
- University Avenue/Sinclair Library Parking Lot (New Signal)
- University Avenue/Dole Street
- Dole Street/Lower Campus Road

Year 2017 with LRDP

While the LRDP includes new parking structures, the number of students is not projected to increase as a result of these additions. Ultimately, as based on standard methods for generating trips for Universities, this would mean that the number of vehicular trips generated by the LRDP will remain the same. However, a redistribution of the existing trips will occur, in this case more heavily concentrating traffic at the University Avenue/Dole Street, Dole Street/Lower Campus Road, and Dole Street/East-West Road intersections. However, given the improvements recommended in Base Year 2017 Mitigation Measures, these intersections will continue to operate at LOS E or better and under capacity.

As stated earlier, one caveat to this statement is that downstream conditions along University Avenue and subsequently the H-1 Freeway, Beretania Street, and South King Street will continue to experience congestion, and may therefore limit the incoming/outgoing capacity in the area.

Year 2017 with Project Recommended Improvements

No improvements beyond those recommended in Base Year 2017 Mitigative Measures are recommended.

Improvements at the Old Waialae Road Entrance/Exit and at the Varsity Place were investigated, and are generally not recommended. See discussion in Section IV.E.

VI. REFERENCES

1. Federal Highway Administration, Manual on Uniform Traffic Control Devices for Streets and Highways, including Revision 1, 2004.

2. Institute of Transportation Engineers, Trip Generation, 7th Edition, 1997.

3. Institute of Transportation Engineers, Trip Generation Handbook, and ITE Recommended Practice, 2001

4. Transportation Research Board, Highway Capacity Manual, 2000.

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(TO BE SUBMITTED WITH FINAL)

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(TO BE SUBMITTED WITH FINAL)

TRAFFIC IMPACT ASSESSMENT REPORT

University of Hawaii at Manoa
Long Range Development Plan 2007 Update (Category I)

Manoa, Honolulu, Hawaii

I. INTRODUCTION

This report documents the findings of a traffic study conducted by Austin, Tsutsumi & Associates, Inc. (ATA) to evaluate the potential traffic impacts resulting from the University of Hawaii Long Range Development Plan 2007 Update – Category I, which shall be referred to hereinafter as "LRDP".

A. Background

As stated in the LRDP, throughout its early years, the University of Hawaii at Manoa (UHM) was developed without the benefit of a formalized development plan. In 1987, the first LRDP was completed and adopted, with the goal of coordinating growth and removing vehicular traffic from the center of its campus. The LRDP was subsequently updated in 1994, and is in the process of being updated for a second time.

B. Location

The University of Hawaii, Manoa Campus (UHM) is situated at the entrance to Manoa Valley, and is bordered by the communities of Saint Louis Heights, Moiliili, and Manoa. The H-1 Freeway lies just south of UHM. Figure 1 shows the project location.

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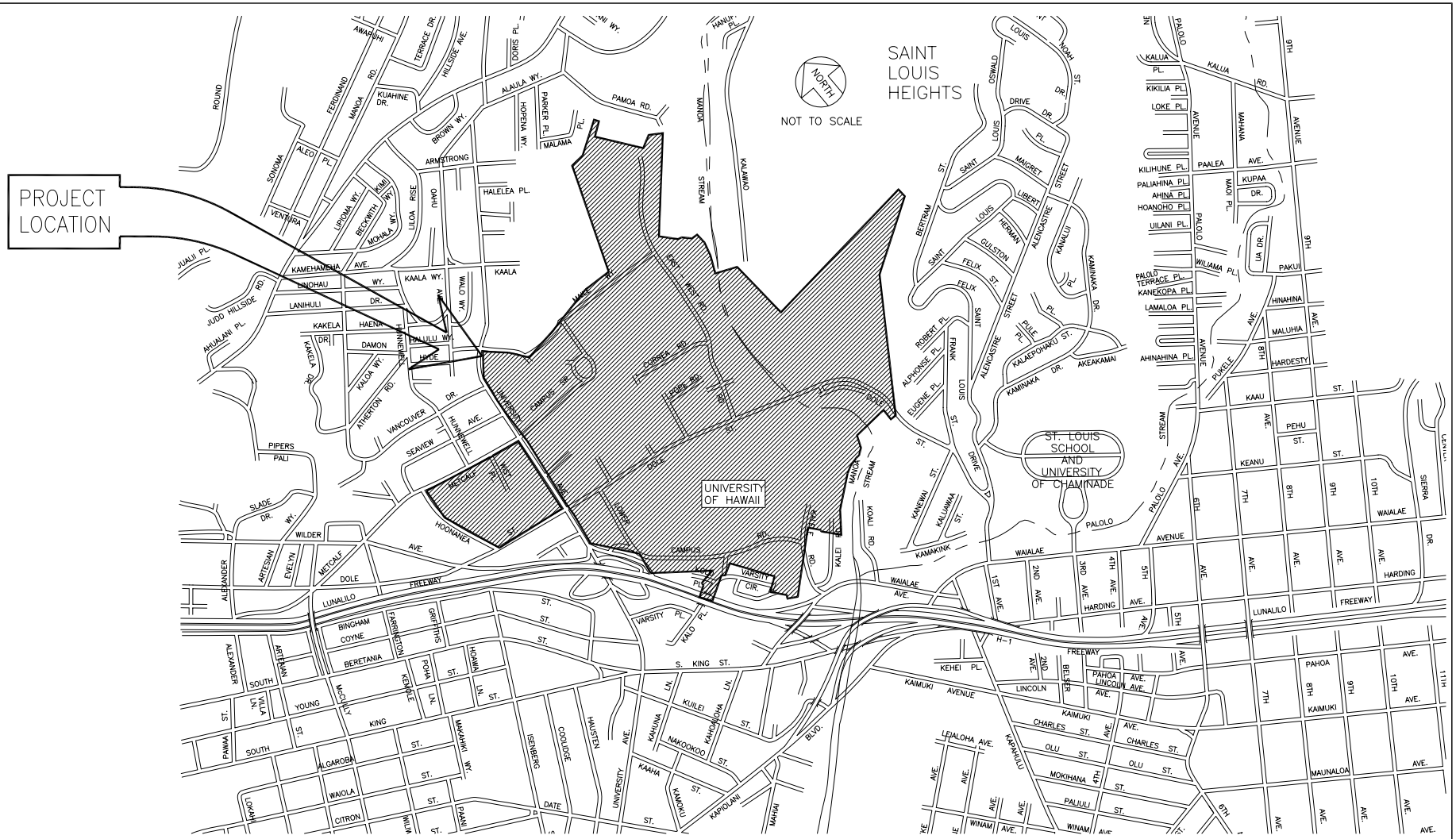

UNIVERSITY OF HAWAII AT MANOA
LRDP UPDATE 2007

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LOCATION MAP

FIGURE 1

C. Project Description

The intent of this report is to assess the potential traffic impacts arising from the LRDP. The current plan includes numerous building and parking improvements, including:

- Law School Expansion
- Campus Center Expansion to the Northeast
- Instruction Building and Henke Hall Site
- Kennedy Theatre Expansion
- **Parking Structure at Kennedy Theatre (900 parking Stalls)**
- **Parking Structure IIB/Bookstore (480 Parking Stalls)**
- Research Buildings – North and East of Biomedical Building
- Research Buildings – Mauka Campus
- Research Space – Infill of South Courtyard of Biomedical Building
- Research Buildings – Mauka Campus
- Research Space – Infill of South Courtyard of Biomedical Building
- Instruction Building – College of Education
- I.T.S. – Bilger Hall Addition, Phase II
- Media Facilities at KHET Site
- Johnson Hall – Replacement Dormitory
- Hale Noelani – Replacement Dormitory
- Faculty Housing – Waahila Ridge or Mauka Campus
- Klum Gym Replacement
- School of Hawaiian Knowledge

Relative to traffic analysis, the additional parking structures will be the only part of the LRDP that will significantly affect traffic operations along the roadways within the area. This is due to the fact that traffic projections for

Universities are generally based upon student enrollment, which is not projected to increase (see Section IV). See Figure 2 for Site Plan.

D. Study Methodology

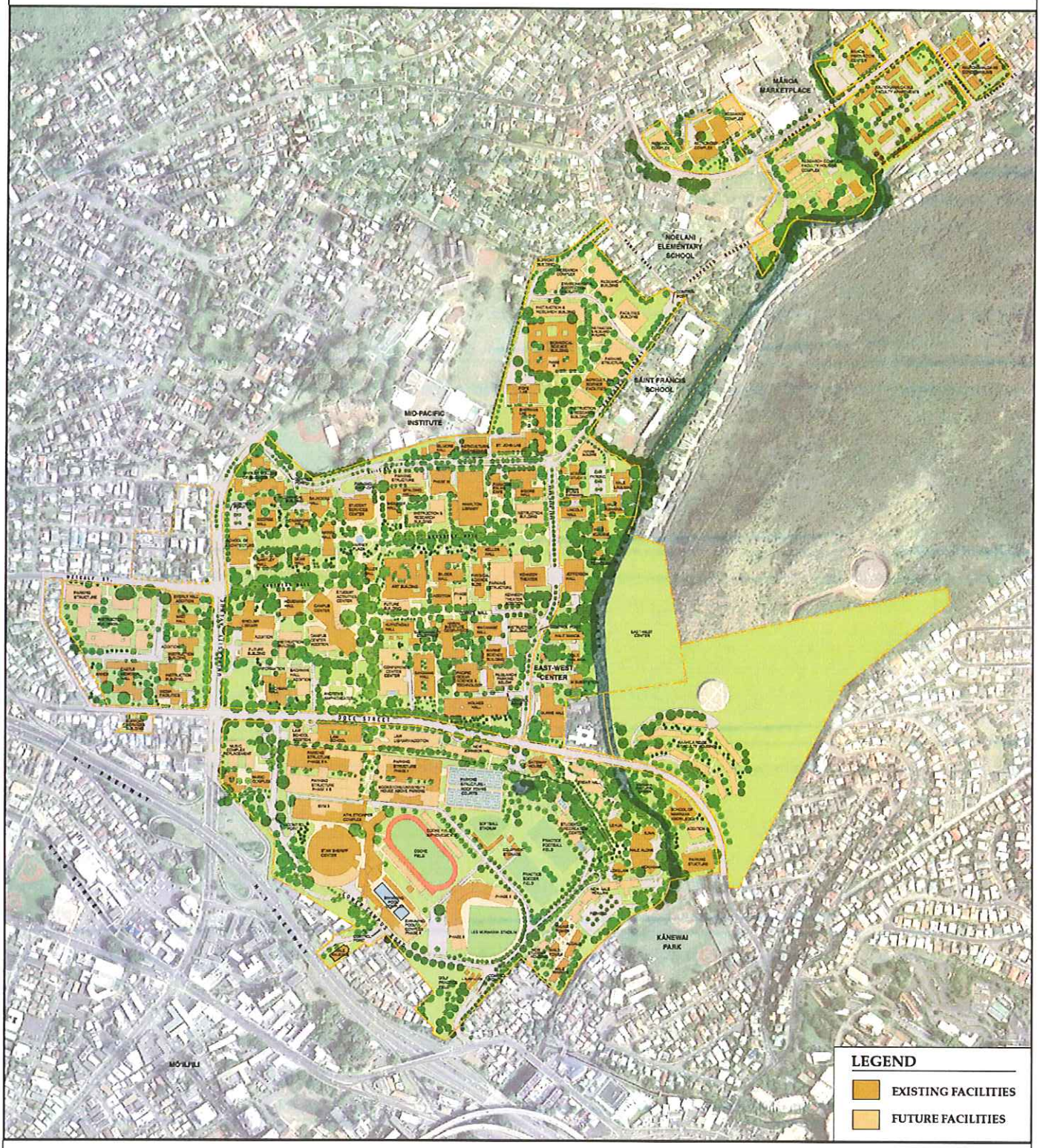
This study will address the following:

1. Existing traffic operating conditions at key locations within the study area.
2. Base Year 2017 (buildout year for LRDP) traffic projections (without LRDP) including traffic generated by a defacto growth rate. Note: LRDP Category I includes improvements for a timeframe of 5-10 years.
3. Identify potential traffic mitigation measures for the Base Year 2017 Traffic.
4. Trip generation and traffic assignment characteristics.
5. Determination of the impact of Project-generated traffic.

Recommendations for roadway improvements or other mitigative measures, as appropriate, to reduce or eliminate the adverse impacts resulting from traffic generated by the LRDP.

E. Definitions

- **Base Year 2017** – describes scenario where vehicular traffic volumes for the year 2017 are projected without the traffic generated by the LRDP. In simple terms, this is the "no-build" or "do-nothing" alternative.
- **High, or Heavy Turning Movement Volume –** a subjective term that for this report; shall be used to describe conditions where the turning movement volume forms a significant component of the traffic processed through the intersection, and noticeably reduces capacity along the main arterial. This term can apply to a single heavy turning movement, or the collective effect of all turning movements.
- **Mitigation** – applies to recommendations aimed at improving unsatisfactory traffic conditions (i.e. LOS = F, volume/capacity ratio>1) experienced as a result of Base Year 2017 conditions.
- **Year 2017 with Project** – describes estimated vehicular traffic volumes for the year 2017 with the traffic generated by the LRDP.



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LRDP UPDATE 2007

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SITE PLAN

FIGURE 2

- **Level-of-Service (LOS)** – as based on The Highway Capacity Manual – Special Report 209 (HCM), dated 2000, LOS is a qualitative measure used to describe the conditions of traffic flow at intersections. Values range from LOS A (minimal delay) to LOS F (congested).
- **Trips** – for the purposes of this report, vehicular trips traversing the roadway network. Note that this term can also signify other modes of transportation, however vehicular trips will be the only trips considered in this report.
- For a complete glossary of terms, refer to Appendix E.

II. EXISTING CONDITIONS

A. General

UHM has been divided into three (3) distinct areas throughout the LRDP as follows:

The Central Campus is bounded by University Avenue, Dole Street, East-West Road, Maile Way, and extends mauka to Pamoa Road, between Mid-Pacific Institute and Saint Francis School. The other part of the Central Campus is the College of Education, which is bounded by University Avenue, Metcalf Street, Hoonanea Street, and Dole Street. Vehicular access to the Central Campus is provided via the Dole Street/East-West Road and University Avenue/Maile Way intersections.

The Upper Campus is bounded by Maile Way, Mid-Pacific Institute, Pamoa Road residences, and Saint Francis School.

The Makai Campus, also called the "Quarry" or "Lower Campus" is bounded by Dole Street, University Avenue, the H-1 Freeway, and Manoa Stream. Access to the Makai Campus is provided via Lower Campus Road at Dole Street, Old Waialae Road at Kalei Road, Varsity Place in Varsity Circle, and a direct off-ramp connection from the westbound H-1 Freeway.

B. Roadway System

The following are brief descriptions of the existing roadway network in the vicinity of UHM:

University Avenue is a six-lane, north-south major collector roadway in the vicinity of UHM. North of Maile Way, the roadway narrows to two (2) lanes. South of The H-1 Freeway, the roadway narrows to four (4) lanes with channelization.

In addition to UHM, this roadway serves as one (1) of two (2) primary access roads into Manoa Valley, which is comprised primarily of residential land uses. South of UHM, on-ramps and off-ramps to the Eastbound/Westbound H-1 Freeway are provided.

University Avenue ultimately terminates at Ala Wai School.

H-1 Freeway is a six-lane divided freeway in the vicinity of UHM. On-ramps and Off-ramps to University Avenue and Old Waialae Road are provided in the vicinity of UHM.

South King Street is a five-lane, one-way eastbound major arterial west of University Avenue. East of University Avenue, the road combines with its westbound couplet Beretania Street and continues as a six-lane, two-way Major Arterial, eventually terminating at its intersection with Kapahulu Avenue.

Beretania Street is a three-lane, one-way westbound arterial west of University Avenue. Beretania Street begins at University Avenue when it recombines with South King Street.

Waialae Avenue is a six-lane, two-way east-west arterial roadway in the vicinity of UH Manoa. Contra-flow operation occurs during PM peak hour of traffic.

East-West Road is a two-lane UHM campus road that provides access from Dole Street onto the heart of UHM's campus.

Dole Street is a four-lane, two-way east-west collector road between University Avenue and East-West road, where it is otherwise a two-lane collector road.

Saint Louis Drive is generally a two-lane, two-way north-south collector road. South of its intersection with Dole Street, this road provides one lane in the northbound direction, and three lanes in the southbound direction.

Metcalf Street is a two-lane, two-way east-west collector road that begins at its intersection with Alexander Street (near H-1 Freeway Westbound On-Ramp) to the west and terminates at University Avenue, where it continues eastward as Campus Road, which is incidentally inaccessible to vehicles from University Avenue.

Maile Way is a two-lane, two-way east-west minor collector raod that begins at its intersection with Oahu Street and terminates within the University Campus at its intersection with East-West Road.

Varsity Place is a two-lane, two-way, east-west county road that begins at its intersection with University Avenue and terminates at its intersection with Varsity Circle.

Old Waialae Road is a three-lane, one-way westbound arterial road, which begins at Waialae Avenue to the East and ends at near the.Humane Society.

Figure 3 shows the existing lane configuration at the study intersections.

C. Existing Traffic Volumes

The hourly turning movement data utilized in this report was collected by ATA between Tuesday, April 20 and Thursday, April 22, 2004. Traffic Counts were redone at the University Avenue/Dole Street intersection on September 13, 2007. The counts showed a slight decrease in volume during the PM peak hour of traffic, and a negligible increase during the AM peak hour of traffic.

Due to proximity to UHM, the following intersections were studied:

- King Street/Beretania Street/Waialae Avenue/University Avenue (signalized)
- University Avenue/Dole Street (signalized)
- University Avenue/Sinclair Parking Lot (signalized)
- University Avenue/Metcalf Street (signalized)
- University Avenue/School of Architecture entrance/exit (unsignalized)
- University Avenue/Maile Way (signalized)

- Wilder Street/Dole Street (unsignalized)
- Wilder Street/Metcalf Street (signalized)
- Dole Street/Lower Campus Road (signalized)
- Dole Street/East-West Road (signalized)
- Dole Street/Saint Louis Heights Drive (unsignalized)
- Waialae Avenue/Saint Louis Heights Drive (signalized)
- University Avenue/Varsity Place (signalized)

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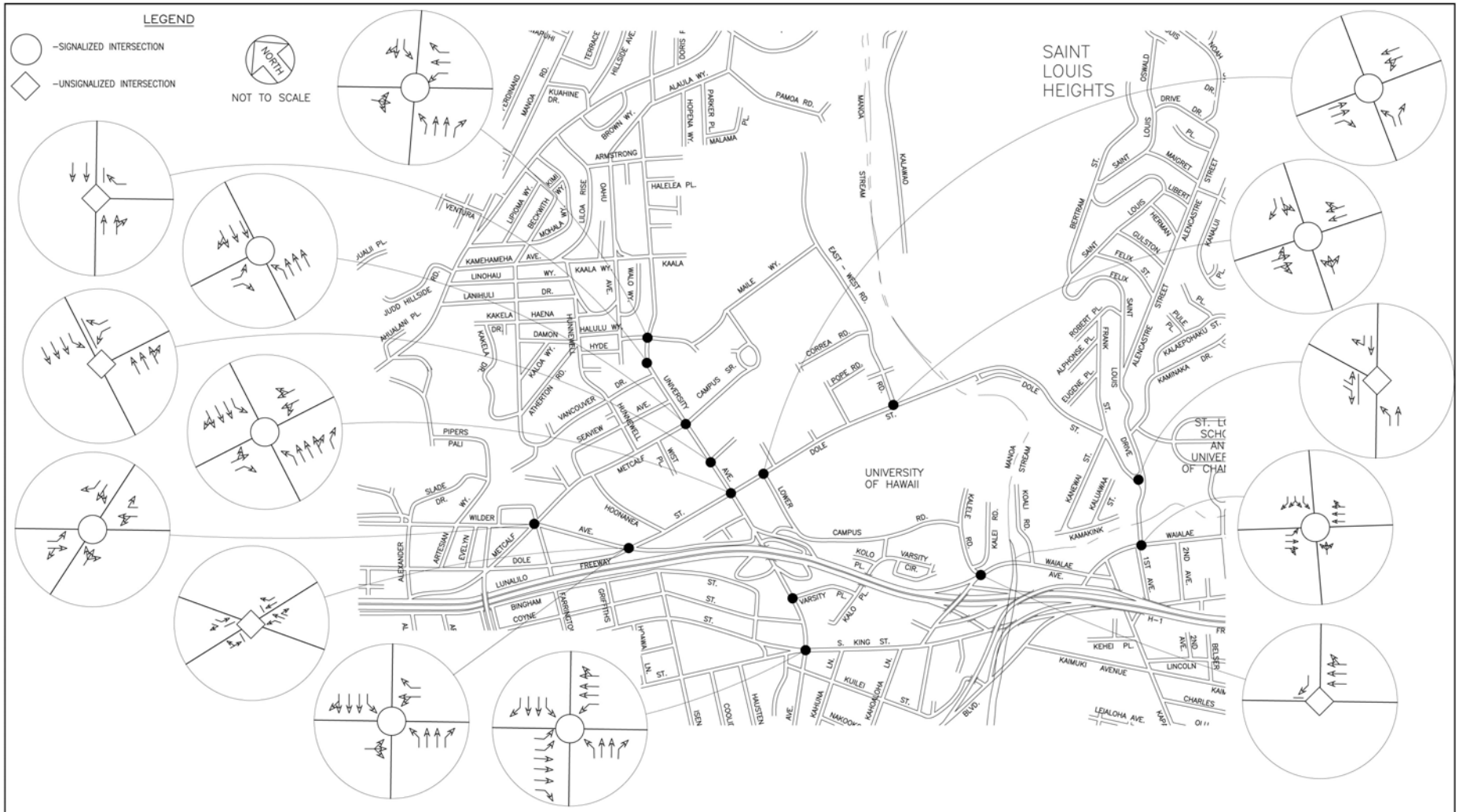

UNIVERSITY OF HAWAII AT MANOA LRDP UPDATE 2007	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE 3
	EXISTING LANE CONFIGURATION	

Based on traffic count data, the peak hours of traffic were determined to be from 6:45 AM to 7:45 AM and 4:30 PM to 5:30 PM on weekdays. The traffic count data is provided in Appendix A. See Figure 3 for existing lane configurations.

D. Existing Traffic Conditions Analysis and Observations

Level of Service (LOS) is a qualitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A to congested conditions at LOS F. The Highway Capacity Manual – Special Report 209 (HCM), dated 2000, methods for calculating volume to capacity ratios, delays and corresponding Levels of Service were utilized in this study. LOS definitions for signalized intersections are provided in Appendix B.

The Manual on Uniform Traffic Control Devices, 2003 edition (MUTCD) recommends that successive intersections along a major arterial and within proximity of less than a half of a mile of each have their timing optimized and coordinated in order to facilitate optimal vehicular flow along the arterial. Currently, most of the signalized intersections along the following arterials meet this criterion:

- South King Street,
- Beretania Street,
- University Avenue (only between Varsity Place and King Street)

The University Avenue/Dole Street and Dole Street/Lower Campus Road intersections are not currently coordinated. Coordination is accomplished by ensuring that each intersection within the coordinated region is bound by the same cycle length (or multiples thereof), and that the through traffic on the major arterial in the peak direction is allowed to flow at carefully planned offsets (see Appendix E for definition) through consecutive intersections. This reduces the "stop and go" effect that drivers experience on uncoordinated systems, where red lights sometimes appear at each successive intersection, thus increasing motorist frustration and delay.

As a consequence of coordination and fixed-cycle lengths in general, vehicles traversing the minor approaches and those making the left-turn movement off of the main road often must wait at the intersection, despite the absence of vehicles traversing the main road.

Methodology

Analysis for the study intersections was performed using Synchro, which is able to prepare reports based on the methodologies prescribed by the HCM. These reports contain control delay results, as based on intersection lane geometry, signal timing (including coordination and actuated minimums and maximums), and hourly traffic volume. Based on the vehicular delay at the intersection, a LOS is assigned (see Appendix B) as a qualitative measure of performance. These results, as confirmed or refined by field observations, constitute the technical analysis that will form the basis of the recommendations outlined in this report.

Regional Analysis

UHM lies at the base of Manoa, which is a primarily residential town, to which access provided solely through University Avenue and Punahou Street. Relative to vehicular travel to and from the campus, much of the regional traffic arrives via the H-1 Freeway, King Street, Beretania Street, or Waialae Avenue. During the AM and PM peak hours of traffic, regional congestion occurs along all of these major roads, which is consistent with conditions throughout much of the urbanized areas of Oahu.

Results of Intersection Analysis

The analysis and observations described below are based on prevailing conditions during the time at which the data was collected in 2004, and reassessed in 2007, with little noticeable change. Hereinafter, observations that are expressed as ongoing and current shall represent the conditions that prevailed at the times during which field observations were taken in 2004 and 2007.

South King Street/Beretania Street/University Avenue

In addition to the Manoa and UHM traffic, this intersection experiences a heavy regional component along South King Street and Beretania Street during the peak hours of traffic. During the PM peak hour of traffic, queues in the eastbound direction along King Street at times extend beyond Star Market (approximately 1,000 feet) in all lanes.

Although other potential bottlenecks exist downstream along South King Street, one hindrance to vehicular flow in the eastbound direction near this intersection is the permitting of left-turns into driveways despite the absence of channelized left-turn lanes. This occurs between University Avenue and the Humane Society. This decreases the effective capacity of South King Street, as left-turning vehicles wait for openings in opposing traffic, which are few and far between.

Westbound traffic along South King Street and Beretania Street in this area is generally constrained due to the prevailing regional congestion caused by commuters during the afternoon peak hour of traffic. Successive downstream bottlenecks occur at McCully Street, Punahou Street, Piikoi Street, and Ward Avenue. Traffic generally queues back to the humane society.

As a result of this prevailing congestion, northbound and southbound traffic along University Avenue are also affected, wherein southbound traffic often must wait for two (2) or more traffic signal cycles before passing through the intersection.

University Avenue/Dole Street

Due to the fact that this intersection serves as a junction point between Manoa Residents, students accessing the Quarry Parking Lot and Central Campus, Moiliili residences, and the H-1 Freeway, congestion occurs here.

One problem observed during the AM peak hour of traffic is that vehicles traveling in the northbound direction queue back beyond the H-1 Freeway off-ramps (approximately 1000 feet) due to:

- Prohibition of right-turn-on-red in the northbound direction, although an extraordinarily high number of right-turns occur (648) during the AM peak hour of traffic;
- Weaving pattern – vehicles exiting the H-1 Freeway off-ramps in the northbound direction along University Avenue do not always make the right-turn. In fact, their destinations may include Saint Francis School, the Mid Pacific Institution, the University Lab School, Manoa, UHM's Maile Way Gate, Moiliili, and U-turns towards the south. As these vehicles exit, they attempt to move towards the center and left lanes while the prevailing queue hinders this movement. Furthermore, especially during the AM peak hour of traffic, after exiting the H-1 Freeway eastbound and westbound Off-Ramps, vehicles immediately move towards the left lane in order to make u-turns;
- Current information indicates that the University Avenue/Dole Street and the Dole Street/Lower Campus Road intersections are not coordinated. This could be a contributing factor to problems at these intersections.

The result of this is a vehicular queue that causes queues to extend through the H-1 Freeway off-ramps and onto the Freeway.

During the PM peak hour, congestion in the westbound direction queues back beyond the Dole Street/Lower Campus Road intersection and near the Law School Library. This often reduces the ability of vehicles to make the northbound left-turn out of Lower Campus Road onto Dole Street.

University Avenue/Sinclair Parking Lot

This intersection serves the Sinclair Library and Bachman Hall Parking Lots and the Bus Turnaround. The entering/exiting volume is relatively low. However, it has been observed that the busses have difficulty making westbound left-turn onto University Avenue.

University Avenue/Metcalf Street

Vehicles generally flow smoothly through this intersection.

University Avenue/School of Architecture Entrance/Exit

Vehicles generally flow smoothly through this intersection, which operates as right-in/right-out.

University Avenue/Maile Way

Although analysis indicates that this intersection operates at LOS B during the AM and PM peak hours of traffic, vehicular flow in the northbound is often impeded by:

- Narrowing of University Avenue to two (2) lanes immediately north of the University Avenue/Maile Way intersection,
- Occasional School Bus Stoppages (near the Mid-Pacific Institute) during the AM peak hour of traffic, and
- Operations at signalized intersection of University Avenue and Kaala Street, which incidentally provides access to the Mid-Pacific Institute. No chanellized lanes are currently provided at this intersection.

Wilder Avenue/Dole Street

While the high-volume H-1 Freeway off-ramp movements experience relatively unimpeded flow, through and left-turning traffic along Dole Street experience LOS F. Furthermore, downstream congestion occurs along Wilder Avenue during the PM peak hour of traffic.

Wilder Avenue/Metcalf Street

According to HCM analysis, this intersection operates at LOS E or better on all approaches during the AM and PM peak hour of traffic. However, downstream congestion does occur along Wilder Avenue in the westbound direction during the PM peak hour of traffic and in the eastbound direction during the AM peak hour of traffic.

Dole Street/Lower Campus Road

This intersection serves as the highest volume access road into the Makai Campus. Currently, 3,509 parking stalls exist within the Makai Campus. These stalls, in combination with drop-off/pick-up turn-around's at the Music Building

and Law School Parking Lot, contribute to the high turning movement volume into and out of this intersection.

During the AM peak hour of traffic, 490 vehicles make the eastbound right-turn into Lower Campus Road. Some of the congestion along University Avenue can be attributed to this.

During the PM peak hour of traffic, approximately 271 vehicles make the northbound left-turn out of Lower Campus Road and westbound onto Dole Street, whereupon they immediately meet the westbound queue generated by the University Avenue/Dole Street intersection.

Dole Street/East-West Road

This intersection operates relatively smoothly during both the AM and PM peak hours of traffic.

Dole Street/Saint Louis Heights Drive

Although traffic making the southeastbound left-turn experience LOS F during the PM peak hour of Traffic, the volume for this movement is low. Furthermore, traffic was observed to operate relatively smoothly at this intersection, with no significant queues occurring during the AM and PM peak hours of traffic.

Waialae Avenue/Saint Louis Heights Drive

During the AM peak hour of traffic, congestion was observed to occur in the westbound direction, where queues were observed to extend as far as 10th Avenue during the AM peak hour of traffic, primarily in the right and center lanes.

During the PM peak hour of traffic, similar congestion occurs in the westbound direction along Waialae Avenue. Although there is a brief reprieve west of Saint Louis Drive, congested conditions resume along Old Waialae Road, the H-1 Freeway and King Street further westward.

University Avenue/Varsity Place

Traffic at this intersection is affected by downstream conditions at the South King Street/Beretania Street/University Avenue intersection. Westbound queues sometimes extend as far back as Varsity Circle. To exacerbate matters, the left-turn movements into driveways and side streets are allowed in the

northbound and southbound direction immediately south of this intersection along University Avenue. Due to the absence of left-turn lanes along University Avenue, the capacity of this roadway segment is decreased significantly, primarily during the PM peak hour of Traffic.

Figure 4 shows the existing traffic volumes and overall LOS for the study intersections. See Table 1 for LOS for at individual turning movements.

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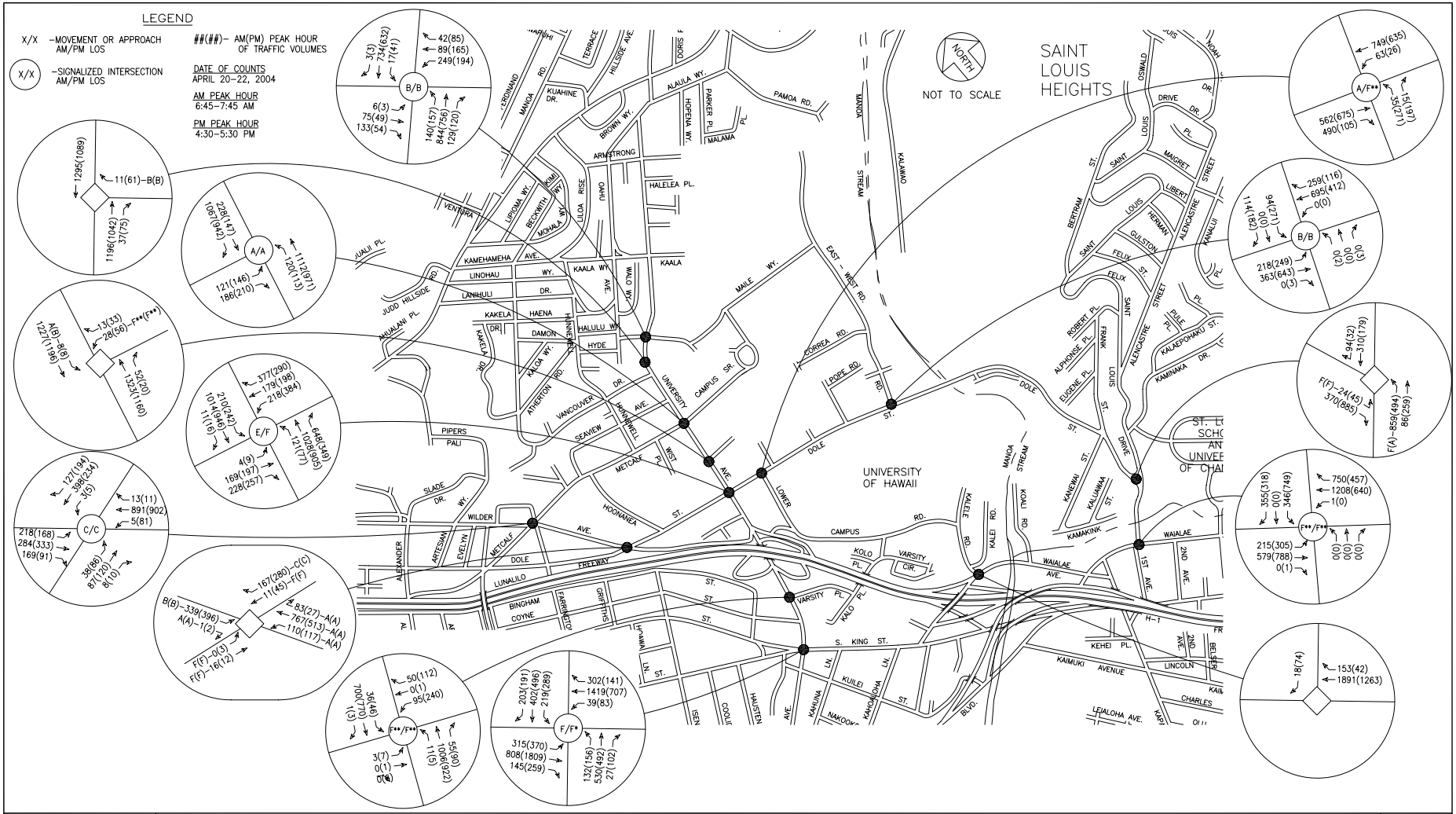

UNIVERSITY OF HAWAII AT MANOA LRDP UPDATE 2007

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EXISTING TRAFFIC VOLUMES AND LEVEL OF SERVICE

FIGURE 4

TABLE 1
Existing Level of Service Summary

Intersection	Existing AM LOS	Existing PM LOS
South King Street/Beretania Street/University Avenue		
EB LT	F	E
EB TH	C	D
EB RT	B	C
WB LT	F	F
WB TH/RT	**F***	D
NB LT	F	**F***
NB TH	F	F
NB RT	D	D
SB LT	**F***	**F***
SB TH	D	D
SB RT	D	D
OVERALL	*F*	**F***
University Avenue/Varsity Place		
EB LT/TH/RT	C	C
WB LT/TH	D	D
WB RT	C	C
NB LT	A	A
NB TH	A	A
NB RT	A	B
SB LT	A	A
SB TH	A	A
OVERALL	*F***	*F***
University Avenue/Dole Street		
EB LT/TH	D	E
EB RT	D	D
WB LT/TH/RT	E	F
NB LT	E	E
NB TH/RT	**F***	**F***
NB RT	B	B
SB LT	E	E
SB TH/RT	D	D
OVERALL	*E*	*F*
University Avenue/Sinclair Parking Lot		
WB LT	F**	F**
SB LT	B	A

* V/C ratio > 1.0
** Effective LOS F Due to Downstream Conditions

TABLE 1
Existing Level of Service Summary

Intersection	Existing AM LOS	Existing PM LOS
University Avenue/Metcalf Street		
EB LT	C	B
EB RT	C	B
NB LT	A	B
NB TH	A	A
SB TH/RT	A	A
OVERALL	*A*	*A*
University Avenue/School of Architecture		
WB RT	B	B
University Avenue/Maile Way		
SEB LT/TH/RT	C	B
NWB LT	E	C
NWB TH	C	B
NWB RT	B	B
NEB LT	C	B
NEB TH	A	A
NEB RT	A	A
SWB LT	A	A
SWB TH/RT	B	A
OVERALL	*B*	*B*
Dole Street/Wilder Street		
EB LT/TH	F	F
WB TH	F	F
WB RT	C	C
NB LT/TH	A	A
SB LT	B	B
Wilder Street/Metcalf Street		
EB LT/TH/RT	C	E
WB TH/LT	D	C
WB RT	B	B
SEB LT	B	B
SEB TH/RT	B	A
NWB LT/TH/RT	C	C
OVERALL	*C*	*C*
Dole Street/Lower Campus Road		
EB TH	A	A
EB RT	A	A
WB LT/TH	A	A
NB LT	C	F**
NB RT	C	B
OVERALL	*A*	*F***

* V/C ratio > 1.0
** Effective LOS F Due to Downstream Conditions

TABLE 1
Existing Level of Service Summary

Intersection	Existing AM LOS	Existing PM LOS
Dole Street/East-West Road		
EB LT/TH	B	A
WB TH/RT	B	C
NB LT/TH/RT	A	B
SB LT/TH	C	B
SB RT	C	B
OVERALL	*B*	*B*
Dole Street/Saint Louis Heights Drive		
NB LT	F	A
SEB LT	F	F
Waialae/Saint Louis Heights Drive		
EB LT	D	**F***
EB TH	A	A
WB TH/RT	**F***	D
SB LT	B	C
SB TH	B	C
SB RT	B	B
OVERALL	*E*	*C*

* V/C ratio > 1.0
** Effective LOS F Due to Downstream Conditions

III. BASE YEAR 2017 SCENARIO *(see section I.D. for definition)*

*Base Year 2017 = (Existing Traffic * Growth Factor)*
Where Growth Factor = (1 + defacto growth rate) ^ 10

The Year 2017 was selected as the Base Year to reflect the time table for Category 1 of the LRDP (5-10 Years). Base Year 2017 projections were formulated by applying a defacto growth rate, described in the following section, to existing hourly vehicular traffic volumes.

A. Defacto Growth Rate

The State Department of Transportation (SDOT) performs 24-hour traffic counts annually at various locations on Oahu. Based on this data, it was possible to estimate the prevailing regional growth along King Street and Waialae Avenue, which is predicted to be approximately 1 percent, annually. By the year 2017, this equates to a 10.5 percent increase over existing conditions. No growth was projected near the University, since the LRDP projects that UHM's student enrollment will remain stable, and that not much more residential or commercial development will occur within the area.

B. Base Year 2017 Traffic and Analysis

Based on the defacto growth rate, regional traffic will increase along King Street, Waialae Avenue, and Beretania Street. However, most of the study intersections will experience a relatively stable demand, due to the fact that development and student base within the area is projected to remain constant for all intents and purposes.

LOS F conditions will continue to occur at the following intersections:

- South King Street/Beretania Street/University Avenue*
- University Avenue/Varsity Place*
- University Avenue/Dole Street*
- University Avenue/Sinclair Parking Lot*
- Dole Street/Wilder Avenue
- Dole Street/Lower Campus Road*
- Dole Street/Saint Louis Heights Drive

- Waialae Avenue/Saint Louis Heights Drive

* Indicates that Mitigation is proposed in Section III C.

While mitigation is proposed to address the intersections with asterisks after them, the remaining intersections will be discussed below.

Dole Street/Wilder Avenue

The northbound approach to this intersection is a busy freeway off-ramp, whose vehicular flow should not be impeded to accommodate minor street traffic. Wilder Avenue, in general, is congested downstream in the westbound direction during the AM and PM peak hours of traffic due heavy school traffic caused by Punahou and Maryknoll schools. Therefore, no mitigation is recommended for this intersection.

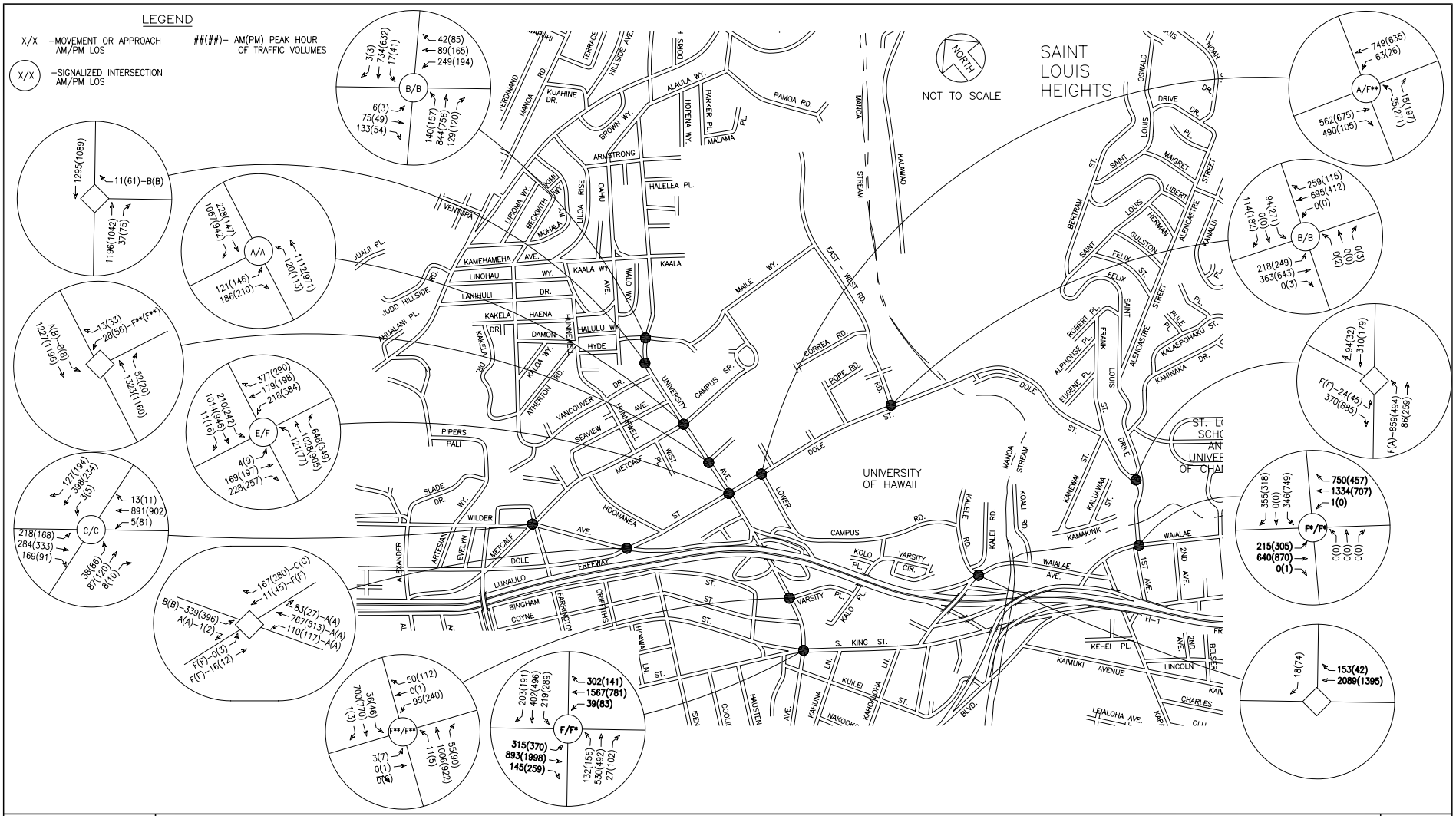
Dole Street/Saint Louis Heights Drive

While turning movement analysis indicates that the eastbound left-turn movement at this intersection will continue to operate at LOS F during the PM peak hour of traffic, this intersection was not observed to be problematic during the AM or PM peak hours of traffic. Furthermore, with only 25(45) vehicles making this turn during the AM(PM) peak hours of traffic, a traffic signal will not be warranted. No mitigation is recommended for this intersection.

Waialae Avenue/Saint Louis Heights Drive

This intersection currently operates at an observed LOS F during the AM and PM peak hours of traffic. However, due to limited right-of-way, no geometric improvements can be made at this intersection.

See Figure 5 for Base Year 2017 traffic volumes and Overall LOS.



UNIVERSITY OF HAWAII AT MANOA
LRDP UPDATE 2007

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FIGURE 5

BASE YEAR 2017 TRAFFIC VOLUMES AND LEVEL OF SERVICE

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C. Base Year 2017 Mitigative Measures

The Base Year 2017 mitigative measures are designed to improve conditions at intersections that are projected to operate unsatisfactorily during Base Year 2017, regardless of whether or not the LRDP is implemented.

University Avenue/Dole Street and Dole Street/Lower Campus Road Intersections

Mitigation is recommended to improve operating efficiency of this intersection. As discussed earlier, during the AM peak hour of traffic, there is a lack of capacity in both the northbound and westbound directions that generates vehicular queues that extend onto the H-1 Freeway's Westbound and Eastbound off-ramps at times, ultimately causing a safety hazard along the H-1 Freeway, as fast-moving vehicles encounter vehicles in queue. The improvements recommended below seek to reduce this congestion.

Intersection analysis indicates that that traffic in the northbound direction is and will continue to operate beyond its capacity. This problem can be addressed by the following modifications:

Phase I

Reconfigure the westbound approach to the University Avenue/Dole Street intersection to incorporate an exclusive left-turn lane, a shared left-turn/through lane, and an exclusive right-turn lane, with storage extending approximately 100 feet east of the University Avenue/Lower Campus Road intersection. This mitigative measure could potentially necessitate the relocation of the historic Gateway structures located along University Avenue.

The effect of Phase I would be to eliminate over-capacity conditions. However, the southbound left-turn movement would still expericnce LOS F during the PM peak hour of traffic.

See Figure 6 for existing lane configuration, and Figure 7 for Phase I modifications.

Phase II

Reconfigure the northbound approach to the University Avenue/Dole Street intersection to incorporate three (3) exclusive through lanes and two exclusive right-turn lanes, the rightmost of which would directly connect with the H-1 Freeway Westbound Off-Ramp. In conjunction with this, modify the Dole Street/Lower Campus Road intersection to incorporate one (1) Eastbound through lane, an eastbound shared through/right-tum lane, and an exclusive right-turn lane. Note that these modifications could potentially necessitate the relocation of the existing monkeypod trees along University Avenue, and reduce the available parking within the Music Building Complex.

Phase II, when implemented without Phase I, would produce a similar result as phase I, in that over-capacity conditions would be eliminated, and that the southbound left-turn movement would continue to experience LOS F, while the eastbound and westbound approaches would experience LOS E during the PM peak hour of traffic.

Phase I & II

HCM analysis indicates that the effect of implementing phases I and II in combination would improve the overall delay of the intersection from 73.1 (56.6) seconds during the AM (PM) peak hours of traffic to 38.8 (39.9) seconds, with all movements at the intersection operating at LOS E or better during both periods. It should be noted that at the Dole Street/Lower Campus Road intersection, the lane modification will reduce the number of lanes that drivers need to cross to enter the Lower Campus Road, thereby reducing capacity reductions caused by weaving movements.

It is recommended that Phases I and II be implemented as a mitigative measure, while recognizing that the intent of this geometric augmentation would be to improve conditions for vehicles traveling northbound along University Avenue. Although vehicular flow will also improve in the westbound direction during the PM peak hour of traffic,

such benefits would generally be realized locally, given that existing bottlenecks occur downstream at the following locations:

- University Avenue/H-1 Freeway Eastbound On-ramp
- University Avenue/H-1 Freeway Westbound On-ramp
- South King Street/Beretania Street/University Avenue
- Dole Street/Wilder Street
- University Avenue, south of Maile Way

Mitigation of these problems would require costly modifications, including improving congestion along the entire corridor. The H-1 Freeway, Beretania Street, and South King Street would all have to be widened to accomplish this. However, the implementation of the Rapid Transit System will ultimately reduce future vehicular traffic demand.

See Figure 8 for an illustration of Phases I and II.



Figure 6: Existing Lane Configuration at University Avenue Intersections with Dole Street and Lower Campus Road



Figure 7: Phase I Modifications



Figure 8: Phases I and II Modifications

Turning Movement Restriction

During field observations, it was noted that along South King Street, east of University Avenue, and University Avenue in the Varsity Area, vehicular flow was hampered by the allowing of left-turns into driveways and small side streets.

Varsity Area

Vehicles turning left from the southbound direction cause other vehicles to switch lanes to maneuver around them. Due to the lack of an acceptable gap in northbound traffic, these vehicles often cause those behind them to arrive at the South King Street/Beretania Street/University Avenue intersection after the signal indication has turned red. The resulting flow interruptions have implications along University Avenue in this area, due to the fact that the current cycle length at that intersection is 170 seconds. Effectively, all of the vehicles impacted by this problem will be delayed by a additional two minutes, fifty seconds as the traffic signal cycles through all of its phases again. Operations at the University Avenue/Varsity Place intersection are also affected by this problem.

Similarly, in the northbound direction left-turns impede the flow of the approximately 1000 vehicles (for both AM and PM peak hours of traffic) traveling in the northbound direction, sometimes reducing the upstream capacity of the South King Street/Beretania Street/University Avenue intersection.

South King Street – East of University Avenue

South King Street, east of University Avenue has become a bottleneck for eastbound traffic during the PM peak hour of traffic. It has been observed that vehicles traveling eastbound along South King Street are affected by vehicles making left-turns into driveways, and at the signalized intersection near the Seven Eleven/Aloha Gas station.

Based on the conditions described above, it is recommended that a dialogue be initiated between community members and the City to assess the potential for left-turn prohibitions during the PM peak hour of traffic for:

- Northbound and southbound University Avenue traffic, south of Varsity Place, and north of King Street
- Eastbound South King Street traffic, East of University Avenue and west of the Humane Society.

It is recognized that the merit of this mitigative measure will have to be balanced with the needs of the local community and businesses.

It should be noted that should these prohibitions be implemented, they would not eliminate LOS F at the South King Street/Beretania Street/University Avenue intersection. However, they would improve the efficiency of the intersection and the capacity of University Avenue and South King Street in the area.

University Avenue/Sinclair Library Driveway

While this intersection experiences a relatively low turning movement volume and operates at LOS B, the bus traffic that passes through the turnaround often have difficulty making the westbound left-turn out of the driveway. Therefore, it is recommended that a traffic signal be installed to facilitate this movement. In conjunction with this, it is recommended that the bus stop located along University Avenue, just north of Dole Street be relocated to the existing bus turnaround at this intersection.

University Avenue/Maile Way

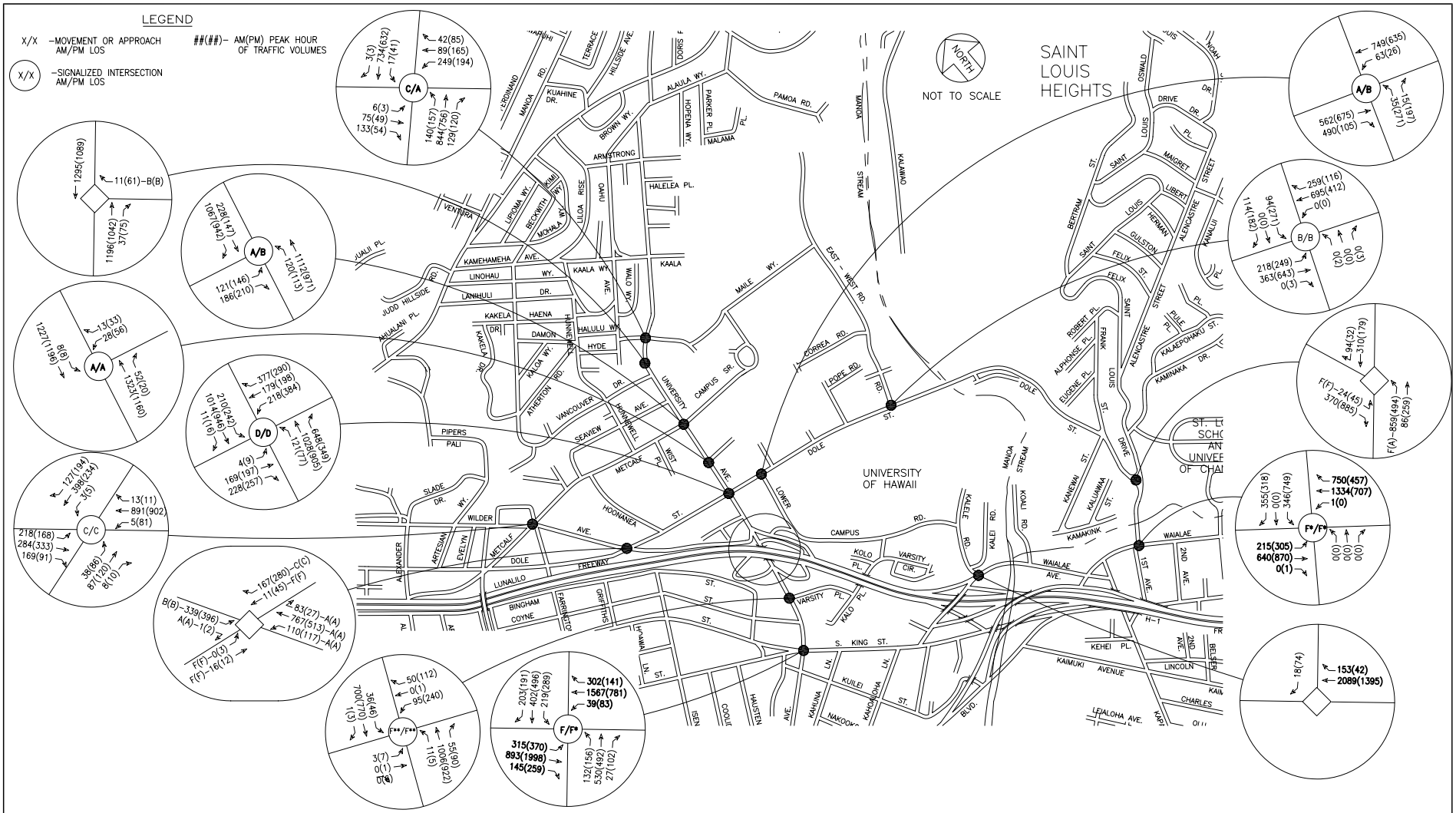
Although HCM analysis indicates that this intersection operates at LOS C(B) during the AM (PM) peak hours of traffic, existing operations have been observed to be worse, especially during the AM peak hour of traffic, where vehicles destined towards the Mid Pacific Institute and Saint Francis cause the downstream intersection (Kaala Street) to be overburdened. Currently, this intersection only provides a single lane at each approach, with no channelization (turning lanes). It is therefore recommended that a dialogue be initiated between community members and the City to assess the feasibility for widening the segment of University Avenue between Kaala Street and Maile Way to incorporate a second northbound lane. This lane would terminate at Kaala Street as an exclusive right-turn lane.

Figure 9 shows the traffic volumes and overall LOS. Table 2 compares the individual turning movement LOS for Base Year 2017 with/without mitigation with existing conditions.

Traffic Signal Coordination along University Avenue and Dole Street/Lower Campus Road

All of the signalized intersections along University Avenue between Dole Street and Maile Way, and the Dole Street/Lower Campus Road intersection are within approximately 1000 feet or less of each other. Therefore, in order to facilitate flow between these intersections, it is recommended that the following intersections be coordinated:

- University Avenue/Maile Way
- University Avenue/Metcalf Street
- University Avenue/Sinclair Library Parking Lot (New Signal)
- University Avenue/Dole Street
- Dole Street/Lower Campus Road



UNIVERSITY OF HAWAII AT MANOA LRDP UPDATE 2007

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FIGURE 9

BASE YEAR 2017 WITH MITIGATION TRAFFIC VOLUMES AND LEVEL OF SERVICE

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TABLE 2
Base Year 2017 Level of Service Summary

Intersection	Existing AM LOS	Existing PM LOS	Base 2017 (Timings Optimized) AM LOS	Base 2017 (Timings Optimized) PM LOS	Base 2017 with Mitigation AM LOS	Base 2017 with Mitigation PM LOS
South King Street/Beretania Street/University Avenue						
EB LT	F	E	**F***	E		
EB TH	C	D	C	**F***		
EB RT	B	C	B	C		
WB LT	F	F	F	**F***		
WB TH/RT	**F***	D	F	E		
NB LT	F	**F***	**F***	**F***		
NB TH	F	F	**F***	E		
NB RT	D	D	D	D		
SB LT	**F***	**F***	**F***	**F***		
SB TH	D	D	D	D		
SB RT	D	D	D	D		
OVERALL	*F*	**F***	**F***	**F***		
University Avenue/Varsity Place						
EB LT/TH/RT	C	C	C	C		
WB LT/TH	D	D	D	D		
WB RT	C	C	C	C		
NB LT	A	A	A	A		
NB TH	A	A	A	B		
NB RT	A	B	A	C		
SB LT	A	A	A	A		
SB TH	A	A	A	A		
OVERALL	*F***	*F***	*F***	*F***		
University Avenue/Dole Street						
EB LT/TH	D	E	E	E	E	E
EB RT	D	D	D	D	D	D
WB LT					D	D
WB LT/TH/RT	E	F	E	E		
WB LT/ TH					D	D
WB RT					D	B
NB LT	E	E	E	E	E	E
NB TH					D	D
NB TH/RT	**F***	**F***	**F***	**F***		
NB RT	B	B	B	B	B	B
SB LT	E	E	E	E	E	E
SB TH/RT	D	D	D	D	C	C
OVERALL	*E*	*F*	*E*	*E*	*D*	*D*
University Avenue/Sinclair Parking Lot						
WB LT	F**	F**	F**	F**	E	E
WB RT					E	E
NB TH/RT					A	A
SB LT	B	A	B	A	A	A
SB TH					A	A
OVERALL					A	A

* V/C ratio > 1.0
** Effective LOS F Due to Downstream Conditions

TABLE 2
Base Year 2017 Level of Service Summary

Intersection	Existing AM LOS	Existing PM LOS	Base 2017 (Timings Optimized) AM LOS	Base 2017 (Timings Optimized) PM LOS	Base 2017 with Mitigation AM LOS	Base 2017 with Mitigation PM LOS
University Avenue/Metcalf Street						
EB LT	C	B	C	B	E	E
EB RT	C	B	C	B	E	A
NB LT	A	B	A	B	B	A
NB TH	A	A	A	A	A	A
SB TH/RT	A	A	A	A	A	A
OVERALL	*A*	*A*	*A*	*A*	*A*	*B*
University Avenue/School of Architecture						
WB RT	B	B	B	B	B	B
University Avenue/Maile Way						
SEB LT/TH/RT	C	B	C	B	D	B
NWB LT	E	C	E	C	F	D
NWB TH	C	B	C	B	C	C
NWB RT	B	B	B	B	C	B
NEB LT	C	B	C	B	C	B
NEB TH	A	A	A	A	A	A
NEB RT	A	A	A	A	A	A
SWB LT	A	A	A	A	B	A
SWB TH/RT	B	A	B	A	C	B
OVERALL	*B*	*B*	*C*	*B*	*C*	*B*
Dole Street/Wilder Street						
EB LT/TH	F	F	F	F		
WB TH	F	F	F	F		
WB RT	C	C	C	C		
NB LT/TH	A	A	A	A		
SB LT	B	B	B	B		
Wilder Street/Metcalf Street						
EB LT/TH/RT	C	E	C	E		
WB TH/LT	D	C	D	D		
WB RT	B	B	B	B		
SEB LT	B	B	B	B		
SEB TH/RT	B	A	B	A		
NWB LT/TH/RT	C	C	C	C		
OVERALL	*C*	*C*	*C*	*C*		
Dole Street/Lower Campus Road						
EB TH	A	A	A	A	A	A
EB RT	A	A	A	B	A	A
WB LT/TH	A	A	A	A	A	A
NB LT	C	F**	C	F**	E	E
NB RT	C	B	C	D	E	D
OVERALL	*A*	*F***	*A*	*F***	*A*	*B*

* V/C ratio > 1.0
** Effective LOS F Due to Downstream Conditions

TABLE 2
Base Year 2017 Level of Service Summary

Intersection	Existing AM LOS	Existing PM LOS	Base 2017 (Timings Optimized) AM LOS	Base 2017 (Timings Optimized) PM LOS	Base 2017 with Mitigation AM LOS	Base 2017 with Mitigation PM LOS
Dole Street/East-West Road						
EB LT/TH	B	A	A	A		
WB TH/RT	B	C	B	C		
NB LT/TH/RT	A	B	A	B		
SB LT/TH	C	B	C	D		
SB RT	C	B	D	B		
OVERALL	*B*	*B*	*B*	*B*		
Dole Street/Saint Louis Heights Drive						
NB LT	F	A	C	A		
SEB LT	F	F	F	F		
Waialae/Saint Louis Heights Drive						
EB LT	D	**F***	D	D		
EB TH	A	A	A	B		
WB TH/RT	**F***	D	**F***	D		
SB LT	B	C	B	D		
SB TH	B	C	B	D		
SB RT	B	B	B	C		
OVERALL	*E*	*C*	*f***	*f***		

* V/C ratio > 1.0
** Effective LOS F Due to Downstream Conditions

IV. YEAR 2017 WITH PROJECT SCENARIO *(see section I.D. for definition)*

Year 2017 with Project = Base Year 2017 + LRDP Traffic

A. Discussion

While the LRDP includes new buildings and parking structures, during its 5-10 year horizon, number of students is not projected to increase as a result of these additions. Generally for traffic studies, vehicular trips are generated using empirical correlations between known independent variables that are based upon data compiled by the Institute of Transportation Engineers (ITE). The compiled data is reduced into average trip rates or formulae. In the case of Universities, the only studied independent variable is the number of students.

However, despite the construction of an additional 1200 parking stalls as a result of the LRDP, the student population is not projected to increase. Logically, the potential users of the additional parking will be drawn from the pool of existing campus commuters that are either currently unable or unwilling to utilize campus parking. This report assumed that the additional vehicles that will park on campus will relocate from existing off-campus parking.

Effectively, while within the segment of University Avenue between Dole Street and Maile Way, and the segment of Dole Street between Lower Campus Road and East-West Road may see an increased amount of traffic as a result of this redistribution, areas exogenous to these segments will likely notice a reduction. Such areas are identified in the Parking Study, and include:

- Manoa,
- Saint Louis Heights,
- Dole Street (Near Cultural Center), and
- Residential area west of Varsity

While the potential for trip reduction in these areas may occur, it would be overly presumptive to make assumptions to this point, especially since the future is unknown in regard to the possibility of permit parking for residents. Therefore, this report will conservatively assume that any areas outside of the aforementioned segments of University Avenue and Dole Street will experience no change as a result of the additional parking.

B. Trip Generation

Although standard methods for trip generation are not applicable in this case, the Lower Campus, with relatively few entrances and exits, offers a good indication as to the number of vehicular trips that are generated during the peak hours of traffic relative to the number of parking stalls.

The parking study concluded that there are currently 3,509 stalls in the lower campus area. The proposed Phase IIB quarry parking lot will increase this number by 900 to 4409. Therefore, it is reasonable to assume that the total number of trips entering and exiting each of the three primary entrance/exits will increase by a factor of (900/3509), or twenty-six percent. Note that this should be conservative, given that trips entering/exiting the Dole Street/Lower Campus Road intersection also include drop-off/pick-up's via the music building parking lot.

Likewise, the Kennedy Theatre parking lot, while creating an additional 480 stalls, will be partially tempered by the removal of 140 stalls within the 10 year horizon, effectively increasing the central campus parking by approximately 300 stalls. Currently, there are 1991 stalls in the central campus. This number will be increased by 300, or fifteen percent.

C. Trip Distribution/Assignment

The additional traffic generated by the new parking facilities were distributed based on existing travel patterns, within the aforementioned segments of Dole Street and University Avenue.

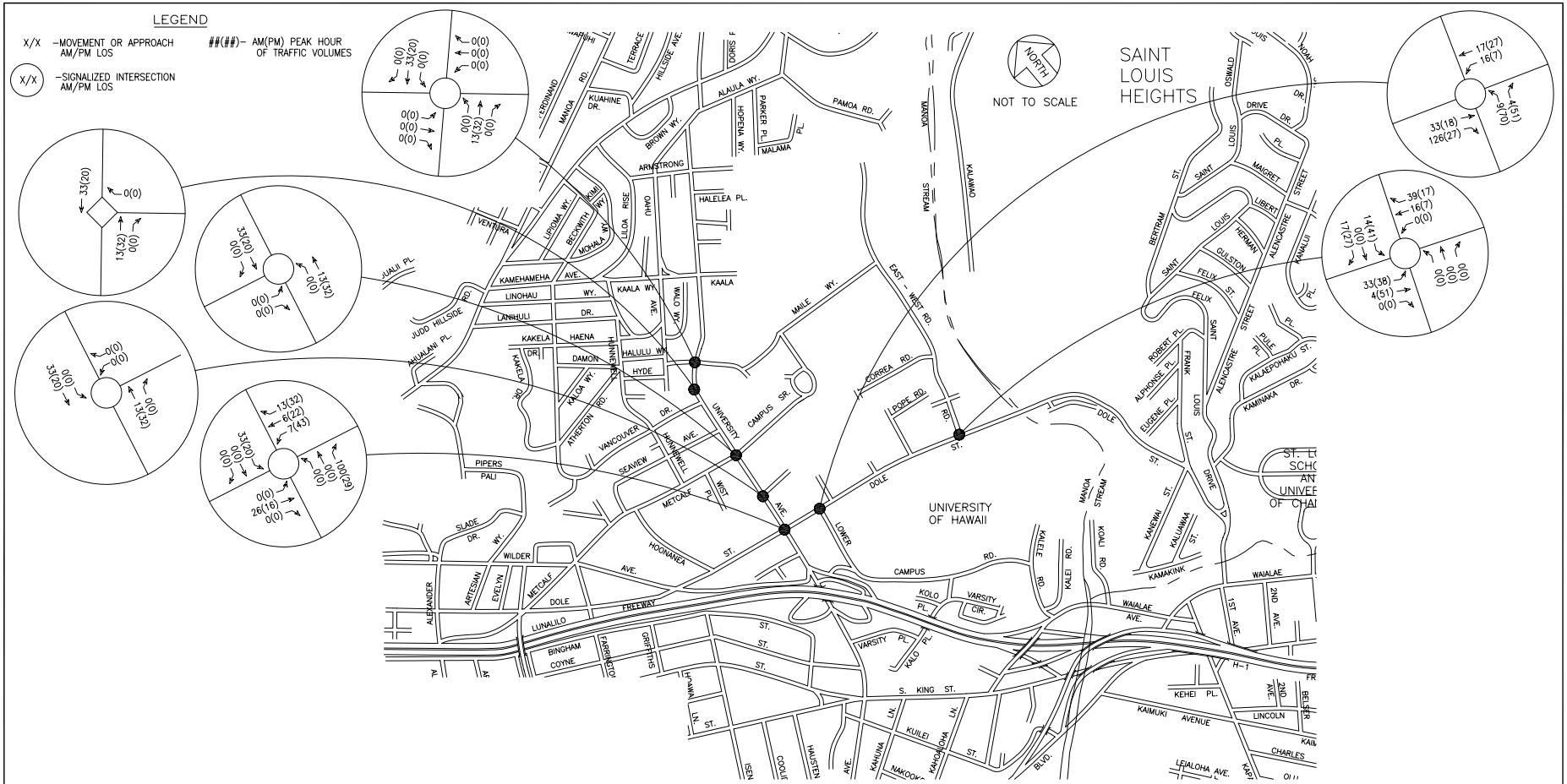
D. Year 2017 with Project Analysis

The following discussion considers incremental traffic impacts of the LRDP, and based on the preceding discussion, is limited to the segment of University Avenue between Dole Street and Maile Way, and the segment of Dole Street between University Avenue and west of Saint Louis Heights Drive. Hereinafter, these segments shall be collectively referred to as the "affected region."

Operations at all of these intersections within the affected region will continue to operate at LOS E or better, with the exception of the University

Avenue/Maile Way intersection, which will continue to experience LOS F in the westbound direction as a result of signal coordination. However, the delay at this intersection is projected to be 91 seconds, which is only slightly higher than the 80 second LOS F threshold.

HCM analysis indicates that the University Avenue/Dole Street and Dole Street/Lower Campus Road intersections will be able to accommodate the projected increase in traffic, while maintaining LOS E or better and under-capacity conditions at all approaches. However, as stated earlier, the effectiveness of the proposed mitigative measures at the University Avenue/Dole Street intersection will be tempered by conditions downstream of the intersection, particularly in the southbound direction toward the H-1 Freeway onramps and the South King Street/Beretania Street/University Avenue intersection, all of which experience prevailing regional congestion during the AM and PM peak hours of Traffic. See Figures 10 and 11 for project traffic and overall LOS. See Table 3 for individual turning movement LOS.



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	UH LRDP UPDATE PROJECT TRAFFIC VOLUMES AND LEVEL OF SERVICE	

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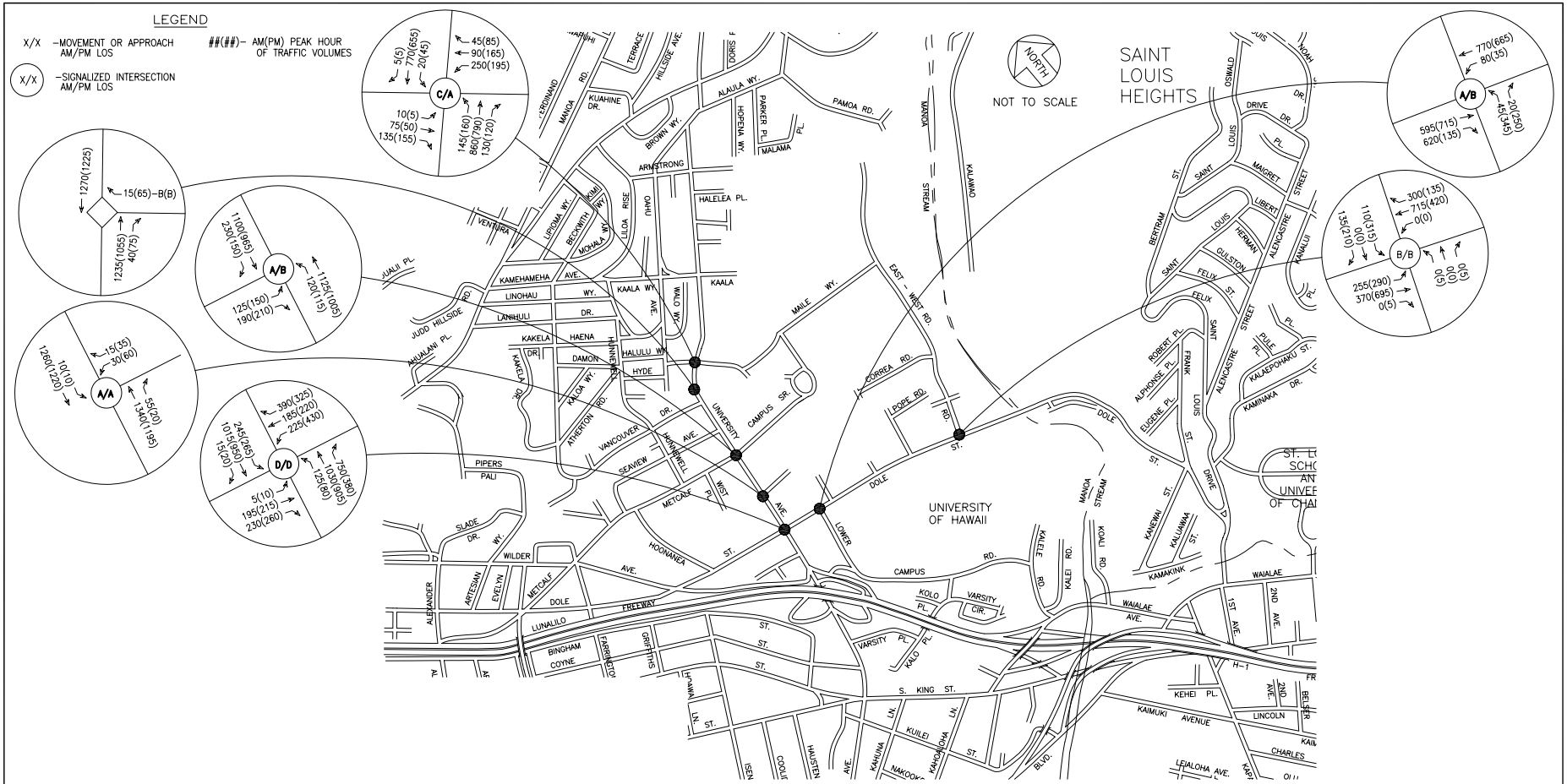

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FIGURE 11

YEAR 2017 WITH UH LRDP UPDATE TRAFFIC VOLUMES AND LEVEL OF SERVICE

TABLE 3
Year 2017 with LRDP Update (Category 1 - 5-10 Years)

Intersection	Base 2017 (Timings Optimized) AM LOS	Base 2017 (Timings Optimized) PM LOS	Base 2017 with Mitigation AM LOS	Base 2017 with Mitigation PM LOS	2017 with LRDP Update AM LOS	2017 with LRDP Update PM LOS
South King Street/Beretania Street/University Avenue						
EB LT	**F***	E				
EB TH	C	**F***				
EB RT	B	C				
WB LT	F	**F***				
WB TH/RT	F	E				
NB LT	**F***	**F***				
NB TH	**F***	E				
NB RT	D	D				
SB LT	**F***	**F***				
SB TH	D	D				
SB RT	D	D				
OVERALL	**F***	**F***				
University Avenue/Varsity Place						
EB LT/TH/RT	C	C				
WB LT/TH	D	D				
WB RT	C	C				
NB LT	A	A				
NB TH	A	B				
NB RT	A	C				
SB LT	A	A				
SB TH	A	A				
OVERALL	*F***	*F***				
University Avenue/Dole Street						
EB LT/TH	E	E	E	E	E	E
EB RT	D	D	D	D	D	D
WB LT			D	D	D	D
WB LT/TH/RT	E	E				
WB LT/ TH			D	D	D	D
WB RT			D	B	C	C
NB LT	E	E	E	E	E	E
NB TH			D	D	D	E
NB TH/RT	**F***	**F***				
NB RT	B	B	B	B	B	B
SB LT	E	E	E	E	E	E
SB TH/RT	D	D	C	C	C	C
OVERALL	*E*	*E*	*D*	*D*	*D*	*D*
University Avenue/Sinclair Parking Lot						
WB LT	F**	F**	E	E	E	E
WB RT			E	E	E	E
NB TH/RT			A	A	A	A
SB LT	B	A	A	A	A	A
SB TH			A	A	A	A
OVERALL			A	A	A	A

* V/C ratio > 1.0
** Effective LOS F Due to Downstream Conditions

TABLE 3
Year 2017 with LRDP Update (Category 1 - 5-10 Years)

Intersection	Base 2017 (Timings Optimized) AM LOS	Base 2017 (Timings Optimized) PM LOS	Base 2017 with Mitigation AM LOS	Base 2017 with Mitigation PM LOS	2017 with LRDP Update AM LOS	2017 with LRDP Update PM LOS
University Avenue/Metcalf Street						
EB LT	C	B	E	E	E	E
EB RT	C	B	E	A	E	E
NB LT	A	B	B	A	B	A
NB TH	A	A	A	A	A	A
SB TH/RT	A	A	A	A	A	A
OVERALL	*A*	*A*	*A*	*B*	*A*	*B*
University Avenue/School of Architecture						
WB RT	B	B	B	B		
University Avenue/Maile Way						
SEB LT/TH/RT	C	B	D	B	D	C
NWB LT	E	C	F	D	F	D
NWB TH	C	B	C	C	C	C
NWB RT	B	B	C	B	C	B
NEB LT	C	B	C	B	C	B
NEB TH	A	A	A	A	A	A
NEB RT	A	A	A	A	A	A
SWB LT	A	A	B	A	B	A
SWB TH/RT	B	A	C	B	C	B
OVERALL	*C*	*B*	*C*	*B*	*C*	*B*
Dole Street/Wilder Street						
EB LT/TH	F	F				
WB TH	F	F				
WB RT	C	C				
NB LT/TH	A	A				
SB LT	B	B				
Wilder Street/Metcalf Street						
EB LT/TH/RT	C	E				
WB TH/LT	D	D				
WB RT	B	B				
SEB LT	B	B				
SEB TH/RT	B	A				
NWB LT/TH/RT	C	C				
OVERALL	*C*	*C*				
Dole Street/Lower Campus Road						
EB TH	A	A	A	A	A	B
EB RT	A	B	A	A	A	C
WB LT/TH	A	A	A	A	A	A
NB LT	C	F**	E	E	E	D
NB RT	C	D	E	D	E	D
OVERALL	*A*	*F***	*A*	*B*	*A*	*C*

* V/C ratio > 1.0
** Effective LOS F Due to Downstream Conditions

TABLE 3
Year 2017 with LRDP Update (Category 1 - 5-10 Years)

Intersection	Base 2017 (Timings Optimized) AM LOS	Base 2017 (Timings Optimized) PM LOS	Base 2017 with Mitigation AM LOS	Base 2017 with Mitigation PM LOS	2017 with LRDP Update AM LOS	2017 with LRDP Update PM LOS
Dole Street/East-West Road						
EB LT/TH	A	A			A	A
WB TH/RT	B	C			B	C
NB LT/TH/RT	A	B			A	B
SB LT/TH	C	D			D	D
SB RT	D	B			D	B
OVERALL	*B*	*B*			*B*	*C*
Dole Street/Saint Louis Heights Drive						
NB LT	C	A				
SEB LT	F	F				
Waialae/Saint Louis Heights Drive						
EB LT	D	D				
EB TH	A	B				
WB TH/RT	**F***	D				
SB LT	B	D				
SB TH	B	D				
SB RT	B	C				
OVERALL	*f***	*f***				

* V/C ratio > 1.0
** Effective LOS F Due to Downstream Conditions

E. Year 2017 with Project Recommended Improvements

No improvements are recommended beyond those outlined in Section IIIC. Operations at the affected intersections will remain relatively constant without any substantial increase in delay.

While the potential for improving the Old Waialae Road and Varsity Place Exits was considered, these improvements are generally not recommended. Discussion follows:

Old Waialae Road Entrance/Exit

As an entrance, this access point services vehicles originating in Waikiki, Kaimuki, or Kapahulu Areas. Any vehicles from areas further east will likely utilize the Freeway exit to access the Makai Campus. Currently, incoming flow does not experience significant difficulty entering the Entrance/Exit.

As an exit, this access point services vehicles either destined for the H-1 freeway (westbound), South King Street (westbound), or the Kapahulu Area/H-1 Freeway (Eastbound – Indirect connection). The limited number of vehicles that utilize this exit during the PM peak hour of traffic immediately experience difficulty making this maneuver during the PM peak hour of traffic (when vehicles are more likely to exit), due to the following conditions:

- When accessing the H-1 Freeway Onramp (westbound), the queue from the H-1 Freeway spills back to beyond the Old Waialae Road Entrance/Exit.
- When accessing South King Street (westbound), there is difficulty finding an acceptable gap in the prevailing flow along Old Waialae Road to immediately cross the two (2) lanes necessary to make this movement.
- The H-1 Freeway onramp (westbound) has a very short acceleration lane, which makes it difficult to enter the freeway at this location.

Improvement of this vehicular gateway would require the installation of a traffic signal at the Old Waialae Road/Kalele Road intersection. This is not recommended, due to a lack of sight distance along Old Waialae Road.



Figure 12: Old Waialae Road

Varsity Place Entrance/Exit

Access to this entrance/exit is relatively limited due to the limitation on ingress/egress. Currently, Lower Campus Road intersects with Varsity Circle, and Ultimately Varsity Place. Varsity Place connects with University Avenue, where congestion is currently a problem. While roadside parking could be cleared, and the road widened to facilitate vehicular flow along Varsity Place to incorporate two lanes in the westbound direction towards University Avenue, these vehicles the benefits of such a change would only be realized during the PM peak hour of traffic, and could potentially decrease the capacity of University Avenue during the PM peak hour of traffic.

True improvement of this entrance/exit would necessitate the acquisition of Rights-of-Way (ROW) from a variety of owners of property that front South King Street, in order to provide a direct connection between Lower Campus Road and King Street. Such a modification would also require sufficient lane

channelization be provided, as not to further impede vehicular flow along South King Street. It is likely that eastbound double left-turn lanes, an exclusive westbound right-turn lane, and dedicated southbound left and right-turn lanes would be necessary. In conjunction with this, a traffic signal would have to be installed at the new intersection. See Figure 13 below for an aerial photograph of the area surrounding the Varsity Place Entrance Exit.



Figure 13: Varsity Area

V. CONCLUSIONS AND RECOMMENDATIONS

The University of Hawaii at Manoa Long Range Development Plan, 2007 Update, Category I (LRDP) (5-10 year horizon) will work towards creating a livable campus community with useable green space and a more pedestrian friendly central campus. Pursuant to this ideal, new buildings, pedestrian malls, and parking lots will be constructed throughout the campus.

Existing Conditions

The University of Hawaii at Manoa (UHM) campus, as a result of being situated at the gateway to the mature residential community of Manoa, near the H-1 Freeway, and Major Arterials South King Street, Beretania Street, and Waialae Avenue, experiences its fair share of traffic (both regional and local in origin).

With Level-of-Service (LOS) used as the Measure of Effectiveness (MOE) at intersections of interest within the vicinity of UHM, the following key study intersections were identified as problematic:

- South King Street/Beretania Street/University Avenue – King Street and Beretania Street belong to a greater east-west corridor, which also includes the H-1 Freeway, Kapiolani Boulevard, and Ala Moana Boulevard. Therefore, these major arterials experience a significant regional traffic component. Furthermore, this intersections' adjacency to numerous H-1 Freeway On-ramps and Off-ramps, UHM traffic, and Manoa Traffic, generates a significant turning movement demand in a location which is not capable of further roadway widening. The efficiency and capacity of this intersection is also negatively impacted by the permitted left-turn movements into driveways, despite the absence of dedicated left-turn lanes.
- University Avenue/Dole Street – the busiest intersection along UHM's perimeter, vehicular queues in the northbound (mauka) direction extend southward towards South King Street and onto the H-1 Freeway Off-ramps, during the AM peak hour of traffic. During the PM peak hour of traffic, vehicular queues in the westbound direction queues beyond the Lower Campus Road intersection, and into Lower Campus Road itself.

- University Avenue/Sinclair Parking Lot – While HCM analysis indicates that this intersection currently operates smoothly, the express bus traffic that utilize this exit often have difficulty making the westbound left-turn out of the driveway. This is in part due to the wide turning angles required, and the prevailing queue in the southbound direction at the University Avenue/Dole Street intersection, which should be improved as a result of the mitigative measures at that intersection.
- University Avenue/Maile Way – According to HCM analysis, this intersection operates smoothly at an overall LOS C or better during the AM and PM peak hours of traffic for both existing and future conditions. However, HCM analysis does not account for the congestion downstream in the northbound direction along University Avenue. During the AM peak hour of traffic especially, conditions at the signalized intersection of Kaala Street, which provides access to the Mid Pacific Institute are extremely congested during the AM peak hour of traffic. To exacerbate problems, immediately north of the University Avenue/Maile Way intersection, the two (2) northbound lanes merge into one (1). Therefore, this intersection likely operates at LOS E or F during its worst peak periods.
- Wilder Avenue/Dole Street – The northbound approach to this intersection is formed by the H-1 Freeway Wilder Street Off-Ramp, which provides access to the Makiki Area, which includes residential land uses, Punahou School, and Maryknoll Schools. This off-ramp is given the right-of way, in order to maintain conditions along the H-1 Freeway. However, this is done at the expense of Dole Street traffic, which has a relatively low demand.
- Dole Street/Lower Campus Road – The majority of the vehicles entering/exiting the Makai Campus utilizes this vehicular gateway, due to the fact that it offers the greatest accessibility. During the PM peak hour of traffic, many of the commuters, dorm residents, and faculty that utilize the existing 3509 Makai Campus parking stalls exit through Lower Campus Road and turn Left onto Dole Street, where they immediately encounter the queue generated by the University Avenue/Dole Street intersection. This causes vehicles to queue back to the parking guard shack and beyond at times.

- Dole Street/Saint Louis Heights Drive – This intersection operates relatively well during the peak hours of traffic. Although HCM analysis indicates that the southeastbound left-turn operates at LOS F during the AM and PM peak hours of traffic, this turning movement volume is relatively low, and would therefore not warrant a traffic signal.
- Waialae Avenue/Saint Louis Heights Drive – During the AM peak hour of traffic, congestion was observed to occur in the westbound direction, where queues were observed to extend as far as 10th Avenue during the AM peak hour of traffic, primarily in the right and center lanes. During the PM peak hour of traffic, similar congestion occurs in the westbound direction along Waialae Avenue. Although there is a brief reprieve west of Saint Louis Drive, congested conditions resume along Old Waialae Road, the H-1 Freeway and King Street further westward.

Base Year 2017

Based on data obtained from the State DOT, regional traffic is projected to increase by approximately 1% annually along the Regional Arterials. Traffic growth within the vicinity of UHM is not projected to occur, due to the fact that most of the area has already been built out, and that the UHM student population is not projected to increase. Furthermore, vehicular traffic decreased during the PM peak hour of traffic and remained constant during the AM peak hour of traffic between 2004 and 2007 at the University/Dole Street intersection based on field counts conducted by ATA.

LOS F conditions will continue to occur during Base Year 2017 at the following locations:

- South King Street/Beretania Street/University Avenue*
- University Avenue/Varsity Place*
- University Avenue/Dole Street*
- University Avenue/Sinclair Parking Lot*

- Dole Street/Wilder Avenue – Mitigation would result in the reduction of traffic flowing from the H-1 Freeway On-Ramp, which is not recommended. Furthermore, the Dole Street traffic that experiences LOS F exhibits a relatively low demand due to further downstream obstructions and better alternative routes. Therefore, mitigation is not recommended.
- Dole Street/Lower Campus Road*
- Dole Street/Saint Louis Heights Drive – While the southeast-bound left-turn currently experiences and will continue to experience LOS F during the AM and PM peak hours of traffic, the demand for this movement is relatively low, and would not warrant a Traffic Signal. Mitigation is not recommended.
- Waialae Avenue/Saint Louis Heights Drive – Due to limited right-of-way, no geometric improvements can be made at this intersection.

* Indicates that mitigative measures are recommended and discussed in the next section.

Base Year 2017 Mitigative Measures

University Avenue/Dole Street Intersection

Phase I

Reconfigure the westbound approach to the University Avenue/Dole Street intersection to incorporate an exclusive left-turn lane, a shared left-turn/through lane, and an exclusive right-turn lane, with storage extending approximately 100 feet east of the University Avenue/Lower Campus Road intersection. This mitigative measure could potentially necessitate the relocation of the historic Gateway structures located along University Avenue.

The effect of Phase I would be to eliminate over-capacity conditions. However, the southbound left-turn movement would still expericnce LOS F during the PM peak hour of traffic.

Phase II

Reconfigure the northbound approach to the University Avenue/Dole Street intersection to incorporate three (3) exclusive through lanes and two exclusive right-turn lanes, the rightmost of which would directly connect with the H-1 Freeway Westbound Off-Ramp. In conjunction with this, modify the Dole Street/Lower Campus Road intersection to incorporate one (1) Eastbound through lane, an eastbound shared through/right-tum lane, and an exclusive right-turn lane. Note that these modifications could potentially necessitate the relocation of the existing monkeypod trees along University Avenue, and reduce the available parking within the Music Building Complex.

Phase II, when implemented without Phase I, would produce a similar result as phase I, in that over-capacity conditions would be eliminated, and that the southbound left-turn movement would continue to experience LOS F, while the eastbound and westbound approaches would experience LOS E during the PM peak hour of traffic.

Phase I & II

HCM analysis indicates that the effect of implementing phases I and II in combination would improve the overall delay of the intersection from 73.1 (56.6) seconds during the AM (PM) peak hours of traffic to 38.8 (39.9) seconds, with all movements at the intersection operating at LOS E or better during both periods. It should be noted that at the Dole Street/Lower Campus Road intersection, the lane modification will reduce the number of lanes that drivers need to cross to enter the Lower Campus Road, thereby reducing capacity reductions caused by weaving movements.

It is recommended that Phases I and II be implemented as a mitigative measure, while recognizing that the intent of this geometric augmentation would be to improve conditions for vehicles traveling northbound along University Avenue. Although vehicular flow will also improve in the westbound direction during the PM peak hour of traffic,

such benefits would generally be realized locally, given that existing bottlenecks occur downstream at the following locations:

- University Avenue/H-1 Freeway Eastbound On-ramp
- University Avenue/H-1 Freeway Westbound On-ramp
- South King Street/Beretania Street/University Avenue
- Dole Street/Wilder Street
- University Avenue, south of Maile Way

Mitigation of these problems would require costly modifications, including improving congestion along the entire corridor. The H-1 Freeway, Beretania Street, and South King Street would all have to be widened to accomplish this. However, the implementation of the Rapid Transit System will ultimately reduce future vehicular traffic demand.



Figure 14: Existing Lane Configuration at University Avenue Intersections with Dole Street and Lower Campus Road



Figure 15: Phases I and II Modifications

Turning Movement Restriction

During field observations, it was noted that along South King Street, east of University Avenue, and University Avenue in the Varsity Area, vehicular flow was hampered by the allowing of left-turns into driveways and small side streets.

Varsity Area

Vehicles turning left from the southbound direction cause other vehicles to switch lanes to maneuver around them. Due to the lack of an acceptable gap in northbound traffic, these vehicles often cause those behind them to arrive at the South King Street/Beretania Street/University Avenue intersection after the signal indication has turned red. The resulting flow interruptions have major implications along University Avenue in this area, due to the fact that the current cycle length at that intersection is 170

seconds. Effectively, all of the vehicles impacted by this problem will be delayed by a additional two minutes, fifty seconds as the traffic signal cycles through all of its phases again. Operations at the University Avenue/Varsity Place intersection are also affected by this problem.

Similarly, in the northbound direction left-turns impede the flow of the approximately 1,000 vehicles (for both AM and PM peak hours of traffic) traveling in the northbound direction, sometimes reducing the upstream capacity of the South King Street/Beretania Street/University Avenue intersection.

South King Street – University Avenue to Humane Society

South King Street, east of University Avenue has become a bottleneck for eastbound traffic during the PM peak hour of traffic. It has been observed that vehicles traveling eastbound along South King Street are affected by vehicles making left-turns into driveways, and at the signalized intersection near the Seven Eleven/Aloha Gas station.

Based on the conditions described above, it is recommended that a dialogue be initiated between community members and the City to assess the potential for left-turn prohibitions during the PM peak hour of traffic for:

- Northbound and southbound University Avenue traffic, south of Varsity Place, and north of King Street
- Eastbound South King Street traffic, East of University Avenue and west of the Humane Society.

It is recognized that the merit of this mitigative measure will have to be balanced with the needs of the local community and businesses.

It should be noted that should these prohibitions be implemented, they would not eliminate LOS F at the South King Street/Beretania Street/University Avenue intersection. However, they would improve the

efficiency of the intersection and the capacity of University Avenue and South King Street in the area.

University Avenue/Sinclair Library Driveway

While this intersection experiences a relatively low turning movement volume and operates at LOS B, the bus traffic that passes through the turnaround often have difficulty making the westbound left-turn out of the driveway. Therefore, it is recommended that a traffic signal be installed to facilitate this movement. In conjunction with this, it is recommended that the bus stop located along University Avenue, just north of Dole Street be relocated to the existing bus turnaround at this intersection.

University Avenue/Maile Way

Although HCM analysis indicates that this intersection operates at LOS C(B) during the AM (PM) peak hours of traffic, existing operations have been observed to be worse, especially during the AM peak hour of traffic, where vehicles destined towards the Mid Pacific Institute and Saint Francis cause the downstream intersection (Kaala Street) to be overburdened. Currently, this intersection only provides a single lane at each approach, with no channelization (turning lanes). It is therefore recommended that a dialogue be initiated between community members and the City to assess the feasibility for widening the segment of University Avenue between Kaala Street and Maile Way to incorporate a second northbound lane. This lane would terminate at Kaala Street as an exclusive right-turn lane.

Traffic Signal Coordination along University Avenue and Dole Street/Lower Campus Road

All of the signalized intersections along University Avenue between Dole Street and Maile Way, and the Dole Street/Lower Campus Road intersection are within approximately 1000 feet or less of each other. Therefore, in order to facilitate flow between these intersections, it is recommended that the following intersections be coordinated:

- University Avenue/Maile Way

Appendix I. UH Mānoa Traffic Demand Management Plan

LONG RANGE DEVELOPMENT PLAN
UNIVERSITY OF HAWAIʻI, MĀNOA CAMPUS
2007 UPDATE

Transportation Demand Management Plan
August 2009





Prepared for:

Office of the Chancellor
University of Hawaiʻi at Mānoa
2500 Campus Road
Hawaiʻi Hall 307
Honolulu, HI 96822

Prepared by:

GROUP 70 INTERNATIONAL

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INTRODUCTION

The University of Hawai'i, Mānoa Campus is committed to providing transportation and parking management for students, faculty, staff and visitors. The goals of the University of Hawai'i, Mānoa Campus Transportation Demand Management (TDM) Plan projects and programs are to improve mobility and access, reduce congestion and air pollution, and increase safety. These TDM projects and programs reduce the level of drive-alone travel by promoting walking, bicycling, carpooling, vanpooling, public transportation, and other sustainable modes.

BACKGROUND

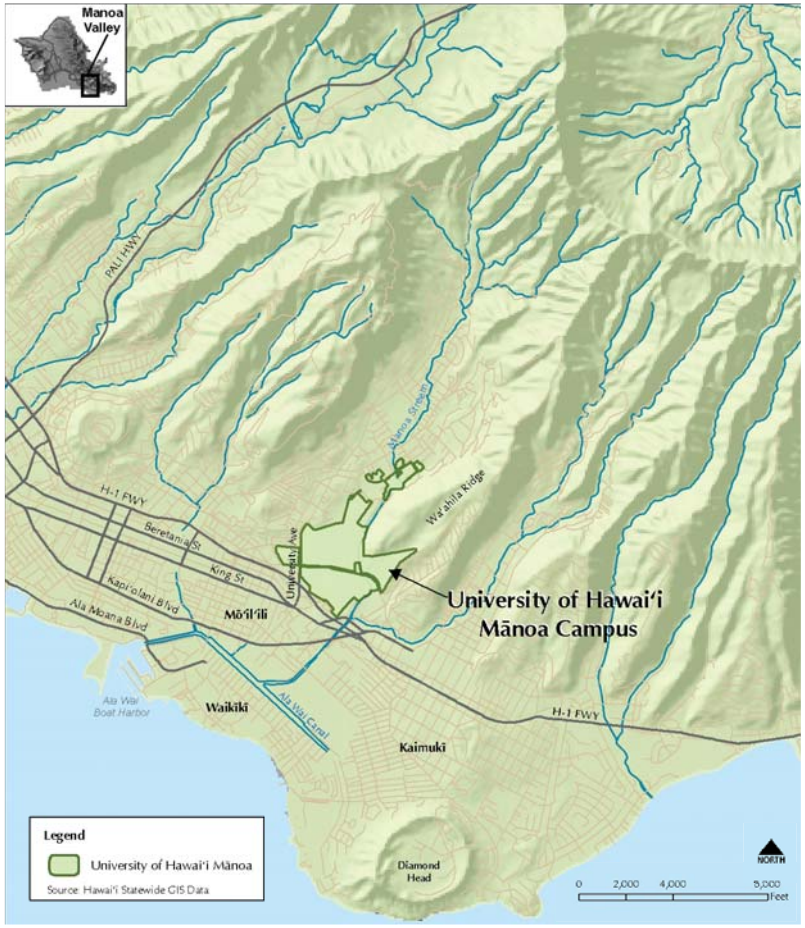
This Transportation Demand Management (TDM) Plan has been prepared as part of the University of Hawai'i, Mānoa Campus Long Range Development Plan 2007 Update, Plan Review Use. In response to the Plan Review Use Resolutions No. 89-411, CD-2; No. 92-286, CD-1, FD-1; No. 06-255, CD-1, the University of Hawai'i, Mānoa Campus has completed TDM projects and program improvements. In addition, the campus has two traffic management plans, 1) Special Events Parking and Traffic Plan, updated 1994, and 2) Traffic Management Plan for Frear Hall, University of Hawai'i at Mānoa, September 2008. In addition to the TDM measures completed for the PRU Resolutions, the University of Hawai'i, Mānoa Campus has also completed many program improvements listed beyond the realm of the Plan Review Use requirements. The University of Hawai'i, Mānoa Campus operations are compatible with current policies, regarding traffic mitigation measures, and have ensured communication with the City and County of Honolulu, Neighborhood Boards, citizens, businesses, and institutions.

PROJECT SITE

The University of Hawai'i, Mānoa Campus occupies some 304 acres of land in lower Mānoa Valley, bounded by the Mānoa, St. Louis Heights, Mō'ili'ili and McCully communities. Its principal physical borders are the Mānoa residential community on the mauka side, Wa'ahila Ridge on the Koko Head side, the H-1 Freeway on the makai side and the lower Mānoa and McCully residential communities on the 'Ewa side.

Its primary vehicular accesses are from the H-1 Freeway, University Avenue, Dole Street and Old Wai'alae Road. Public transportation is primarily provided by regular bus services on King Street, University Avenue, Dole Street and Metcalf Street. The bus service includes routes through the campus via East-West Road and Maile Way. The Mānoa Campus is also served by direct express bus service from the outlying communities.

The UHM Campus, as a result of being situated at the gateway to the mature residential community of Mānoa, near the H-1 Freeway, and Major Arterials South King Street, Beretania Street, and Wai'alae Avenue, experiences its fair share of traffic (both regional and local in origin).

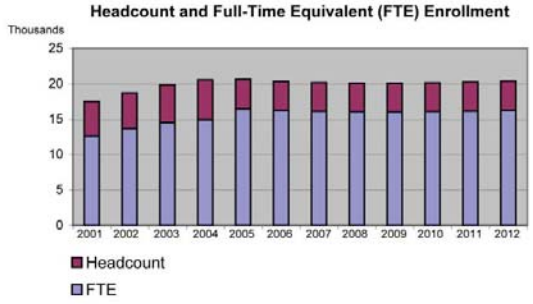


Project Location Map

UHM LRDP 2007 UPDATE

The Long Range Development Plan, University of Hawai'i, Mānoa Campus, 2007 Update was prepared to update the Plan, which was originally adopted in 1987, to reflect current and upcoming educational priorities. Future buildings and projects that are on the Capital Improvements Program and/or are anticipated for development within the next 5-10 years are projected into the Plan. These projects address current space and activity needs on campus. They are not based on any anticipated increase in enrollment over the next planning period. The enrollment at UHM was 20,644 students in the fall of 2007, and 18,818 in the spring 2008 semester. Enrollment is projected to remain relatively stable through 2012, as indicated by the University of Hawai'i's Institutional Research Office, 2007. The anticipated opening of the new West O'ahu Campus is also expected to reduce the pressure on undergraduate enrollment.

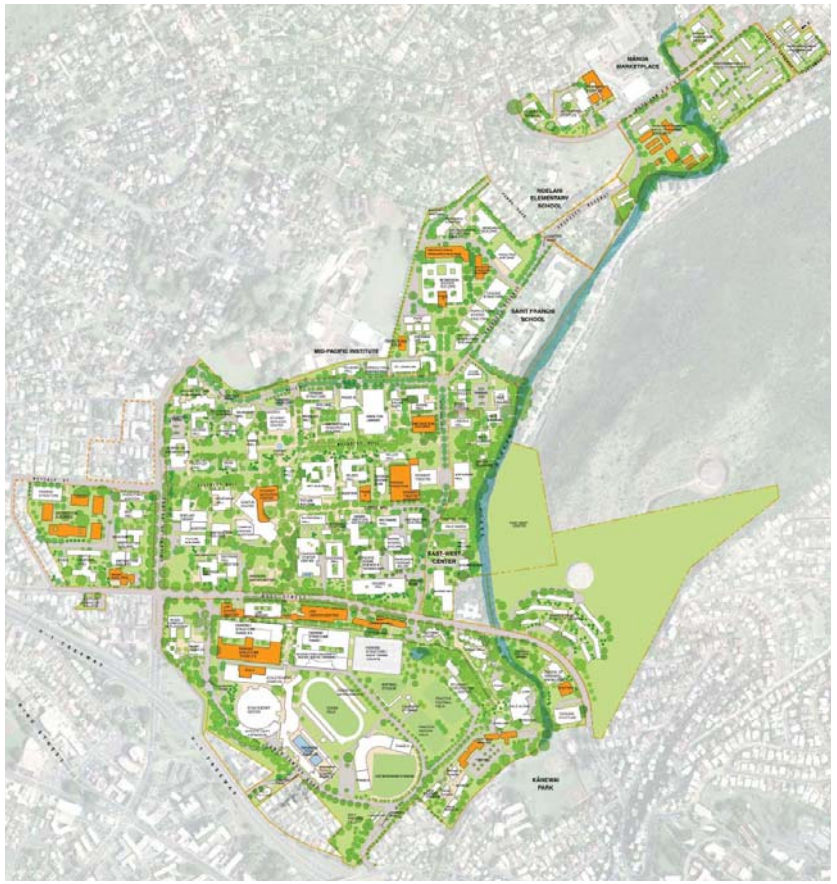
UH Mānoa Enrollment Projections



	2001*	2002*	2003*	2004*	2005*	2006	2007	2008	2009	2010	2011	2012
Headcount	17,532	18,706	19,863	20,549	20,644	20,350	20,186	20,109	20,102	20,158	20,268	20,424
FTE	12,624	13,720	14,517	14,925	16,452	16,243	16,126	16,070	16,057	16,088	16,160	16,264

* Actual

Source: Institutional Research Office, University of Hawai'i, February 2007



University of Hawai'i, Mānoa Campus, Long Range Development Plan 2007 Map

Rather than enrollment growth, campus development at UHM is now stimulated by growing facility needs, the push to expand research and the desire to provide a more complete campus community experience. Universities across the country have focussed on enhanced environments for learning, working, and living. Campuses of the future envision uses and activities not unlike that of any vital urban center. Therefore, the LRDP concept for the campus, continued in this Update, is to give priority to pedestrian circulation. Vehicular arrival points such as parking lots, bus stops and transit stations are, therefore, indicated on the periphery of the campus; freeing the central areas for pedestrian use, such as envisioned for Varney Plaza.

PARKING INVENTORY & COMPLETED PROJECTS

Zone	Space Inventory	Percentage Of Total
Central Campus	1,991	29.5%
Lower Campus	3,509	52.1%
Campus Sub-total	5,500	81.6%
On-street/Off Campus	1,240	18.4%
Grand Total Parking Inventory	**6,740**	**100.0%**

Phase IIA Lower Campus Parking Structure:

- $17,000,000
- 900 additional parking stalls
- Built in conjunction with the 10,000 seat Stan Sheriff Center

Dole Street Parking Structure:

- $4,700,000
- 278 additional parking stalls

Gravel Areas Paved to Create Additional Parking at Lower Campus:

- Gravel areas adjacent to Les Murakami Baseball Stadium
- $111,143
- Additional 70 parking spaces

Additional Upper Campus Visitor Parking Stalls:

- 54 additional visitor stalls (green stalls) are available to Upper Campus visitors to accomodate short-term visitors to campus.





Founders Gate Rendering - Main Gateway to the Mānoa Campus

TRANSPORTATION DEMAND MANAGEMENT PLAN

This TDM Plan was prepared to illustrate the University of Hawai'i, Mānoa Campus' ongoing commitment to parking and traffic management projects and program improvements to mitigate traffic impacts at the campus as well as regionally. The TDM measures manage 1) Baseline transportation and parking activities, 2) Special Events on the Makai Campus up to 5,000 attendees and 3) Special Events projected to generate more than 5,000 attendees at the Makai Campus. Additional TDM programs and projected improvements, including UHM's Long Range Development Plan goals and guidelines for campus planning, transportation management for dormitory move-in and move-out days, additional projected parking for students, and planned pedestrian and bicycle improvements also work to mitigate traffic impacts.

TIER I: BASELINE

OVERFLOW PARKING & PARKING MANAGEMENT

Creation of Overflow Parking at Lower Campus:

- Increased parking at Lower Campus with providing gravel area adjacent to Klum Gym to be used for overflow parking and oversized vehicles.
- Additional 20 parking spaces

REMOTE PARKING AND PARK & RIDE

Off Campus Private Parking Vendors Negiotiated Reduced Student Parking Rates from Public Rates:

- Japanese Chamber of Commerce: 300 parking spaces available
- Pro Park Varsity Theater: 50 parking spaces available
- Church of the Cross Roads: 64 parking spaces available
- Advertise off campus parking alternatives when Lower Campus parking is sold out

Creation of School of Astronomy Parking Passes:

- 75 additional parking permits available for purchase by all students

MOPED/MOTORCYCLE PARKING

Construction of Moped/Motorcycle Parking Areas on Campus:

- Created designated areas for mopeds and motorcycles to control parking on campus at a cost of $100,000
- Constructed separate moped and motorcycle parking areas to enhance safety and promote their use instead of cars.
- Areas for mopeds/motorcycles are designated by Procurement, Property, & Risk Mgmt Office.

BICYCLE PARKING

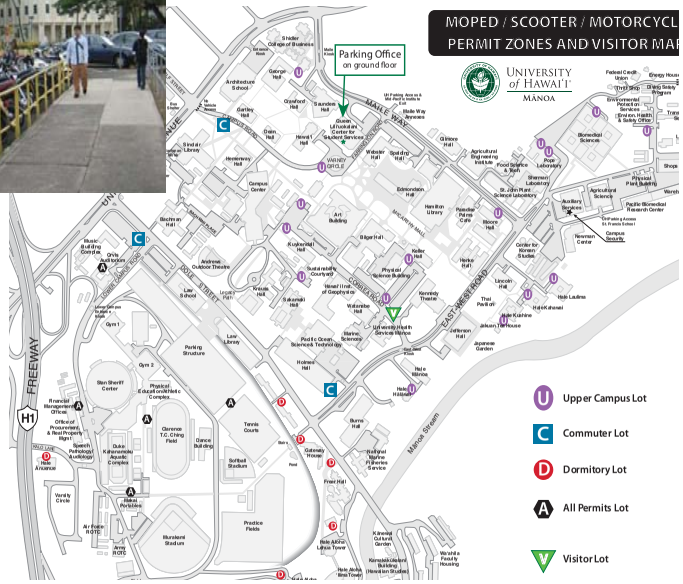
Created Centralized Bicycle Parking Areas:

- Purchased 80 new bicycle racks with security bars at a cost of $9,600.00
- Centralized bicycle parking areas were created to control bicycle parking on campus.

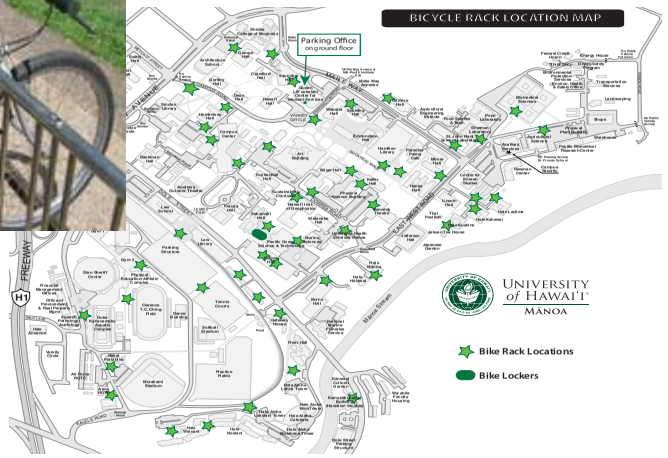
Purchase and Installation of Rental Secured Bicycle Lockers:

- Alternative to storing expensive bicycles in buildings









CONTROL PARKING PERMITS

Designated Parking Permit Zones:

- Designated Parking Permit Zones for students, faculty, staff and visitors on campus.

Student Housing Parking Permit Agreement:

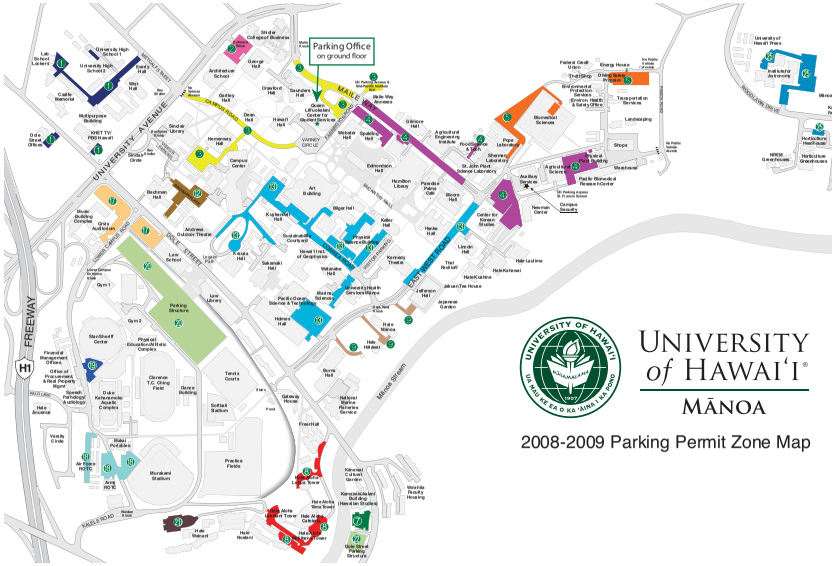
- Allotment of 100 additional parking permits available to student housing residents to accommodate the increase in Student Housing bed spaces.

Reentry Policy Revision for Daily Parkers:

- Unrestricted reentry for vehicles purchasing a daily parking ticket was implemented to accommodate students returning to campus after morning classes

Student Evening Parking Permits Revision:

- Policy revision for Student Evening Parking Permits changed to park after 1:30 PM and all day weekend and holidays from 4:00 PM to maximize use of available parking stalls in the late afternoons



UNIVERSITY of HAWAI'I® MĀNOA

2008-2009 Parking Permit Zone Map

PLANNED PROJECTS & RECOMMENDATIONS

Parking Deficit Summary:

Objective	Spaces
1. Address current over-utilization	-178
2. Estimate number of off-campus/on-street parking by UHM students and faculty in the surrounding neighborhoods	-1,240
3. Replace lost spaces resulting from planned projects (50-10 years)	-175
4. Replace lost spaces resulting from improvements made to Dole Street & University avenue	-30
Total for Objectives 1-4:	**-1,623**

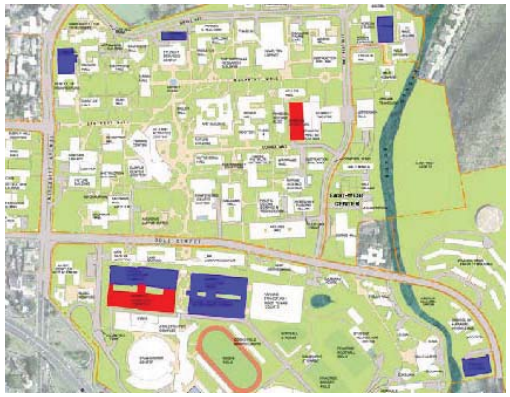
Recommendations	Spaces
Kennedy Theater	480
Parking Structure	900
SubTotal	**1,320**
Ag Sciences (+10 years)	420
TOTAL	**1,740**
Objectives (-1,623) + (1,740)	+117 (Surplus)

Kennedy Theater Parking Structure Construction:

- This project is currently in the design phase
- Projected cost of $20,000,000
- 480 additional parking spaces

Phase IIB Parking Structure Construction:

- Projected cost of $37,349,000 (2009 costs)
- 900 additional parking spaces



Proposed Parking Structures (Red Designations)

TRAFFIC MANAGEMENT

Implemented Traffic Control Plan in conjunction with "Beat the School Jam Program":

- Implemented traffic control measures to reduce the backlog of vehicles on University Avenue and Dole Street during the morning hours at the start of each semester.
  - o Lower Campus Gates are opened earlier to ensure backlog of vehicles does not extend on to Dole Street.
  - o A contra flow lane is added to the two existing lanes entering campus to expedite traffic flow.
  - o Kiosk booths are manned to expedite flow of traffic

TRAFFIC CALMING

Lower Campus Road Improvements in conjunction with the 10,000 Seat Stan Sheriff Center:

- Creation of dedicated lane into Lower Campus
  - o Expedites the flow of traffic into campus
- Relocated the Lower Campus Kiosks further into campus to increase staging area for vehicles entering campus
- Added an additional kiosk to expedite flow of traffic with the projected increased volume of traffic

Additional Bus Turnout at University Avenue by Bachman Entrance Makai of Sinclair Library:

- Completed after 1988
- University of Hawai'i property.

Extension of the Right Turn Lane at the Intersection of University Avenue and Dole Street off of the Freeway Ramp:

- Completed after 1988
- University of Hawai'i property.



Bus Turnout Makai of Sinclair Library

RIDESHARING/CARPOOLING

Creation of Carpool Pass System to encourage multiple riders:

- 300 additional parking permits available to all students
- Minimum requirement to purchase parking pass is two registered students



SHUTTLE SERVICES

UHM Campus Shuttle Program:

- The free campus Shuttle bus services faculty, staff, students and visitors. The Shuttle bus system consists of multiple shuttle routes which provide a mode of transportation throughout the campus during the Fall and Spring semesters Monday-Friday both during the day and evening.
- Implementation of off Campus Shuttle routes to provide transportation for students to and from off campus parking alternatives such as private off campus parking areas, the School of Astronomy parking area and Faculty Housing units located in Mānoa.
- A night shuttle route was added to the Shuttle System to provide a secure transportation alternative at night for students traveling between Upper Campus locations and to the Student Housing area.
- Shuttle Program reduces the use of mopeds/motorcycles to travel between points on campus. Moped/Motorcycle parking permit system provides designated parking areas for commuters and Student Housing residents using mopeds/motorcycles as a transportation alternative. It also limits movement on campus by restricting mopeds/motorcycles to park in specific areas once on campus.
- Annual Cost of $500,000



University of Hawai'i, Mānoa Campus Rainbow Shuttle Bus

Routes	Hours Of Operation	Route Hours	Average Monthly Riders	Average Daily Riders
Dorm 1	7:00 AM - 5:00 PM	10	6,523	338
Dorm 2	7:00 AM - 5:00 PM	10	5,770	348
Dorm Express	7:30 AM - 11:30 PM	4	2,525	169
Faculty Housing	7:00 AM - 6:00 PM	11	7,271	432
Hawaiian Studies	7:15 AM - 11:15 PM	4	2,303	140
Japanese Cultural Center	7:15 AM - 4:15 PM	9	3,460	202
Night	5:30 PM - 11:00 PM	5.5	881	53
Total		**53.5**	**28,733**	**1,682**

Covers January Thru April 14, 2009
Does Not Include Special Charters
Includes Spring 2009 Reduction In Operation Hours

RIGHT OF ENTRY AGREEMENTS

Mid-Pac Institute Right of Entry Agreement

- Allows Mid-Pac traffic to exit through UHM Campus to alleviate congestion on University Avenue during regular school sessions and for special events held on campus.
- Prior to the agreement, Mid-Pac parents dropping off and picking up students in the morning and in the afternoon had only one option to exit Mid-Pac Campus back onto University Avenue. With this agreement, they have the option to exit through the Mānoa Campus using Maile Way expediting the flow of traffic into the Mid-Pac Campus.
- Mid-Pac provides contracted officers to control exiting traffic onto the Mānoa Campus before and after regular school sessions and for special events exiting.
- As part of the agreement, Mid-Pac has constructed a small parking area adjacent the Mānoa Campus and allows the University to utilize the 19 additional parking spaces for UHM permit parking.

St. Francis School Right of Entry Agreement:

- Allows St. Francis School's traffic to exit through UHM Campus to alleviate congestion on Alaula Way and Pāmoa Street during regular school sessions and for special events held on campus.
- Prior to the agreement, St. Francis School's parents dropping off and picking up students in the morning and in the afternoon entered St Francis Campus using University Avenue via Alaula Way through Pāmoa Road. With this agreement, they have the option to exit through the Mānoa Campus using either Maile Way or East West Road expediting the flow of traffic through their campus.
- A new agreement will require St. Francis School to post contracted officers to control the exiting of traffic onto the Mānoa Campus before and after regular school sessions and for special events exiting.

U-PASS BUS PASS AGREEMENT

U-PASS Bus Pass Honlulu City and County TheBus Agreement:

- Bus passes valid for a semester available to students for $100
- ASUH is currently negotiating an agreement with the City and County of Honolulu Department of Transportation Services to expand the U-PASS program by requiring all UHM students to pay a mandatory fee per semester for unlimited use of TheBus system.



UHM EMPLOYEES CAN PURCHASE BUS PASSES THROUGH PAYROLL DEDUCTION ON A PRE-TAX BASIS

"State's Pre-Tax Transportation Benefit Pilot Program (PTBP):

The program continues to run successfully and is highly valued by participants. All eligible employees may enroll in the bus pass program during the open enrollment period which is scheduled for May 4, 2009 through June 22, 2009. Employees may purchase monthly bus passes through payroll deduction on a pre-tax basis, thereby saving on FICA, Federal and State income taxes. NOTE: Employees already enrolled in the bus pass program need not re-enroll each year. Participation will continue in the program unless the employee requests a cancellation.

COMMUTE TRIP REDUCTION & TELEWORK

Additional Student Dormitories and Faculty Housing Units.
Frear Hall Dormitory:

- 810 beds
- Traffic Management Plan, September 2008, implemented for move-in and move-out days (Resolution 06-255)

Expansion and Implementation of Online Courses and Programs:

- Reduced traffic to and from campus for students and faculty
- Telework opportunities utilize telecommunications technology to work from home or other locations with mobile telecommunications techonology. In other words, the daily commute to a central place of work is replaced by telecommunication links.

UNIVERSAL DESIGN

Disabled Parking Plan:

- Disabled-person(s) parking is provided at every parking facility on-campus.
- At all Special Events one section on the first floor of the parking structure next to the elevators will be reserved for additional disabled parking.

TRANSPORTATION ACCESS GUIDE

Parking Personnel are located at all entrances to the campus at designated Kiosks. Parking Personnel provide directions, information and campus maps.

TIER II: SPECIAL EVENTS UP TO 5,000 ATTENDEES

SPECIAL EVENTS COORDINATION

Parking Arrangements for all Special Events are Coordinated through Parking Operations:
Parking and traffic control arrangements for each activity is based on the information provided by the sponsoring department or organization.

Information should include:

1. Type of event
2. Date & time
3. Facility being used
4. Anticipated attendance
5. Special needs
    a. Parking passes
    b. Reserved stalls

Conflicting multi-events planned for the same date are taken into consideration in scheduling and planning for traffic control.

The decision to provide pedestrian and traffic control measures is the responsibility of the Manager for Parking and Transportation.

PARKING PERSONNEL & MANPOWER

Additional Manpower will be Scheduled for Pedestrian and Traffic Control:

- A separate supervisor shall be scheduled to supervise the special event parking and traffic arrangements. The senior supervisor will be required to attend all major events.
- Additional personnel will be scheduled to assist in directing traffic and providing security for the parking areas.
- Additional personnel will be assigned to the entry gates to open additional incoming lanes for vehicles paying the entry fee.

Parking Officers:

- Parking Officers shall be assigned to on campus intersections to direct pedestrian and vehicular traffic.

Campus Security:

- Campus Security shall be briefed on modifications to traffic patterns and requests shall be submitted to the Chief of Campus security for assistance, if necessary.

Special Duty HPD Officers:

- Hiring of Special Duty HPD Officers for before and after special events to expedite traffic flow.
- Scheduling of additional contracted Services Parking Officers to assist with traffic and pedestrian control.

SEASON TICKET PARKING PASSES

- 1,200 parking passes will be sold to season ticket holders.
- These passes shall be valid for Lower and Upper Campus parking areas.
- For the Lower Campus, this pass will be honored only at the Waialae Gate.
- Season ticket parking passes help to reduce traffic congestion by not requiring payment, change, etc at the entry gate to parking areas.



Stan Sheriff Arena Wahine Volleyball Event

INGRESS AND EGRESS OF VEHICLES

UH WARRIOR BASEBALL GAMES

Ingress Plan:

- Opening and closing of entry/exit gates to assist traffic control.
- Lower Campus Road is converted to three lanes inbound and one lane outbound.
- Varsity gate is closed.

Egress Plan:

- Majority of the vehicles shall be routed to Waialae Gate. The roadway to Waialae Gate shall be converted from two-way to one-way traffic.
- Parking officers shall be assigned to the Parking Structure to implement traffic pattern plans for vehicles exiting out of the structure.

STAN SHERIFF ARENA EVENTS
INGRESS PLAN

Entering Lower Campus Parking Areas:

- Traffic shall be regualted to allow two lanes to turn right from Dole Street on to Lower Campus Road.
- Lower Campus Road will have three incoming lanes and one exiting lane.

Restricted Parking Areas:
- Barricades will be set-up on the Lower Campus Road after the access road and at the intersection of Waialae Road and the Lower Campus Road to restrict access into the support staff parking area.

Directing Vehicles to Upper Campus Parking Areas:
- Parking personnel will be provided at key intersections to provide directions and at parking areas outside the main campus to collect parking fees.

Additional Parking Personnel:
- Gate Attendants = 19
- Traffic Control = 29
- Supervisors = 2
- Head supervisor = 1

Misc. Vehicles Entering Lower Campus:
- Drop-offs - Directed through the restricted area.
- Ticket Purchasers - Directed to parking structure.
- Buses - Enter through Waialae and stack park along Lower Campus Road next to the arena.

Moped/Motorcycle Parking Plan:
- Areas for mopeds/motorcycles will be designated.

EGRESS PLAN

Exiting Lower Campus:
- Traffic will be one way from the structure on the access road. Vehicles exiting the Diamond Head exit will be directed to use the left lane. Vehicles exiting the Eva exit will be directed to use the right lane.
- Traffic will be one way from the structure to Waialae Gate. Traffic will be diverted to the far right two lanes before the gate.
- Vehicles will be directed to exit floors in the existing structure using both ramps as down ramps.
- Lower Campus Road shall have three exiting lanes and one incoming lane.
- A permit will be obtained to allow for two left turn lanes out of Lower Campus Road on to Dole Street.
- As the Lower Campus Road starts to back-up, parking personnel will direct traffic to exit out through Varsity Gate or Waialae Gate.

Exiting Upper Campus:
- Parking personnel will be placed in key intersections on the Upper Campus to expedite traffic flow.

Misc. Vehicles Entering Lower Campus:
- Pick-ups - Zone 18 area
- Dorm Parking - Zone 18 area
- Buses - Exit through Lower Campus Road
- Taxi Service - Zone 18 area
- Signage and Traffic Delineator Plan

SIGNAGE

Signage for pedestrian and traffic control will be placed in appropriate areas on campus to expedite traffic flow and to ensure pedestrian safety.

Signs Required:
- Direction signs
- Designated parking signs
- Shuttle Bus Stop signs
- Lot Full signs

PLACEMENT OF CONES, BARRICADES, AND DELINEATORS FOR LOWER CAMPUS:

Lower Campus Road-Cones:
- Three lanes for entry
- Three lanes for exit

Reserved Parking Area-Barricades:
- Access road
- Waialae road

Waialae Gate-Cones:
- Two lane for entry
- Two lanes for exit

Access Road-Cones:
- One Way traffic entering and exiting

RESTRICTED PARKING AREA

Designated parking in the Arena Loading Zone:
- Special Events Arena Manager will identify people allowed to park in loading area.
- Plans for a cattle gate and a entry system will be developed.

CAMPUS SHUTTLE BUS

Rountine Routes and Drop-Off:
- Intra-campus bus shuttle following a Dole Street, University Avenue, Maile Way, East-West Road, and Dole Street route is provided.

Rental of Shuttle Buses:
- Bid Process
- Four (4) @ twenty (20) passenger mini-buses

Buses from Hotels or Outline Areas:
- Enter through Waialae Gate and up Lower Campus Road
- Buses will be directed to stack their buses on Lower Campus Road where they can unload and load there passengers.
- Buses will be directed to exit through Lower Campus Road

PEDESTRIAN TRAFFIC CONTROL PLAN

INGRESS TRAFFIC FLOW

Structure to Stan Sheriff Arena:

- Third floor ramp (green level)
- First floor crossing under existing ramp
- Shuttle Buses will drop-off pedestrians by the Law School crosswalk and they will be directed to use elevator and stairwell system in the existing structure.
- Lower Campus Road to Arena pedestrians may choose to walk down Lower Campus Road and cross the access road by Gym 1.

EGRESS TRAFFIC FLOW

Stan Sheriff Arena to Structure:

- Up escalators to parking structure
- Along access road to new structure
- Crossing under existing ramp
- Cutting across Klum Gym and the grass areas

RENTAL OF MESSAGE BOARDS:

Designated Locations:

- Bachman lawn near intersection of University Avenue and Dole Street.
- Zone 17 parking area after Dole Street and Lower Campus Road intersection.

Rental of Two (2) Programmable Message Boards:

- Bid process

CLOSING PARKING AREAS

Lower Campus:

- Officers will redirect vehicles to the Upper Campus parking areas.
- Lot Full neon light will be turned on.

IDEAS TO EXPEDITE TRAFFIC

- Set-up shuttle bus system from various parking areas off campus.
- Two lanes exiting Lower Campus Road may be converted to left turn lanes to help move traffic out of the Lower Campus quicker.
- Use Student Help to provide information and directions in the new parking structure. First time visitors may be confused by new structure floor designations.

TIER III: SPECIAL EVENTS ABOVE 5,000 ATTENDEES

All measures defined previously for Special Events up to 5,000 attendees are implemented for Special Events above 5,000 attendees. In addition, the following measures will also be added:

PARKING PERSONNEL & MANPOWER

Special Duty HPD Officers:

- Special duty HPD officers will be hired to assist Parking Officers in pedestrian and traffic control of major intersections.
- Special duty HPD officers will be placed at City and County intersections to expedite traffic flow and to ensure safe passage to vehicles and pedestrians.

INGRESS AND EGRESS OF VEHICLES

UH WARRIOR BASEBALL GAMES

Ingress Plan

- The new access road will be converted to one way traffic. Incoming traffic from Lower Campus Road through the new access road shall be allowed to enter through the two Phase IIA entrances.
- Incoming traffic from Waialae Road shall be allowed to enter through the main entrance of the Phase I parking structure.
- Vehicles entering from Waialae Road into the existing structure shall be directed straight to the second floor.
- The road from Waialae Gate to the Parking Structure shall remain open for two-way traffic.
- Parking Officers will be assigned to the Parking Structure to implement traffic pattern plans for vehicles entering the structure.

Egress Plan

- Lower Campus Road converts back to normal two-way traffic with two lanes exiting and two lanes entering. Outgoing traffic from the new structure shall be allowed to exit through the two new Phase IIA structure exits. Vehicles using both those exits shall be directed to exit through the Lower Campus road on to Dole Street or to Varsity gate. Vehicles exiting through the main exit of the Phase I structure shall be directed to exit through Waialae Gate. Vehicles forced to exit towards Waialae Gate may exit through Varsity gate or Lower Campus gate by turning right after the baseball stadium.
- Three special duty HPD officers wil be hired to assist vehicles exiting after the event. HPD officers stop Waialae Road traffic to allow vehicles to exit Lower Campus onto the Freeway and into King Street. An HPD officer assists the flow of traffic from Lower Campus Road onto Dole Street and University Avenue.

STAN SHERIFF ARENA EVENTS
INGRESS PLAN

Entering Lower Campus Parking Areas:

- The access road will be used to feed vehicles into the new structure. One Way traffic pattern will be used with the left lane directed into the first entrance and the right lane being directed into the second entrance.

- Waialae Road will be used to feed vehicles into the existing parking structure. Waialae Road will remain two-way traffic to allow vehicles to exit from both structures. Two kiosks will be operating with three lanes incoming and one exit lane.
- Connection ramps between the new and existing structures will be blocked off on the 1st and 2nd floors. This will allow for smoother traffic flow on the lower floors.

Restricted Parking Areas:
- Varsity Gate will be opened to vehicles with passes and those on an approved name list.

Overflow Lot for Lower Campus Parking Structures:
- The Music and Law parking areas (Zone 17) shall be blocked off and reserved as an overflow lot for the Lower Campus parking structures.
- Excess vehicles that cannot find a parking space in both of the structures shall be directed out the fifth floor emergency exit and into either the Law or Music parking areas.
- Once all vehicles from the Lower Campus have been accommodated, the Zone 17 lots will be opened for regular parking.

Directing Vehicles to Upper Campus Parking Areas:
- Two portable electronic message boards will be rented to direct vehicles to additional Upper Campus parking areas and advertise the free shuttle bus service.

HPD Special Duty Officers:
- University and Dole Street (1)
- Lower Campus Road and Dole Street (2)
- Waialae Avenue (1)
- East-West and Dole Street (1)
- Maile Way and University (1)
- Varsity Gate (1)
- Supervisors (2)

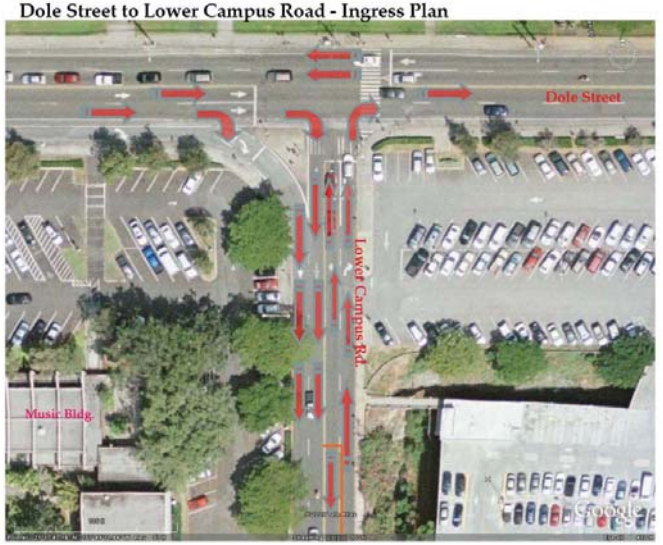
EGRESS PLAN

Exiting Lower Campus:
- Connection ramps between the two structures will be blocked at the 1st and 2nd floors until the majority of the new structure has been emptied.
- If needed for major events, the fifth floor emergency gate will be opened to allow vehicles to exit right only on Dole Street.

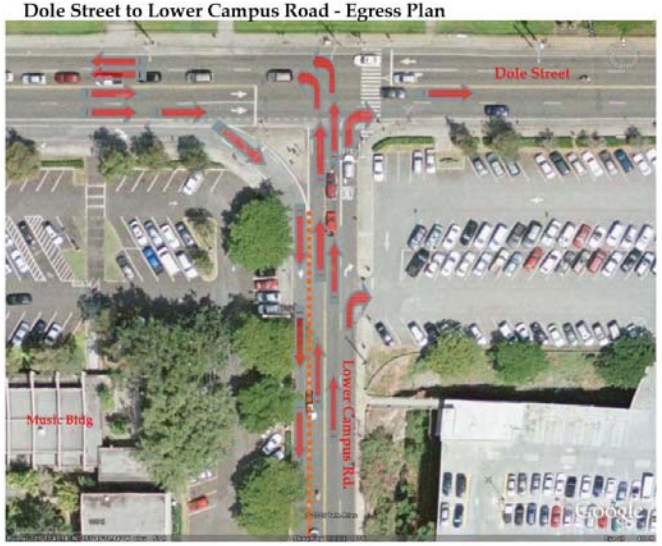
Additional Parking Personnel:
- Gate Attendants = 8
- Traffic Control = 29
- Supervisors = 2
- Head Supervisor = 1

HPD Special Duty Officers:
- University and Dole Street (1)
- Lower Campus Road and Dole Street (2)
- Waialae Avenue (2)
- East-West and Dole Street (1)
- Maile Way and University (1)
- Supervisors (2)

Dole Street to Lower Campus Road - Ingress Plan



Dole Street to Lower Campus Road - Egress Plan



PLACEMENT OF CONES, BARRICADES, AND DELINEATORS

LOWER CAMPUS

Phase I Entrance-Cones:

- One Way exit plan to Waialae Gate

New Structure-Barricades:

- Connection ramps on 1st and 2nd floors
- Back ramp to fifth floor to avoid back-up at turn around point.

UPPER CAMPUS

- Correa Road at East-West Road-Barricade
- Farrington Road at Maile Way-Barricade
- Zone 1 – Barricade
- Zone 2 – Barricade
- Zone 17 Law School and Music Building - Barricade

RESTRICTED PARKING AREA

Access:

- Varsity Gate shall be the primary access. Access may be given through the barricades.
- List of approved names shall be provided to parking personnel.

PEDESTRIAN TRAFFIC CONTROL PLAN

Ingress Traffic Flow

- Additional officers will be placed on the 1st and 3rd floors to assist pedestrians crossing traffic flow.

Egress Traffic Flow
Stan Sheriff Arena to Structure

- Through third floor ramp

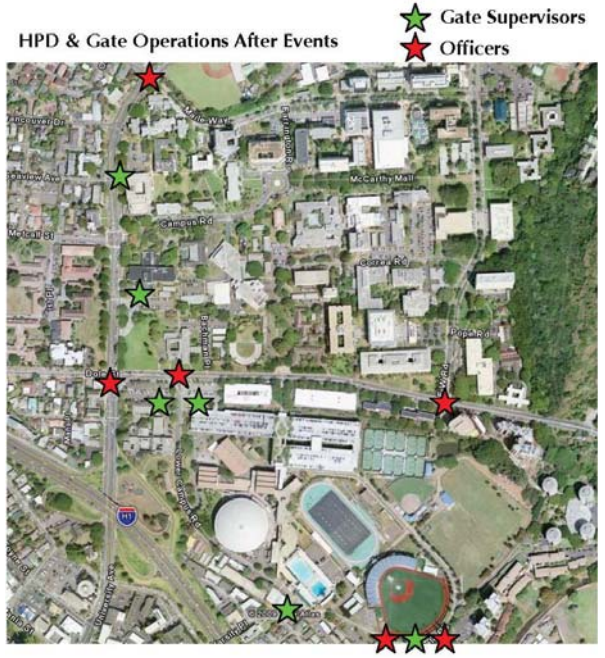
CLOSING PARKING AREAS

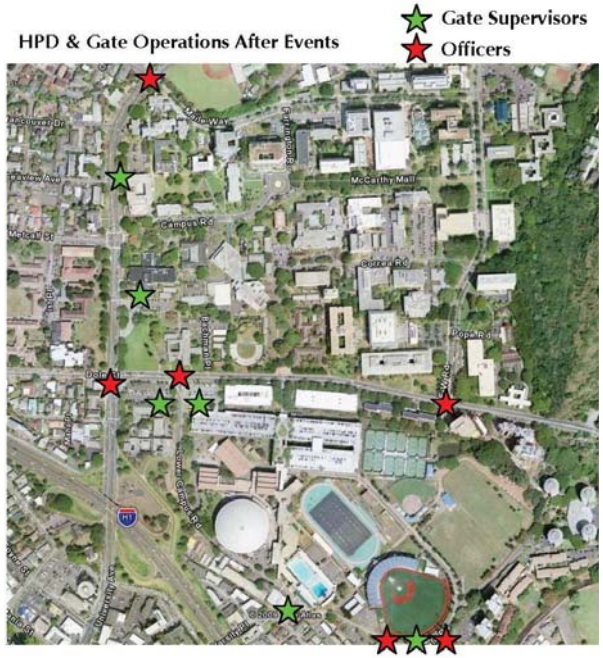
Lower Campus

- HPD officer will assist by closing off Lower Campus Road

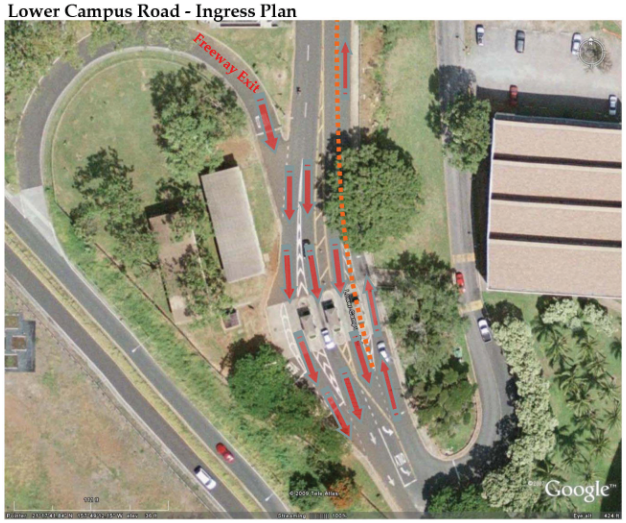
Upper Campus Lots

- As lots such as Zones 1, 2, and 17 get filled, officers will barricade lots.
- As parking areas such as Correa Road, and Farrington Road become filled to capacity, barricades will be set-up to block entry.

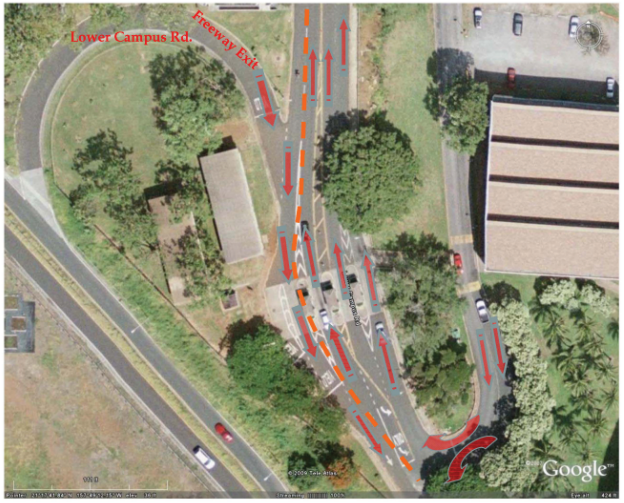




Lower Campus Road - Ingress Plan



Lower Campus Road - Egress Plan



MODIFICATIONS TO NORMAL OPERATIONS

Efficient Ingress and Egress of Vehicles:

- To Ensure Efficient Ingress and Egress of Vehicles Before and After the Special Event, Modifications to Normal Traffic Patterns will be Implemented.

Such modifications will include:

- Closing of Varsity gate to regular traffic at 3:00 p.m.
  - Signs at the Varsity Gate
- Vehicles exiting the parking structure after 5:00 p.m. on Fridays must exit through the Waialae Gate only.
- Barricades will be set-up at 3:00 p.m. on Fridays to establish the restricted parking area (Zone 18).
- Barricades will be set-up at 4:00 p.m. in the Zone 17 parking areas.
- Modifying Lower Campus Road to three inbound lanes with one outbound prior to an event.
- Conversion of two-way roads to one-way traffic flow.
- Coning of contra flow lanes.
- Closing of parking areas for special use.
- Control traffic flow through specific access points by redirecting vehicles to entries or exits that can handle the volume.

IDEAS TO EXPEDITE TRAFFIC

- Require season ticket parking pass holders to enter through Waialae Gate only. Season ticket parking passes attempting to enter through Lower Campus Road shall be charged the $3.00 entry fee.
- Position parking personnel along Lower Campus & Waialae Road to sell game day parking passes to vehicles waiting in the non permit lanes, which will allow them to enter through the permit lane.
- Direct exiting traffic from the fourth floor of the existing parking structure into the new parking structure. Vehicles may be directed to the fifth floor of the new structure where they can exit through the fifth floor emergency gate. These vehicles must turn right onto Dole Street. Other vehicles from the fourth and fifth floors of the existing parking structure may enter into the new parking structure using the faster ramping system to exit.
- Employee/staff support parking at the Astronomy parking lot with shuttle to Lower Campus. through the Waialae Gate only.
- vehicles from the fourth and fifth floors of the existing parking structure may enter into the new parking structure using the faster ramping system to exit.
- Employee/staff support parking at the Astronomy parking lot with shuttle to Lower Campus.

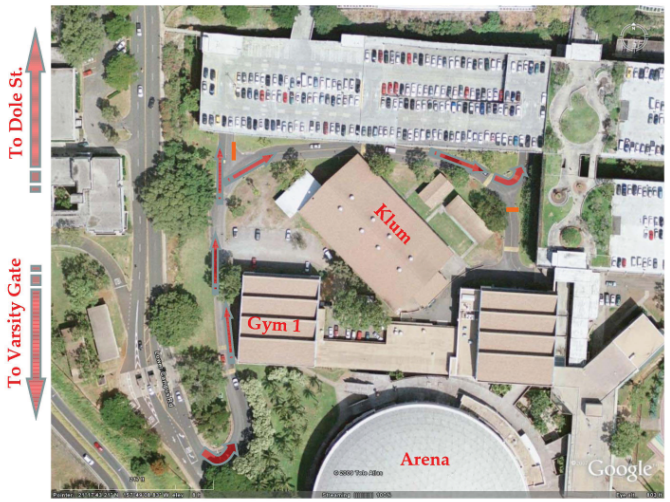
Waialae Gate –Ingress Plan



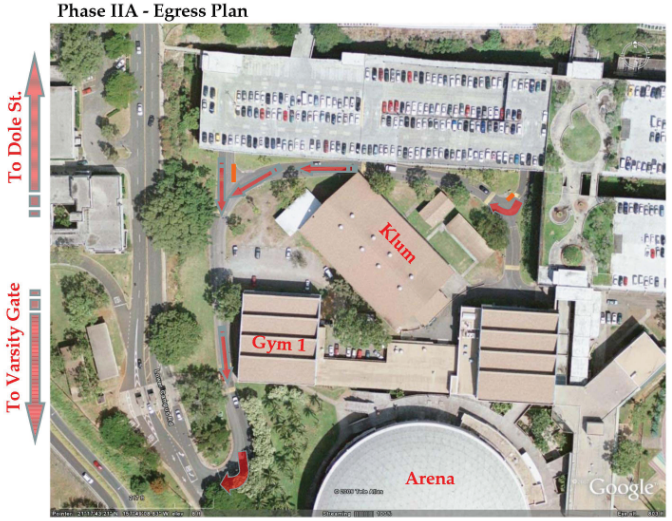
Waialae Gate – Egress Plan



Phase IIA - Ingress Plan



Phase IIA - Egress Plan



OTHER TRANSPORTATION RELATED ISSUES

PLANNED STUDENT & FACULTY HOUSING

As part of the UH Mānoa Long Range Development Plan 2007 Update, proposed projects include replacement and expansion of existing student housing dormitories and additional faculty housing units. Existing dormitories Johnson Hall A (1958), Johnson Hall B (1962) and Hale Noelani (1977) are all over 30 years old and are badly in need of refurbishing to meet current student needs and building codes. Therefore, the existing dormitories are to be replaced with modern higher density student housing facilities, including additional beds to meet current student housing demands.

Additional faculty housing is also proposed for either a site on Wa'ahila Ridge or a site on the Mauka Campus to meet faculty housing demands. The existing 3-story Wa'ahila Ridge Faculty Housing (1960) would be replaced with new, higher density, housing. Another alternative would be new faculty housing at the proposed Mauka Campus Woodlawn Drive site. Planned redevelopment of the CTAHR agricultural research facility for additional low-rise faculty housing is intended to address the transient housing needs of faculty. The site on the Mauka Campus is directly across from Mānoa Marketplace, Mānoa Library and Noelani Elementary School, and is accessible to the main campus via a short footpath, characteristics that make it ideal for faculty housing.

Redevelopment for housing would reduce the volume of commuters to and from campus, while reducing traffic around the campus and regionally. The concentration of student and faculty housing would also support the development of "campus life" and sustainability goals described in the UHM LRDP.

DORMITORY MOVE-IN/MOVE-OUT DAYS

In order to manage traffic impacts with the move-in of additional students. A Traffic Management Plan for Frear Hall was prepared as part of the Plan Review Use Resolution 06-255. The Plan encompasses the Traffic Management Plan of the University of Hawai'i at Mānoa Student Housing Office and was reviewed by the Traffic Review Branch of the City and County of Honolulu Department of Planning and Permitting.

The Student Housing Office at the University of Hawaii, Manoa manages the move-in and move-out for all of the University student dormitories. Actions include scheduling move-in times, providing signage, notification and information regarding move-in/out days, obtaining street use permits from the City and County of Honolulu to provide for unloading activities from Dole Street curb lane fronting Gateway House and Johnson Hall, coordinating on-campus parking, and controlling traffic movements on the Hale Aloha access drive, thereby reducing the volume of traffic. In addition, housing office staff and student volunteers assist arriving students with unloading, directing traffic to the lower campus parking structure where shuttles vans are provided between the parking structure and residence halls. The measures are in place for several days prior to the beginning of fall semester and prior to the end of spring semester.

Traffic flow on Hale Aloha access drive is restricted to one-way flow, in from Dole Street and additional manpower is provided to direct traffic during the busiest hours of the move-in and move-out days. Barricades that normally block vehicular access between the residence halls and the lower campus area are opened during move-in/out and traffic directed out to the lower campus area. Vehicles entering to drop off students and their baggage are sorted out before passing Hale Aloha's Lehua Tower, with those destined to Hale Aloha are directed to the right lane and those destined for apartments directed to use

the left lane. Parking passes are issued and drivers are instructed to proceed to the designated drop-off areas and unload baggage and other belongings, then either leave or park their vehicles in the lower campus parking structure. Drop-off areas near the building entrances are manned by staff and student volunteers to direct traffic and assist in unloading vehicles. Shuttle vans are provided between the parking structure and the residence halls.

CAR FREE PLANNING & PEDESTRIAN IMPROVEMENTS

The LRDP concept for the Central, Upper Central, Makai and Mauka Campus areas, continued in this Update, is to give priority to pedestrian circulation. Vehicular arrival points such as parking lots, bus stops and transit stations are, therefore, indicated on the periphery of the campus; freeing the central areas for pedestrian use. In the Central Campus area, for example, valuable land is presently occupied by low efficiency on-grade parking lots and old roadways. The removal of the parking and roads will provide significant areas for pedestrian use such as the Varney Plaza, the Legacy Path and Correa Mall. The location of additional parking, in structures, on the periphery of the Central Campus is very feasible, as is the servicing of the Central Campus without such a large roadway system as existing today.

Parking structures should be integrated into buildings whenever possible. As with downtown Honolulu, the integration of parking with buildings can serve to mitigate the visual impact of these structures. Parking structures are also prime candidates as sites for other buildings, thereby reducing the impermeable footprint of construction on campus. Finally, these structures are also candidates for "green" or landscaped roofs.





Varney Plaza Existing and Rendering

MOPED/MOTORCYCLE IMPROVEMENTS

One of the alternative modes of transportation popular with students is the moped. Moped parking is allowed only in designated areas on the periphery of the campus areas. These moped parking areas are adjoining or in the proximity of pedestrian gateways and adjoining parking structures.

BICYCLE IMPROVEMENTS

Bicycle parking is allowed at specific locations within the body of the campus and is related to buildings and destinations. Bicycle planning is currently underway at UHM as part of the on-going campus planning effort. A bicycle planning committee has been designated on-campus. To the extent possible, bicycle paths will be designated to minimize serious conflicts with pedestrians.

MASS TRANSIT IMPROVEMENTS

Mass transit is projected as a future mode of transportation for Honolulu. Transit is envisioned to service the UHM Campus and neighboring communities. Future transit stations may be located in the surrounding commercial districts and not on campus in order to enhance campus security, while guaranteeing service to the public as well as University students and faculty. However, the University recognizes that station locations on this phase of rail transit development is speculation at the moment. The University remains open to further discussions with the City on transit alignment and station locations.





Makai Gate Existing and Rendering

CAMPUS SECURITY AND PARKING MANAGERS

University of Hawai`i
Parking Services Office
2600 Campus Rd. Rm 014
Honolulu, HI 96822
Phone: 808-956-8899
Email: parking@hawaii.edu

Special Events: eventprk@hawaii.edu

Traffic & Parking 24/7 Hotline/Campus Security Dispatch:
Phone: 808-956-9292
Email: traffic@hawaii.edu

UHM Parking Office:
The UHM Parking Office is located on the ground level of the Queen Lili'uokalani Center for Student Services

UHM Parking Office Hours
Monday - Friday
7:45 am - 4:30 pm

CONCLUSION

The University of Hawai'i, Mānoa Campus is committed to being a good neighbor and providing parking and traffic management for students, staff, faculty and visitors at the campus. This Transportation Demand Management (TDM) Plan defines traffic and parking measures implemented by the University to mitigate traffic at the campus as well as regionally. The TDM measures manage 1) Baseline daily parking and traffic activities, 2)Special Events of 5,000 Attendees and 3) Special Events above 5,000 Attendees. UHM is committed to the TDM measures.

In addition, UHM also provides many alternative modes of transportation programs, such as the Campus Shuttle Bus, U-PASS, carpool programs, and improved moped/motorcycle and bicycle parking, which work to improve traffic conditions surrounding the campus and regionally. In addition, the UHM Campus is committed to the goals of the UH LRDP 2007 Update, including planning for pedestrian improvements and carfree planning to promote walkability and sustainability goals.

APPENDIX

Special Events Manual

Not all events held on our campus are considered Special Events. The types of events that are covered in this manual are ones that require instructions for the guards in addition to the daily operations.

Special Events include events with attendance of anywhere from 10 to as many as 15,000. Such events as conferences, UH Athletic games, UH Manoa Graduation ceremonies and other outside sponsored events held on the Manoa campus are considered Special Events. Parking and transportation arrangements for these events may include buses, pre-sold parking passes, stick counts for later billings, reserved parking areas and or shuttles. Depending on the time of day and the day of the week, traffic controls with Special Duty HPD Officers may be for both entering and exiting traffic for the event. The size of the event also determines the amount of traffic and parking controls we implement.

The following are examples of the more common types of Special Events that are held on the Manoa campus:

No. of Attendees	Event	Location
10 – 1,000	East West Center Conferences	Imin Conference Center
	UH Convocation Ceremony	Kennedy Theatre
Small Special	Music Concerts/Recitals	Orvis Auditorium
Event	Drama/Theatrical Productions	Kennedy Theatre
	Colleges/Department Open House	Various locations
	UH Wahine Softball Game	Wahine Softball Stadium
	Swimming Meets/Tournaments	Duke Kahanamoku Pool
	Vendor Product Shows	Campus Center
	Career Fairs	Various locations
	Dignitary Visits	Various locations
1,000 – 4,000	UH Wahine Basketball Games	Stan Sheriff Center
	UH Baseball Games	Les Murakami Baseball Stadium
Medium Special	Outdoor Concerts	Andrews Amphitheater
Event	UH Football Green & White Games	Cooke Field
	Oahu Interscholastic Athletic Tournaments	Lower Campus Complex
	Hawaii High School Athletic Association Tournaments	Lower Campus Complex
	Special Olympics	Lower Campus Complex
4,000 +	UH Graduation Ceremonies	Lower Campus Complex
	UH Wahine Volleyball	Stan Sheriff Center
Large Special	UH Men's Volleyball	Stan Sheriff Center
Event	UH Men's Basketball	Stan Sheriff Center
	Los Angeles Lakers Basketball	Stan Sheriff Center
	New Hope Christian Fellowship	Stan Sheriff Center
	Honolulu Police Department D.A.R.E. Program	Stan Sheriff Center

SPECIAL EVENTS MANUAL

Small Special Events:

For most of the smaller Special Events, 10 - 100, we often use the Citation Officers scheduled during that time to assist with parking and or traffic controls. Examples of this type of events are:

- ✓ Conferences held at the Imin Conference Center.
  - Typically a Citation Officer is posted on the grass area to assist with parking vehicles displaying the East West Center Parking Pass.
  - If the number of East West Center Parking Passes issued is high, the Senior Supervisor is also posted to assist the Citation Officer.
- ✓ Concerts at Orivis Auditorium
  - Dependent on the expected crowd, a guard may be requested to sell tickets in the Zone 17 lot(s) for the attendees without a valid UH Manoa Parking Pass or Permit.

Other examples are events and conferences where the coordinators purchase Special Events Parking Passes for the attendees. When this arrangement is made, a sample of the Special Events Parking Pass will be distributed to the Senior Supervisor for dissemination to the Gate Attendants and Citation Officers.

Often other arrangements are made for billing the coordinators after the event for the parking fees. When this happens, the Gate Attendants are instructed to either take a stick count or check off names from a list. It is very important that the Gate Attendants follow the instructions given for these events. The collected numbers are used to calculate the billing costs. Counts from all gates included in the instructions must be accounted for. These numbers are attached to a copy of the billing request and filed for auditing purposes.

Medium Special Events:

For Special Events where the expected attendance is expected around 100 – 1000, a Special Events Manpower Request is submitted to the Senior Supervisor for the Special Event. Examples of these types of events include:

- ✓ UH Wahine Softball Games
- ✓ Smaller UH Baseball Games
- ✓ UH Wahine Basketball Games
- ✓ Outdoor Concerts in Andrews Amphitheater

A typical request will include a Supervisor, Barricade Officers, a Zone 18 Officer, a Zone 19 Officer, a Softball Stadium Officer and additional Officers to assist with traffic and patrols in the parking structure. A detailed listing of the Special Events Manpower Positions will be addressed in a later part of this manual.

Large Special Events:

For the large Special Events where the expected crowd is 1000+, a Special Events Manpower Request is submitted to the Senior Supervisor. Examples of these types of events include:

- ✓ UH Graduation Ceremonies
- ✓ UH Men's Basketball Games
- ✓ UH Women's Volleyball Games

The typical request for these types of events may include similar posts as a Medium Special Event, with an additional Supervisor, additional Gate Attendants and other posts. Often positions are required in the Upper Campus area as well as the Lower Campus area also. Again a detailed listing of the responsibilities for the positions will be addressed in a later part of this manual.

Special Events Parking Passes:

The following is a list of the different types of Special Events Parking Passes that are currently issued by the UH Manoa Parking Operations:

1. Special Events Parking Passes
   This pass is printed on colored paper. The size of the pass is either 4 ¼" X 5 ½ " (half sheet) or 2 $^{1}/_{8}$" X 2 ¾" (quarter sheet)
   The Event Name, Parking Zone(s) and valid dates are printed on the front.
   Samples are distributed prior to the start of the event with any instructions.

2. Regular Season Parking Passes
   This pass is printed on card stock and hangs from the rear view mirror of the vehicle. These passes are valid for parking during the Regular Season home games of the particular UH Sport they are sold for. This passe is valid for parking in zone 20, 17 and all upper campus lots.

   Currently the Regular Season Parking Passes are sold for the following sports:
   UH Wahine Volleyball (WVB)
   UH Men's Volleyball (MVB)
   UH Wahine Basketball (WBB)
   UH Men's Basketball (MBB)
   UH Baseball (RBB)

   This pass is NOT valid for parking during pre-season or post-season games.

3. Regular Season Koa Anuenue Parking Passes
   This pass is also printed on card stock and hangs from the rear view mirror of the vehicles. These passes are only valid for parking during the Regular Season home games of the particular UH Sport and year they are sold for. A separate reserved sections of the parking structure and zone 18 is set up for the drivers with the appropriate Regular Season Koa Anuenue Parking Pass.

Currently the Regular Season Koa Anuenue Parking Passes are sold for the following sports:

UH Wahine Volleyball (WVB)
UH Men's Volleyball (MVB)
UH Men's Basketball (MBB)

This pass is NOT valid during pre-season games. For post-season games the drivers must pay for parking. The reserved parking areas shall be set up as usual. In order to park in the reserved parking areas, the drivers must display BOTH the Regular Season Koa Anuenue Parking Pass and the daily ticket.

BUSES:

For Special Events that include buses that drop off attendees and later pick them up, we again will post a Citation Officer to assist with traffic controls. The Supervisor responsible for the area where the buses will drop off or pick up shall also assist as needed if there will be multiple buses arriving at the same time. They shall stop approaching vehicles to allow the bus to unload safely. If the passengers are required to cross paths with vehicle traffic, the Citation Officer must stop traffic for them to do so safely.

Approved of locations for drop off and pick up of passengers include the following:

- ✓ East West Road:
  - Fronting Kennedy Theatre to Zone 11 along the curb.
  - Along the curb in the intersection of East West and Maile Way, near the Center for Korean Studies.
  - Varney Circle
  - Behind Campus Center by the stairwell near Hemenway Hall.
- ✓ Lower Campus:
  - Fronting the Old Ticket Office (between the parking structure and the Athletic Complex)
  - Depending on the event size, date and time:
    - Along the red curb from the Duke Kahanamoku Pool to the Stan Sheriff Center.
    - Along the curb from the Old Ticket Office to the Les Murakami Baseball Stadium fronting Cooke Field.
- ✓ Dole Street:
  - Fronting Andrews Amphitheater
  - Fronting William S. Richardson School of Law

Typically buses are NOT allowed to stage anywhere on our campus. We do not have enough room in any area that will allow them to do so without impeding traffic or occupying parking stalls. Bus companies' coordinators are informed of this policy. Often drivers will attempt to park on our campus. Citation Officers and Supervisors shall remind the drivers that they need to find other alternative parking and return later for pick up. If their passengers are not ready at the designated pick up time and place, the bus driver must continue on and circle around to return a few minutes later. There are exceptions to this policy.

Only when the Parking Office gives authorization bus drivers are allowed to park on campus. Approved areas for staging buses include:

- ✓ The area between the Duke Kahanamoku Pool and the H.E.L.P. Portables. The bus must be parked along one side. Driver shall remain with the bus at all times. This area shall NOT be used before 5:00PM.
- ✓ Zone 18 Baseball lot
- ✓ Waialae Gate, along the curb.
- ✓ Fronting the Old Ticket Office (between the parking structure and the Athletic Complex)

There are times when coordinators do not arrange for buses. The Supervisors and other guards need to be aware of unexpected arrivals and take appropriate actions.

Special Events Manpower:

A manpower request will be faxed to the Freeman Guards Inc. office at least 2 weeks prior to a Special Event requiring additional manpower. A copy of the fax confirmation as well as the request will be left in the Senior Supervisor's bin at the Parking Office.

Senior Supervisor (Parking 3):

The Senior Supervisor is responsible to ensure the manpower requests for Special Events is filled as requested. They should also ensure the officers assigned to the requested posts are properly trained and capable of working that post. The Senior Supervisor shall work with the assigned Special Events or Daily Supervisors on disseminating information to the different positions that need to be aware of the arrangements.

For high profile and Large Special Events, the Senior Supervisor will be required to work. The Senior Supervisor will oversee all positions assigned for the Special Event. If needed, the Senior Supervisor may have an area of responsibility such as the Upper Campus area to monitor and control.

The Senior Supervisor at times may be the supervisor assigned to a high profile event such as a Dignitary Visit. They shall coordinate with the assigned guards and the Daily Supervisor for traffic cones, barricades and signs.

Special Events Supervisor 1 (Parking 4):

For Medium Special Events, the Special Events Supervisor 1 shall be responsible for all aspects of the Special Event. The areas of responsibility include the guards assigned to the perimeter posts, barricades, zone 19, etc.; as well as the guards assigned inside the parking structure. On the dates when regular manning of the gates is not scheduled and the gates are requested for a Special Event, this Special Events Supervisor shall also be responsible for the gates.

For Large Special Events, this Special Events Supervisor shall be responsible for only the positions outside of the parking structure. This includes the gates, barricades and the zone 17, 18 and 19 guards. This Special Events Supervisor shall work with the Regular Daily Supervisors to ensure the gates have adequate change and daily tickets for parking.

This position is required to be able to make the decisions to control both entering and exiting traffic for a Special Event. If traffic backs up, the call needs to be made to direct drivers in another direction to alleviate the congestion. Strong communication and problem solving skills are critical to this position.

Special Events Supervisor 2 (Parking 5):

For Large Special Events two Special Events Supervisors are required. Special Events Supervisor 2 shall be responsible for all the Special Events positions assigned in the parking structure and the immediate surrounding areas.

If buses are used to drop off passengers, this Special Events Supervisor shall be responsible to work with the guards assigned in the area to stage the buses in approved areas.

Key positions within the parking structure need to be aware of all changes of traffic patterns for entering and exiting traffic. The Special Events Supervisor 2 shall be responsible for disseminating this information to those positions.

Regular updates on the capacity of the parking structure are critical for Large Special Events. It is the responsibility of the Special Events Supervisor 2 to obtain and report this information to the Special Events Manager from the Parking Office. Typically the first status report is made one hour prior to the start of the event and continues every 15 minutes until the start of the Special Event. If is required on a more frequent interval, that shall be communicated to the Special Events Supervisor 2.

Strong communication and problem solving skills are important for the Special Events Supervisor 2 position.

Special Events Gate Attendants:

When requested there will be Special Events Gate Attendants assigned to work during a Special Event. The Gate Attendants will sell daily parking tickets to the drivers without a valid UH Manoa Parking Pass or Permit. In addition to selling daily tickets, the Gate Attendants must be aware of any different charge for parking, different passes that may be valid or not and a list of names for parking in the restricted parking areas for the event. The Special Events Gate Attendants shall sell daily tickets up to 1 hour after the scheduled start time of the event. This time may be adjusted as needed either earlier or later than scheduled dependent on the traffic conditions.

The Lower Campus 4 and East West 3 Gate Attendants shall sell their tickets from outside of the kiosk. A fanny pack with the tickets and change are issued to these Special Events Gate Attendants.

The Metcalf Gate attendant shall post at the entrance along University Avenue. The supervisor shall remove the poles blocking the road. This guard will need to stay at this post for exiting traffic. At that time vehicles shall only be allowed to exit and not enter from this gate.

Barricade Guards:

For events held in the Lower Campus area, Barricade Guards are usually requested. These guards are assigned to the Lower Campus Barricade and Waialae Barricade. They are responsible to screen the vehicles that access the Restricted Parking Area set up for the Special Event.

Strong communication skills are important for these positions. The Barricade Guards must be able to talk to drivers to find out if they are authorized or not to proceed through the Restricted Parking Area. The Barricade Guards also need to notify the zone 19 or zone 18 ROTC guard of vehicles that are approaching and their purpose.

Zone 19 Guard:

For Special Events held at the Stan Sheriff Center, the Zone 19 Guard is a high profile position. This is the area where very special guests park for events. These guests include the Governor of the State of Hawaii and the University of Hawai'i President. This guard is responsible to direct drivers where to park according to the list provided for the area.

The Zone 19 Guard should posses great customer service skills.

Zone 18 ROTC Guard:

For Special Events scheduled in the Stan Sheriff Center, the Zone 18 ROTC Guard duties is to assist with parking the special guests and support staff in the zone 18 area.

For Special Events scheduled in the Les Murakami Baseball Stadium, this position is as critical as the Zone 19 Guard described above. The Zone 18 ROTC area for these Special Events is where the very special guests park for the event.

The Zone 18 ROTC Guard should posses great customer service skills.

Zone 18 KOA:

The responsibility of the Zone 18 KOA Guard is to assist with directing drivers to appropriate parking areas. The list of guests and support staff designates the lots where they are allowed to park. The Zone 18 KOA Guard must be able to assist drivers accordingly.

During the UH Sports Games where the Koa Anuenue Reserved Parking Area is set up for those with the valid Regular Season Koa Anuenue Parking Pass, the Zone 18 Guard shall also direct the drivers to the reserved stalls. The pass number and license number of the vehicle must be logged upon entry.

The Zone 18 KOA Guard should posses great customer service skills.

Zone 17 Music and Zone 17 Law:

Both the Zone 17 Music and Zone 17 Law Guards are required to sell daily tickets to the drivers without a valid UH Manoa Parking Pass or Permit. These guards shall sell daily tickets until 1 hour after the scheduled start time of the event. After the call is made to stop selling daily tickets, but before the end of the Special Event, these Guards shall patrol the respective lots for security of the parked vehicles.

At the end of a large Special Event in the lower campus area, these Guards shall post at the 5th floor cattle gate and Dole Street to direct exiting traffic through the dedicated right turn set up on Dole Street.

Zone 20 Guards:

The Zone 20 Guards assigned for the Special Event shall post in key positions throughout the parking structure. This includes the three entrances as well as other positions critical for directing drivers when we start with modified traffic for entering or exiting.

In addition to the guards assigned for the Special Event, the regular daily guards assigned to zone 20 shall be utilized to expedite entering and exiting traffic. If exiting traffic continues beyond their regular end time, upon approval from a manager from the Parking Office, their end time shall be extended to reflect the actual time they are released from their post. Also, if needed, the gate attendants getting off of their shift may also be asked to stay back and assist with traffic control in the parking structure. The guards' names and extended end times shall be communicated to the Freeman Guards Inc. office to ensure the guards are compensated for their time.

The following are brief descriptions of the posts in the zone 20 parking structure during the Special Events. Each position requires a guard with great communication skills and basic knowledge of traffic controls. They each shall be able to provide directions to customers that may ask.

1st Entrance:

This guard directs traffic entering as well as exiting the parking structure from the 1st or Ewa entrance. When the call is made, the cones are set up and traffic is directed one way into the parking structure from Lower Campus Road. Any driver wanting to exit the parking structure at this time shall be directed towards Cooke Field for exiting out towards Waialae Gate. This guard is responsible to notify the Klum Gravel guard when traffic is modified. The 1st Entrance guard shall direct traffic in a professional manner. This guard will also sell blue tickets to motorcycle riders that want to park in the designated Motorcycle parking area set up next to this entrance during large Special Events held in the arena.

For exiting traffic, the cones shall be set up when the call is made. This guard is responsible to stop traffic to allow pedestrians to cross the road. After the call is made to pick up the cones, the guard shall work with the Klum Gravel guard to pick up the cones along the road and stack them up near the entrance to the parking structure.

Middle Entrance:

This guard directs traffic entering as well as exiting the parking structure from the 2nd or middle entrance. When the call is made, the cones are set up and traffic is directed one way into the parking structure from Lower Campus Road, any driver wanting to exit the parking structure shall be directed towards Cooke Field for exiting out towards Waialae Gate. This guard is responsible to direct traffic in a professional manner.

For exiting traffic, the cones shall be set up when the call is made. This guard is responsible to stop traffic to allow pedestrians to cross the entrance to the parking

structure. They will need to ensure that vehicles are directed to exit via the correct lane of traffic. After the call is made to pick up the cones, the guard shall be sure to direct traffic into the correct lane. They shall then pick up the cones along the road and stack them up near the entrance to the parking structure.

Cooke Field Entrance:

This guard directs traffic entering as well as exiting the parking structure. When the call is made, the cones are set up and traffic is directed one way into the parking structure from Lower Campus Road. Exiting traffic will be directed out towards Waialae Gate from this position. This guard is responsible to direct traffic in a professional manner.

If any buses come in for the Special Event, this guard will assist the Special Supervisor to allow the driver to unload the passengers by the Old Ticket Office. Later this guard shall assist the drivers to stage for the pick up before exiting traffic starts.

For exiting traffic, the cones shall be set up when the call is made. This guard shall notify the guard posted at the 2nd Floor Ramp to start sending vehicles down two lanes. The Cooke Field Entrance guard is responsible to stop traffic to allow pedestrians to cross the entrance to the parking structure. They will need to ensure that vehicles are directed to exit via the correct lane of traffic. After the call is made to pick up the cones, the guard shall notify the 2nd Floor Ramp guard and be sure to direct traffic into the correct lane. They shall then pick up the cones along the road and stack them up near the entrance to the parking structure.

Zone 20 Cattle Gate:

This guard shall watch the cattle gate on the fifth floor of the parking structure. Only exiting traffic will be allowed to go through this gate. Drivers wanting to park in the parking structure must enter via the Lower Campus or Waialae Gates.

Authorized vehicles allowed to enter via the cattle gate are Campus Security, Parking Office and Freeman Guards, Inc. If any of these vehicles approach the gate for entering, this guard shall assist with ensuring no vehicles are exiting at the same time.

This guard is assigned to another post for exiting traffic if zone 17 guards are also posted for the Special Event.

2nd Floor Ramp:

This position is in the Koko Head side of the parking structure. The guard shall post at the top of the ramp going up from the Cooke Field Entrance. During entering traffic the guard is responsible to direct traffic coming in from the 1st Entrance as well as the traffic from Cooke Field Entrance.

For exiting traffic, when the call is made to start, the Cooke Field Entrance guard shall notify this guard to begin and stop sending traffic down two lanes out towards Cooke Field Entrance. When the call is made to go back to regular traffic, the guard shall be sure to direct vehicles down the correct lane.

2nd Floor Middle:
This position is in the area above the Middle Entrance. This guard is responsible to direct traffic in the correct directions. When the call is made for one way in from Lower Campus, this guard shall direct any driver wanting to exit out towards Cooke Field Entrance.

For exiting traffic this guard shall direct drivers from the Ewa side of the parking structure out towards the First Entrance. Traffic from the Koko Head side of the parking structure shall be directed out towards Cooke Field. Towards the end of exiting traffic, if the traffic is light on the Ewa side, the traffic from the Koko Head side can be directed out towards the First Entrance.

3rd Floor Handicap:
This guard shall patrol the area of the 3rd Floor Handicap stalls on the Koko Head side of the parking structure. They are responsible to ensure drivers parking in the marked accessible stalls have a valid Department of Transportation Disability Parking Placard. This guard shall also ensure drivers do not park in areas marked off for wheelchair accessibility. If this area is full, the guard shall direct drivers to other Handicap stalls in the parking structure.

3rd Floor Ramp:
This position is in the Koko Head side of the parking structure. The guard shall post at the top of the ramp going up from the 2nd floor. During entering traffic the guard is responsible to direct traffic coming in from the middle as well as the traffic from the 2nd floor coming up the ramp. During exiting traffic the guard shall direct drivers to go down both sides of the ramp. When the flow of exiting traffic is light, the guard shall direct drivers down the correct side of the ramp.

3rd Floor Middle:
This position is in the area above the Middle Entrance. This guard is responsible to direct traffic entering and exiting. They shall be aware of traffic from both the Ewa side as well as the Koko Head side of the parking structure. If one side needs to be stopped to allow the other side to move, this guard shall be responsible to do that.

For exiting traffic this guard shall direct drivers from the Ewa side of the parking structure out towards the Ewa side. Traffic from the Koko Head side of the parking structure shall be directed out towards Koko Head. Towards the end of exiting traffic, if the traffic is light on the Ewa side, the traffic from the Koko Head side can be directed out in that direction.

4th Floor Ramp:
This position is in the Koko Head side of the parking structure. The guard shall post at the top of the ramp going up from the 3rd floor. During entering traffic the guard is responsible to direct traffic coming in from the middle as well as the traffic from the 3rd floor coming up the ramp. During exiting traffic the guard shall direct drivers to go down both sides of the ramp. When the flow of exiting traffic is light, the guard shall direct drivers down the correct side of the ramp.

4th Floor Middle:
This position is in the area above the Middle Entrance. This guard is responsible to direct traffic entering and exiting. They shall be aware of traffic from both the Ewa side as well as the Koko Head side of the parking structure. If one side needs to be stopped to allow the other side to move, this guard shall be responsible to do that. Any driver wanting to exit the parking structure shall be directed out towards the 5th floor cattle gate.

For exiting traffic this guard shall direct drivers from the Ewa side of the parking structure out towards the Ewa side. Traffic from the Koko Head side of the parking structure shall be directed out towards Koko Head. There will be drivers wanting to exit out the 5th floor cattle gate from this point. The guard will need to coordinate this traffic with the guard on the post mauka from this post so that the traffic in one direction does not stop for too long.

5th Floor Ramp:
This position is at the top of the ramp coming up from the 4th floor on the Ewa side of the parking structure. The guard will need to direct traffic entering towards the closest available parking stalls.

For exiting traffic this guard shall direct drivers down both sides of the ramp to the 4th floor. When traffic is light the guard shall direct drivers down the correct side of the ramp.

Zone 20 KOA Guards:
The Zone 20 KOA Guards are positioned to screen vehicles that enter through the Koa Anuenue Reserved Parking Area in the parking structure. The pass number and the license number of the vehicles shall be logged upon entry into this area.

For UH Baseball Games and other Large Special Events scheduled in the Les Murakami Baseball Stadium or the Wahine Softball Stadium, the Koko Head, Makai area of the first floor shall be coned off for Handicap Accessible parking. The Guard(s) posted in this area shall screen vehicles wanting to park to ensure they posses a valid Department of Transportation Handicap placard.

Klum Gravel Guard:
The Klum Gravel Guard shall be aware of when traffic patterns are modified. Often the traffic on the Lower Campus Access Road is modified to travel in a one way direction. Drivers wanting to exit out of the Klum Gravel lot will need to be directed accordingly.

The Klum Gravel Guard will need to always be on the lookout for oversized vehicles wanting to park or a Special Event. The Klum Gravel lot is one designated lot for oversized vehicles. If the gravel lot is full, the guard needs to notify the closest guard with a radio to notify the gates. This will enable to gate attendants to instruct the drivers of oversized vehicles to park in zone 17.

Other authorized vehicles for the Klum Gravel lot are Media (TV, Radio, Newspaper, etc.) and the UH Cheerleaders. All others must park in the zone 20 parking structure.

Correa Road Guard:

The Correa Road Guard shall direct drivers parking in the lots along Correa Road to open parking spaces. As the lots fill, the Correa Road Guard shall move up the road and continue directing drivers to the available parking.

Krauss Circle Guard:

The Krauss Circle Guard is responsible to keep the area clear. When shuttles are needed to transport attendees parking in far lots, Krauss Circle needs to remain clear of vehicles so the shuttles may proceed through with ease. During Outdoor Concerts at Andrews Amphitheater, the area around Krauss Circle becomes a Restricted Parking Area. The Krauss Circle Guard must screen drivers and only allow authorized vehicles into this area.

Kalele Road Guard:

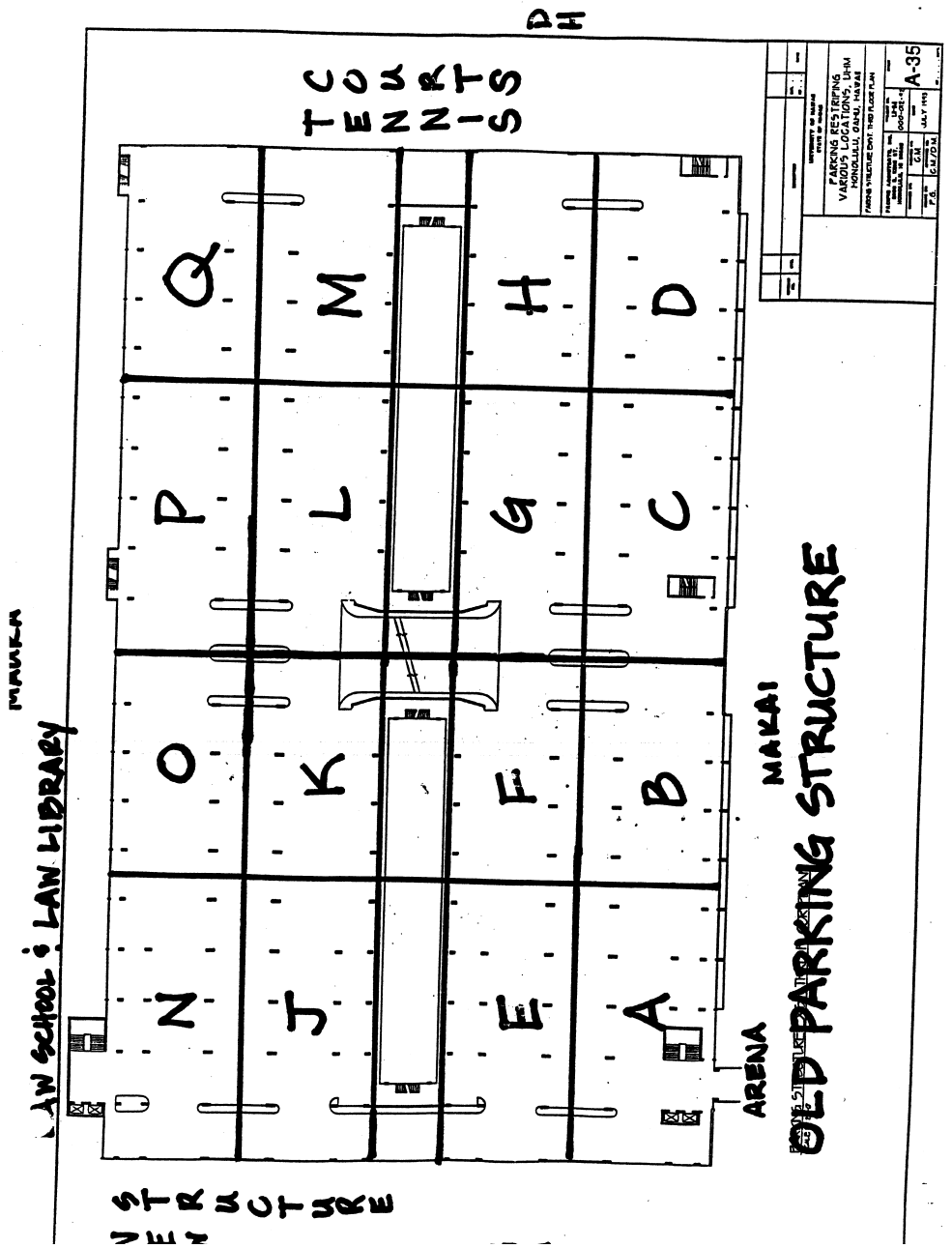
The Kalele Road Guard assists the Special Duty Honolulu Police Department Officers with setting up cones for exiting traffic from Special Events held in the Lower Campus area. When the call is made by a Special Events Supervisor to set up for exiting, the Kalele Road Guard shall respond and do so.

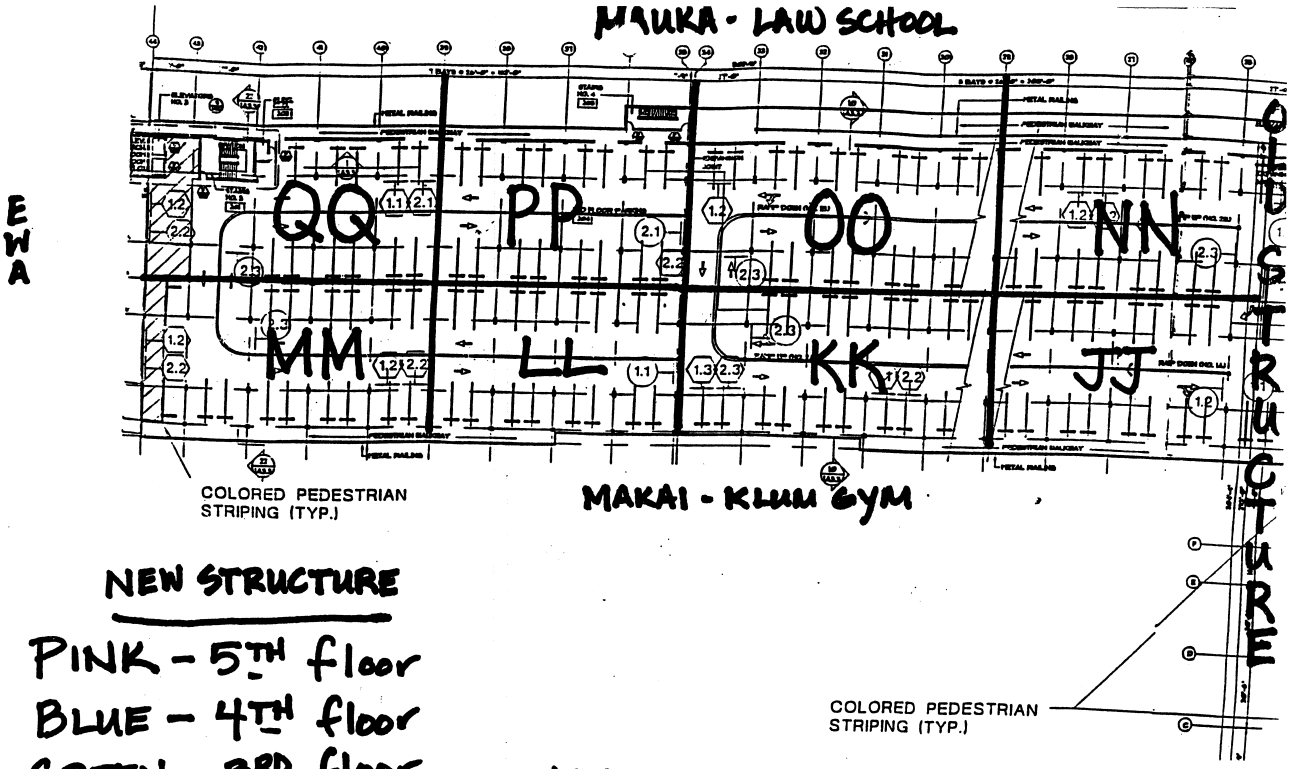
Softball Guard:

For Special Events scheduled in the Wahine Softball Stadium, the Softball Guard is responsible to keep the area between the practice field and the Wahine Softball Stadium clear. Authorized individuals will be on a list to be provided to the Softball Guard.

Varney Circle, Farrington Road and Korean Studies Guards:

The positions of Varney Circle Guard, Farrington Road and Korean Studies Guards are similar to the Correa Road Guard. These Guards shall monitor the lots in the area and direct drivers to the available parking areas.

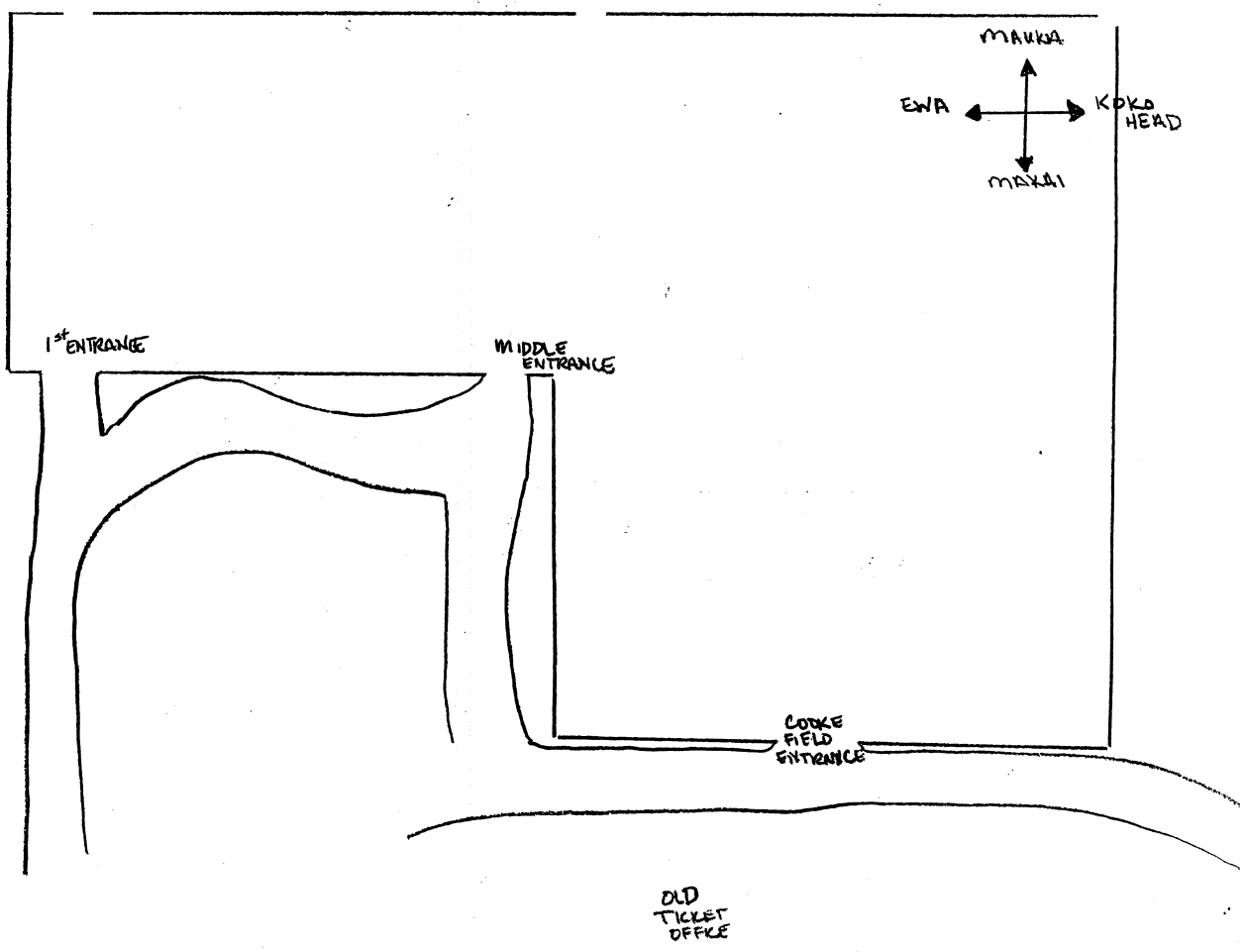


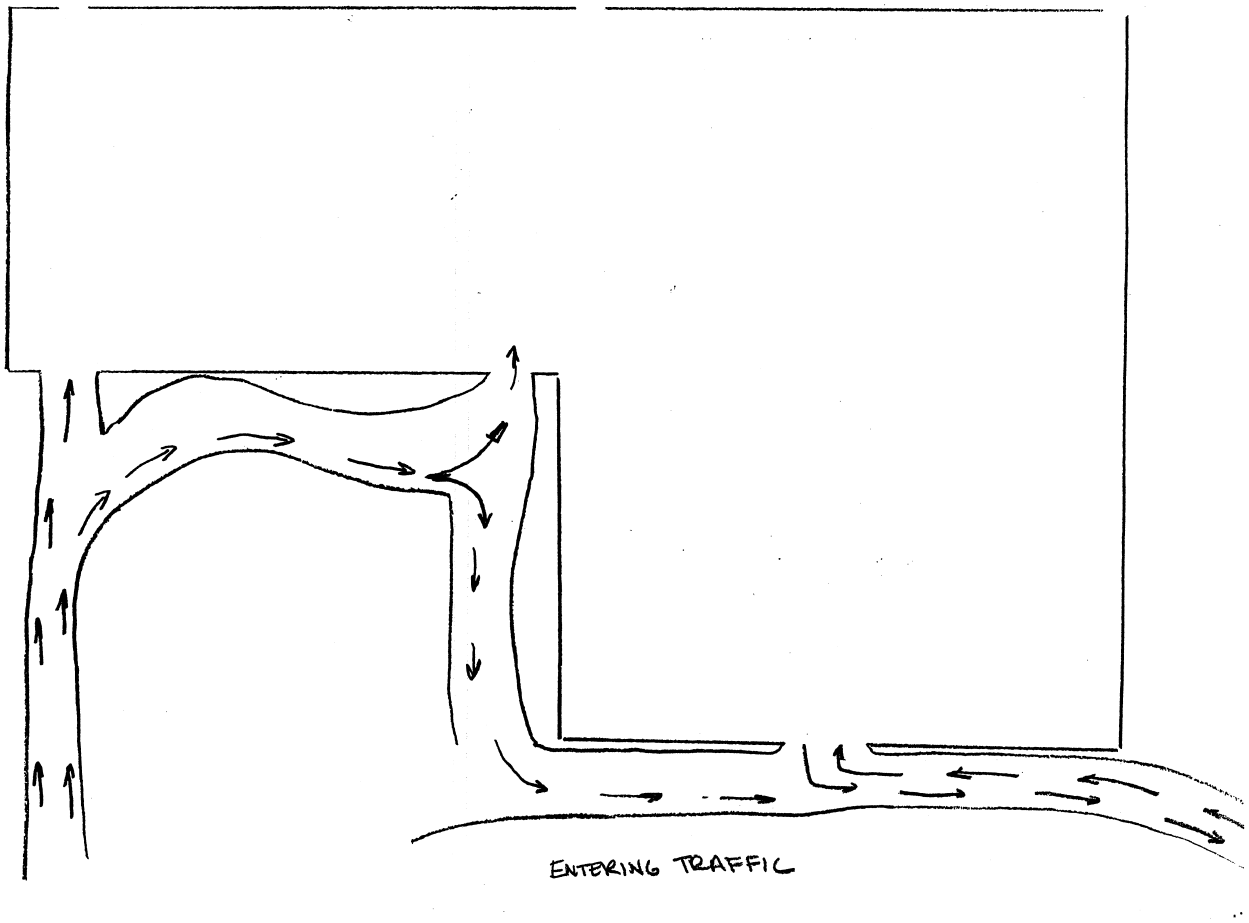


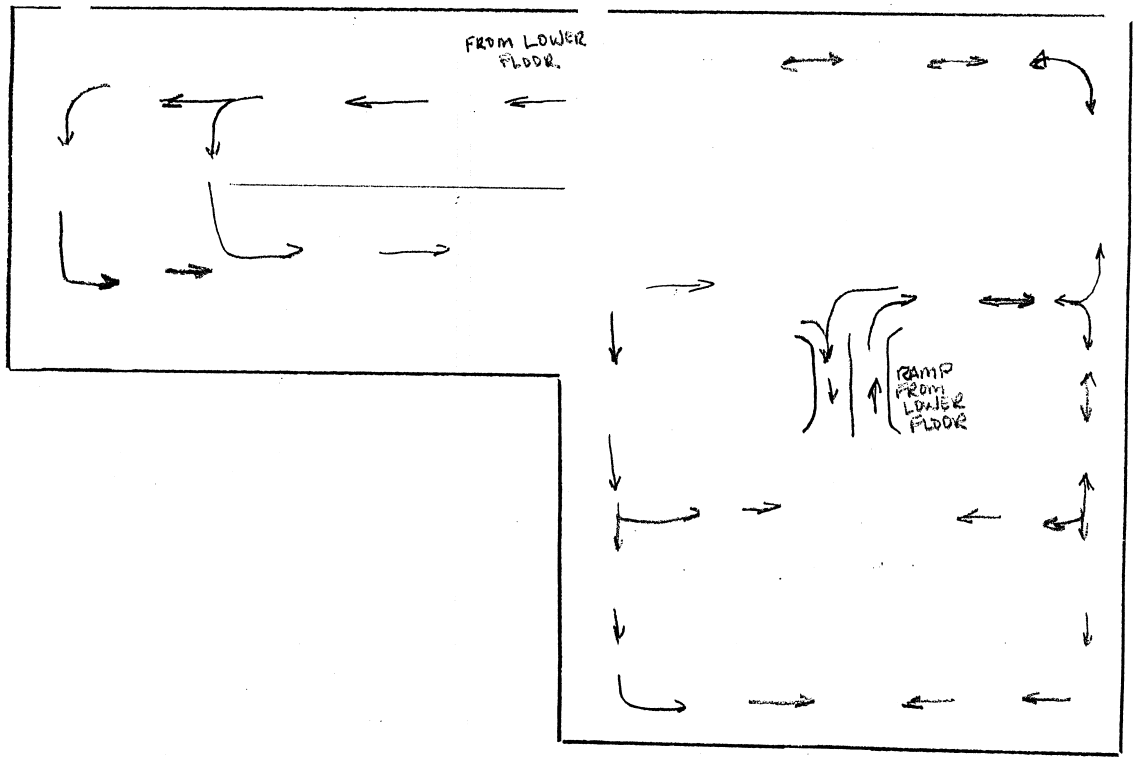
NEW STRUCTURE

PINK - 5TH floor
BLUE - 4TH floor
GREEN - 3RD floor
ORANGE - 2ND floor
RED - 1ST floor

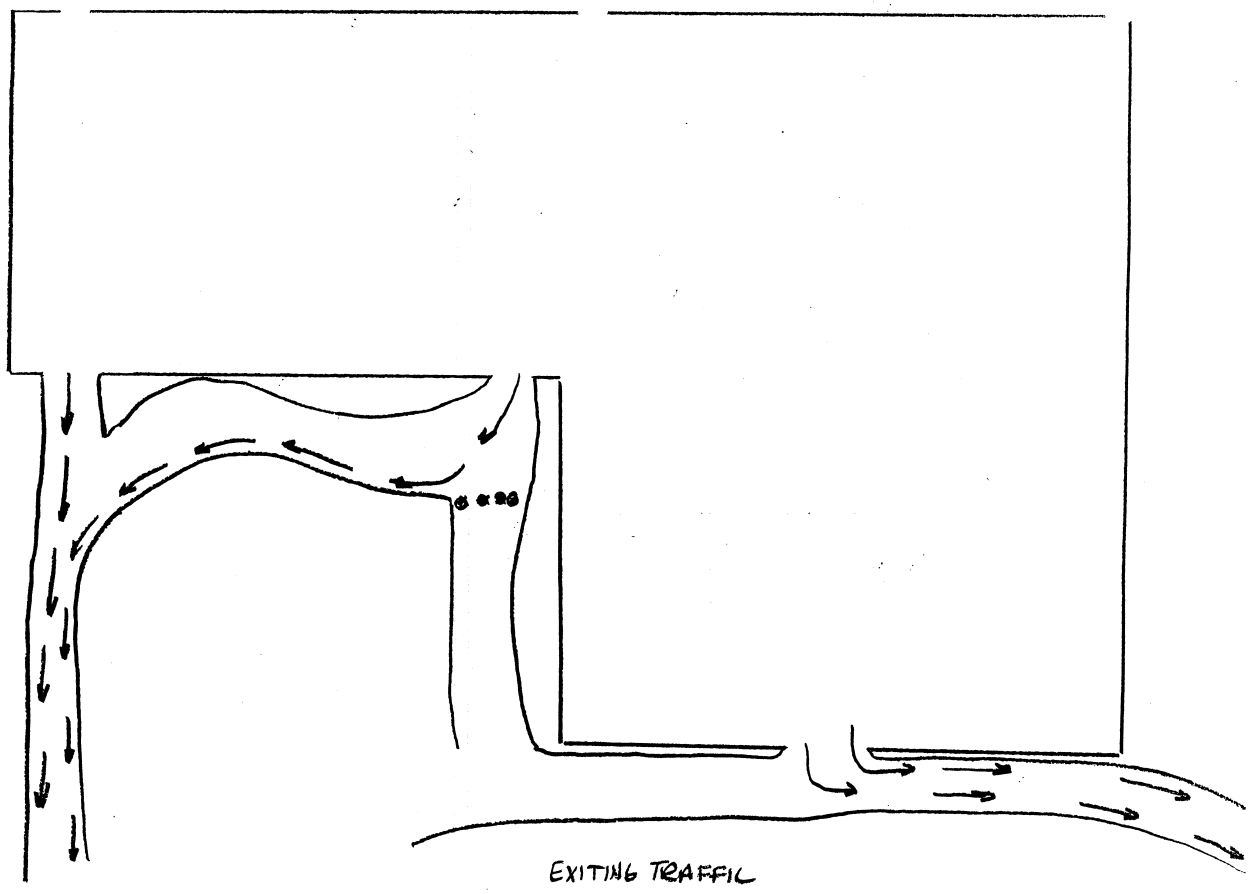
HANDICAP ACCESS TO ARENA AND BASEBALL STADIUM THROUGH 3RD FLOOR RAMP FROM STRUCTURE TO ATHLETIC COMPLEX.



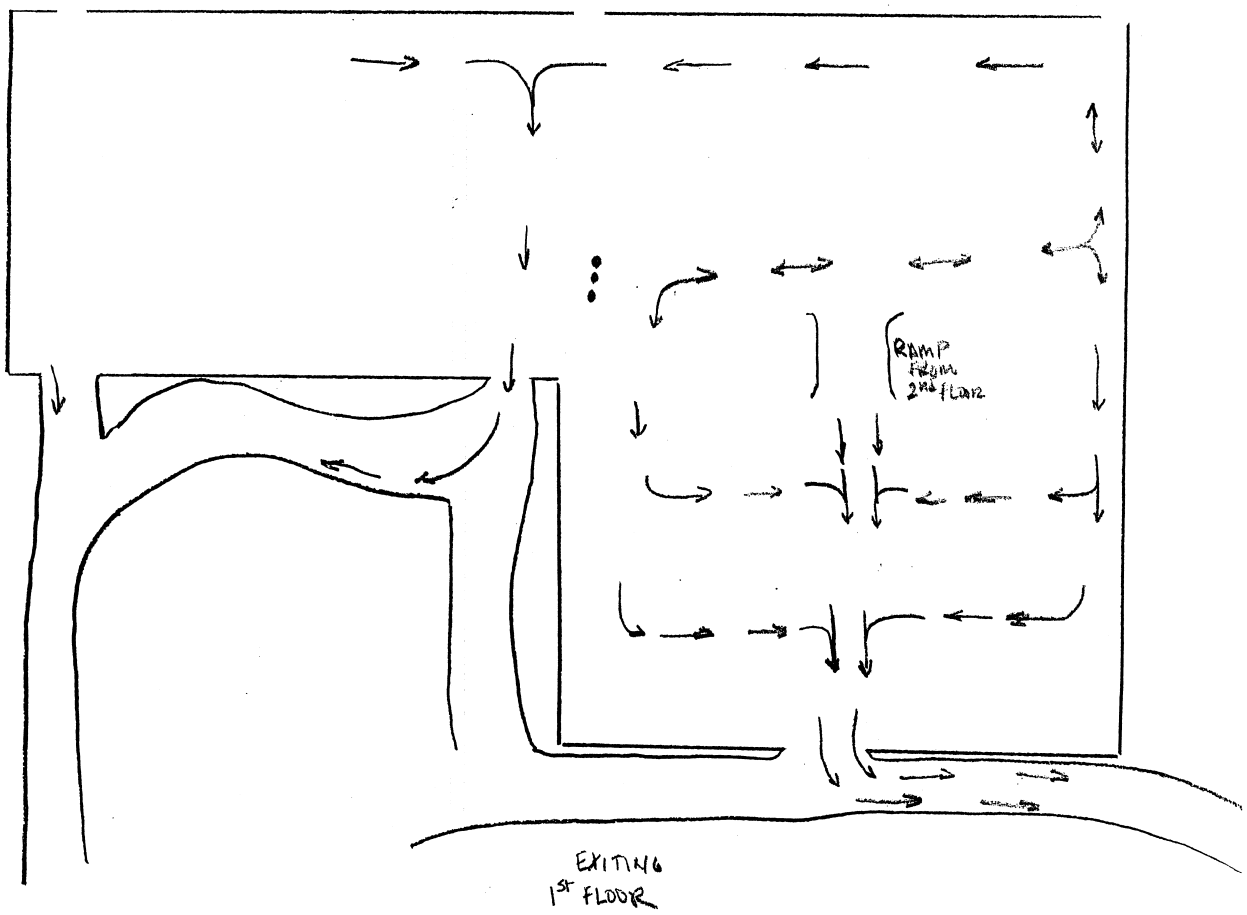

ENTERING TRAFFIC

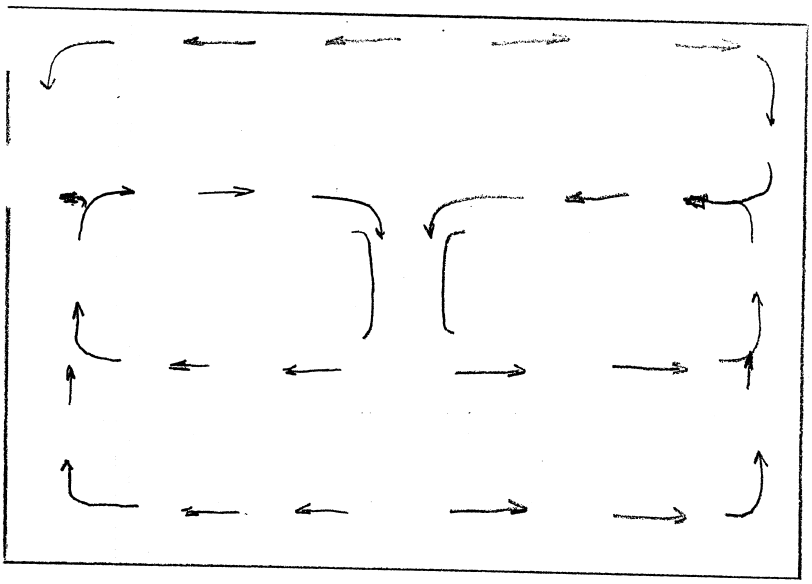


ENTERING TRAFFIC
PHASE I & II
UPPER FLOORS

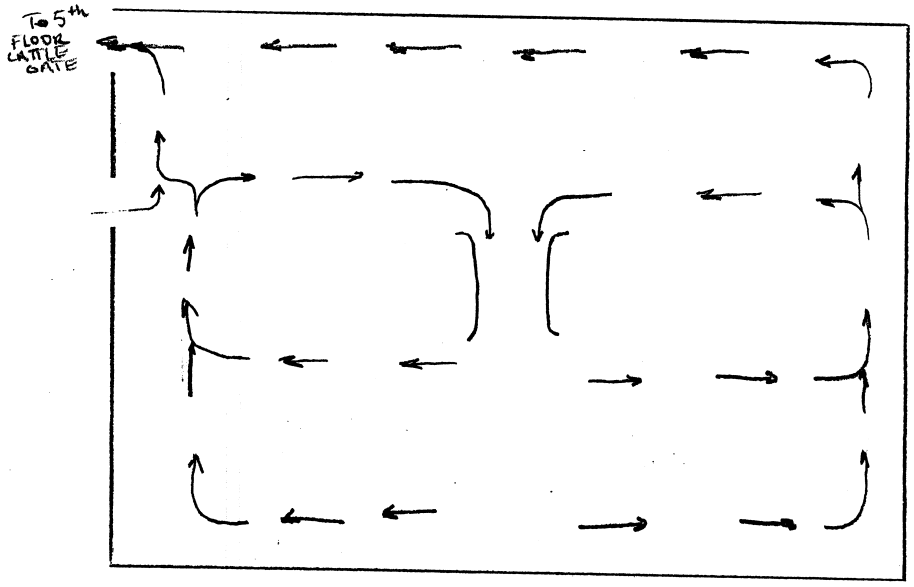


EXITING TRAFFIC

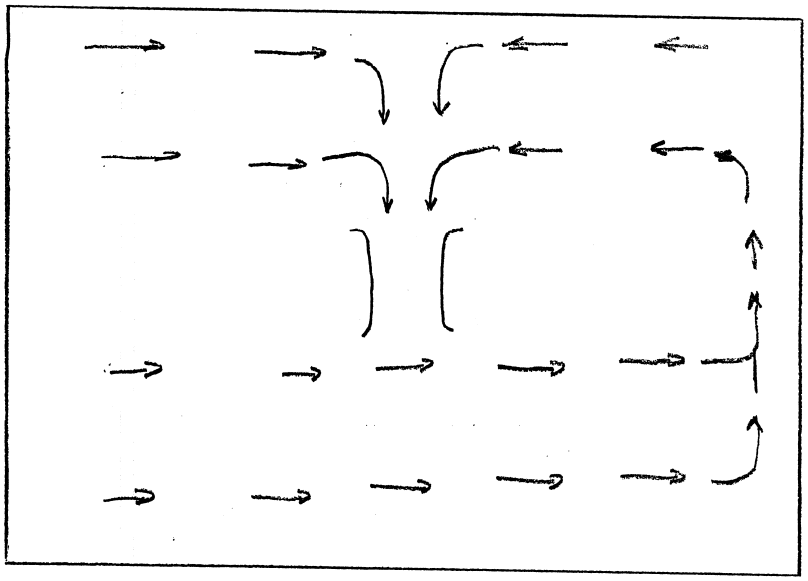




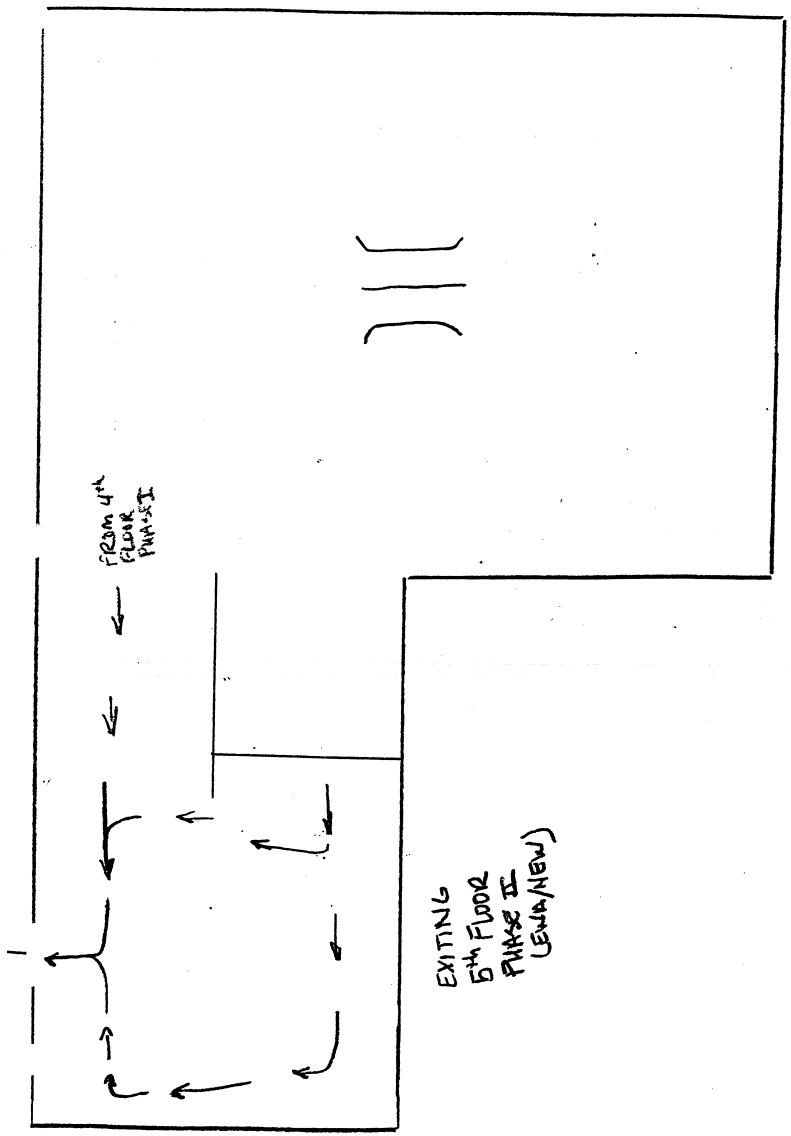
PHASE I (KOKO HEAD/OLD)
EXITING
2nd & 3rd FLOORS



PHASE I (KOKO HEAD/OLD)
EXITING
4th FLOOR



PHASE I (KOKO HEAD/OLD)
EXITING
5th FLOOR



Special Events S.O.P.

Any time your on the road or on the tailgate of the truck be sure to wear the vest!!

Set-up

1. Get into the truck and bring cone shop keys and shop keys.
2. Drive to cone shop.
    a. Grab 2 radios if needed for more people.
    b. Grab vest for everyone.
    c. Grab a box of flares. (Have at least 15 flares; Night events only)
    d. Grab barricades.
        i. 6 metal expandable barricades
        ii. 3 wooden barricades with the one-way arrow attached.
        iii. 6 wooden A-frames and 12 small junk cones.
    e. Grab cones.
        i. 2 stacks of 12 big cones.
        ii. 1 stack of 14 big cones.
        iii. 14 green small cones.
        iv. 8 junk cones.
        v. 4 small orange cones.
        vi. About 45 cones. (throw cones individually into the truck)
3. Load the barricades first and distribute them around the structure before loading the cones.
4. Drive up the cook field entrance ramps and place a wooden barricade with 2 A-frames and 4 small orange cones on the center island between the stalls. (Place a wooden barricade on the second, third and fourth floor in the same place.)
5. One metal expandable barricade is placed on the second floor in the space between 2 stalls on the ramp between the new side and the old side of the structure.
6. 5 metal expandable barricades are placed in the same spot as the second floor but on the fourth floor.
7. The best way to do the barricades is to do everything by floors.
8. At the forth floor park the truck to go turn on the escalators.
    a. Open all the gates and turn escalators on. All going down.
9. Have 2 people sit on the tailgate of the truck. (Have a good careful driver)
    a. People sitting on the tailgate should be wearing their vest at all times and should hold onto the truck just as a safety precaution.
10. Drive up to the law lot.

11. Place the 14 small green cones in the first 14 stalls to reserve them for HPD. (See diagram)
    a. There should be 7 stalls on each side of the first row.
    b. If there are cars in the stalls place the cone on the line beside the stall.
12. Have one person with a vest take 3 big cones to the top of the road near the island at the light between the law lot and the music lot.
13. Place one cone on the second reflector on the yellow line.
    a. The very top reflector is the first one.
14. Place another cone on the fourth reflector skipping the third reflector.
15. The third cone goes on the 6 reflector.
16. Basically the first cone starts on the second reflector from the top and then there is a cone on every other reflector all the way down. (See diagram)
17. Leave the law lot and have the driver drive down the left lane closest to the yellow line to allow the people on the tailgate to place cones on every other reflector. (See diagram)
18. Move to the right lane and position yourself to the far right by the curb when reaching the guard shacks.
19. Place cones evenly spaced out while the truck moves to form another lane that cars can go through. (See diagram)
20. The last cone should be placed in line with the solid horizontal white line for the left turn lane.
21. At that line place 3 cones horizontally with one cone on each of those 3 cones (so 6 total) to block off that lane that was just made. (See diagram)
22. Drop off 3 flares with guard. (Night event only)
23. Turn left to head down toward the structure.
24. Place a cone at the very top of the yellow line, as you turn left.
25. Place a cone on the yellow line so that the cone is approximately in line with the lamppost. (First 2 lamp post only) (See diagram)
26. At the speed bump right before the first entrance to the structure, place one cone before the speed bump and 2 cones after it. (See diagram)
27. Drive into the first entrance and ask the guard how many cones they need. Give them the cones and come back out.
28. At the beginning of the yellow line after turning left out of the first entrance place a cone in line with the light post.
29. While driving down that road place a cone at every light post until you reach the middle entrance. (See diagram)
30. Throw 8 junk cones onto the grass. (See diagram)
31. Head toward the cook field entrance.
32. Place 5 small cones and one big cone between the entrance and exit of the cook field. (See diagram0
33. From the middle of that entrance walk straight out to yellow line and place 2 big cones side by side horizontally.
34. From there place 3 big cones evenly spaced out in a line on the yellow line. (See diagram)
35. Drive toward the Waialae entrance.
36. At the crosswalk before the guard shacks place a stack of 12 big cones on the right side curb and place 3 flares under them. (See diagram)
37. Drive back down to the Dole street entrance and wait by the guard near the barricade until the switch needs to be made.
    a. The switch is to allow traffic to flow 2 ways coming in.
38. Call "parking 6" or the special events manager on the radio to see when they want the switch done.
39. The "Switch" 2 way in traffic; **follow this order** (See diagram)
    a. Move all the cones on the yellow line leading up to the guard shacks, to the far right so it makes only one lane at the end.
    b. Check to see if the is a guard ready to open up the last booth.
        i. If there is no guard the switch can't be done, unless the special events manager or "parking 6" approves of it.
    c. When they are ready, move the refund sign to the farthest island to show that the last lane is the only way out.
    d. TOP:
    e. Move the cones that were placed in the middle to the far right white line as you walk up the road.
        i. Two people usually do this by tossing cones to each other. (When tossing cones watch out for cars.)
        ii. About the 4th or 5th cone from the top move the cone toward the middle of the lane.
    f. After all the cones are moved over one person will go on the radio and will say: "first entrance, middle entrance, cook field; specials". When the all reply back you will say: "pick-up your pinches for 2-way in traffic".
    g. Wait for the guards to move their cones then wait till the last car exits.
    h. **BOTTOM:**
    i. Looking up the road from where the truck is parked, move the cones that are on the far left to the nearest white line to make a car lane. Use your judgment for spacing.
    j. Move the six cones that were blocking off the lane.
        i. Make cones form 2 lanes turning into the structure. See diagram.

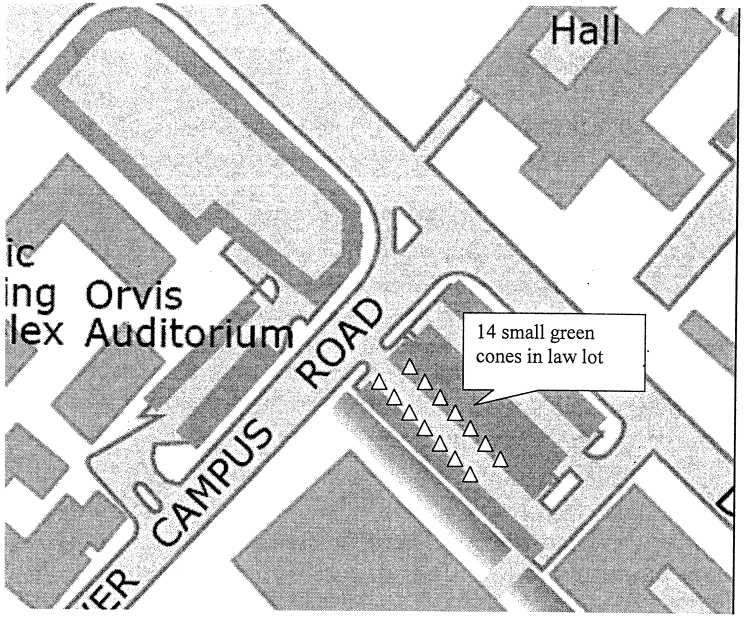
k. Make sure cars follow the right lane to avoid accidents and help the guard if they need help.

During the Event:

1. Empty the trash.
2. Monitor game.
3. Help supervisors as needed.
4. Help freeman guards if needed.
5. Check escalators to make sure their running.
6. Sweep stairs.
7. One person may use their personal vehicle to get dinner for the crew. (Taking the state vehicle is not allowed)
8. The "Switch" back to in and out traffic. (Do before half the event is done or when supervisor wants it done.) (See diagram)
    a. Move the top cones above the guard shack from the far right lane to the far left lane so that only one lane will have incoming traffic and 3 lanes going out.
        i. Move cones over until you reach the third cone from the top.
        ii. The third cone goes in the middle of the second lane from the left.
    b. After all the cones are moved over someone can make the call on the radio.
        i. "First entrance, middle entrance, cook field; specials".
        ii. "Go ahead and pick up your pinches for in and out traffic".
    c. Move the cones on the far right back to their original position on the yellow line.
    d. Move the refund sign back to its original position.
    e. Use the excess cones on the road to close off the middle lane. Only the farthest lane to the left should be open.
    f. Change the escalators from all going down to all going up.

Closing:

1. Go up to the law lot (Zone 17).
2. Pick up the 14 small green cones.
3. Go to the entrance by the law school to set up for the dedicated right turn lane. (See diagram)
    a. Take out about 6 big cones and 4 flares.
    b. Place 2 cones diagonally so that they block off the right lane.
    c. Use the other cones to make a straight line so that the cars coming out of the parking lot can only turn right.
    d. Place two flares (one lit and the other on top of it) between the two cones blocking the lane and two flares on the line.
4. Before leaving the law lot have one person place 4 cones at the entrance to close it off.
5. Drive to the music lot and go all the way to the far end by the traffic lights on University.
6. Take out the 14 small green cones and split them in half for two people.
7. One person will go to the nearest left turn lane and the other will go to the other left turn lane on University.
8. With the 7 cones you will block off the left turn lanes so no cars can turn left. (See diagram)
9. Drive to the other end of the music lot and wait by the traffic lights on Dole Street.
10. When the police are ready to turn the lights move the top 3 cones to the nearest white line to form 3 lanes going out. (See diagram)
11. Just wait by the truck till one of the supervisors says, "last run", then let police know that they need to make one more run.
12. Have one person stay back to help move the cones back over to 2 lanes going out when the police turn back the lights to normal.
    a. After the cars move back into their proper lanes, this person will stack all the cones on the road for pick up later on.
    b. This person will stack all the cones by the guard shack.
    c. Then they will go to the escalators and turn them off and lock all the gates.
13. The other people will go to the traffic lights on University and pick up all the small green cones.
14. Drive to the law lot and collect the 4 cones blocking the entrance.
15. Go to the other entrance next to the law school and collect the 6 big cones and any extra flares.
16. Collect all cones around the campus that were put out.
17. Collect all barricades that were put in the structure.
18. Put all cones, barricades, vest, extra flares, and radio back into the cone shop.
19. Close the "cattle gate".
20. Go back to the shop and clock out.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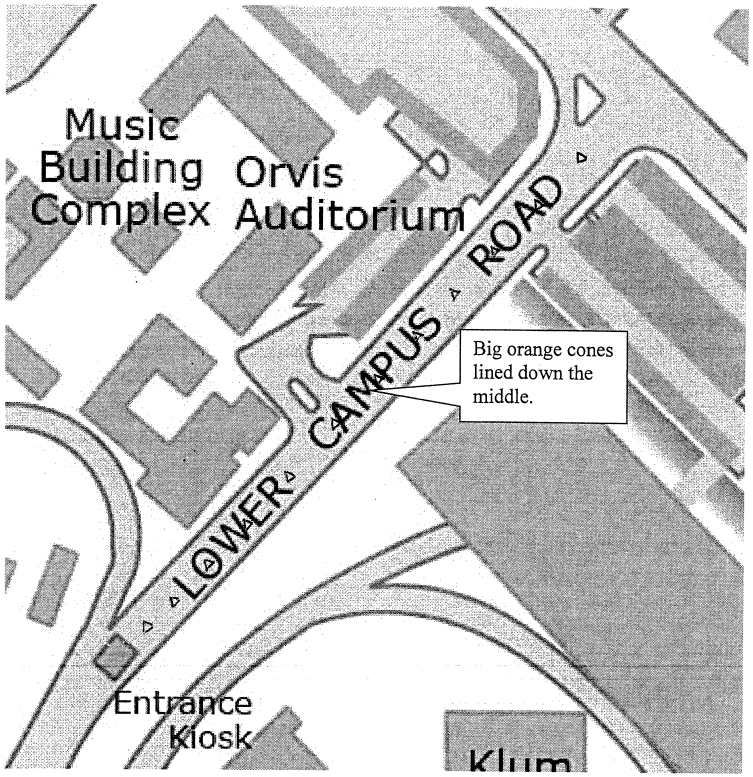
14 small green cones in law lot


Music
Building
Complex
Orvis
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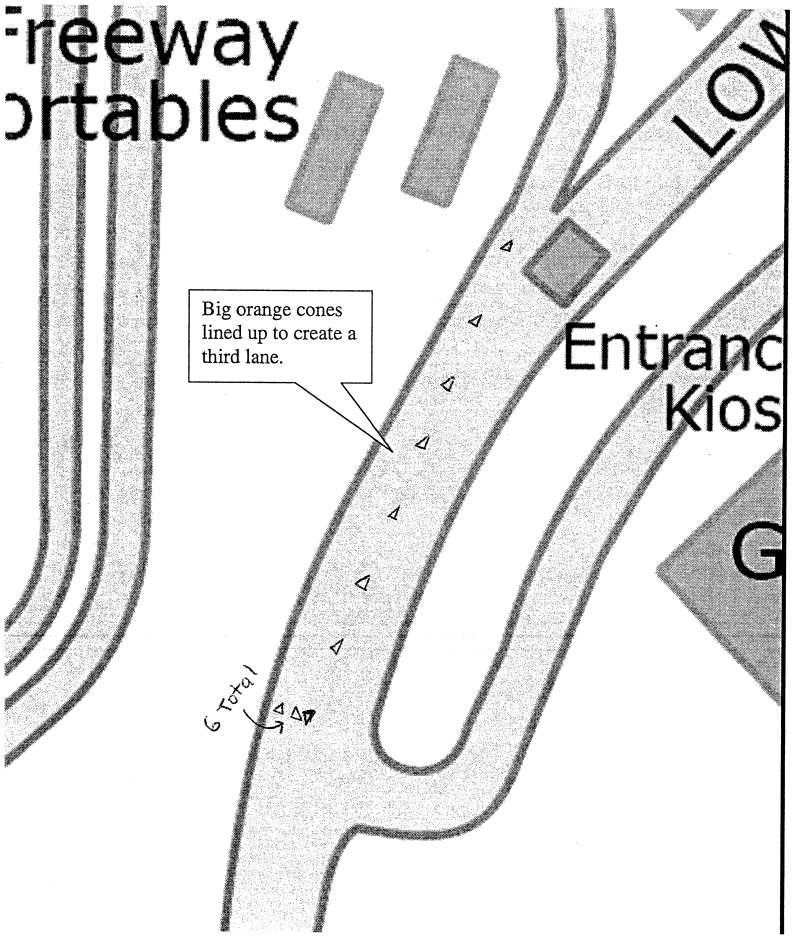
CAMPUS
LOWER
Big orange cones lined down the middle.
Entrance
Kiosk
Klum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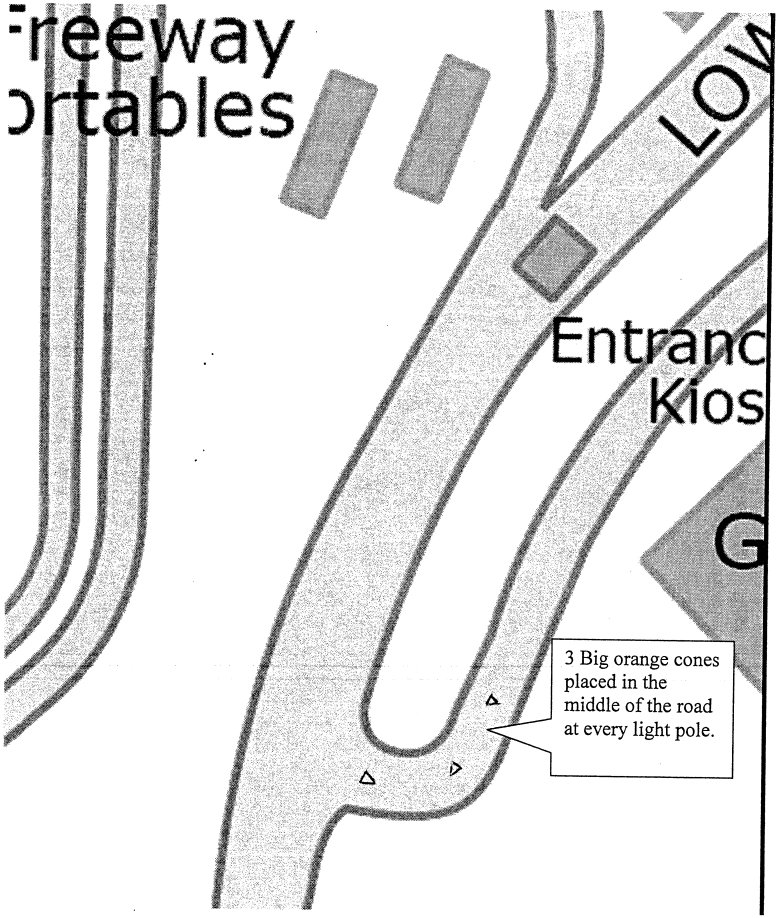
Big orange cones lined up to create a third lane.
6 Total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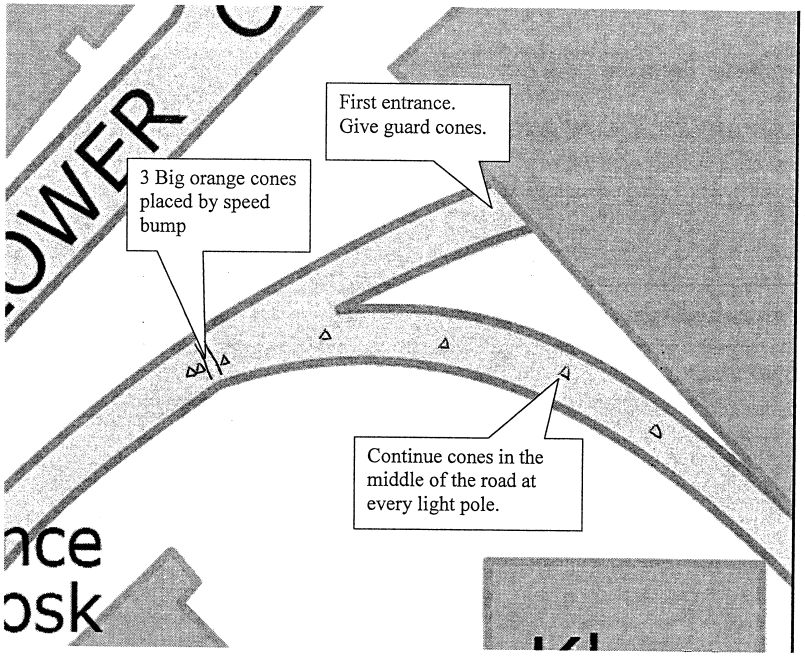
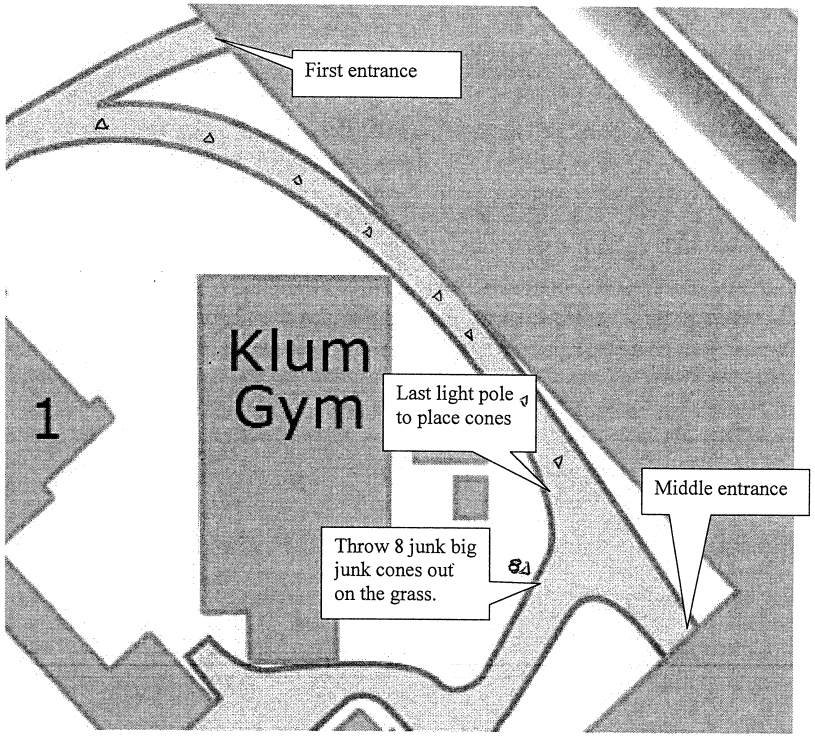
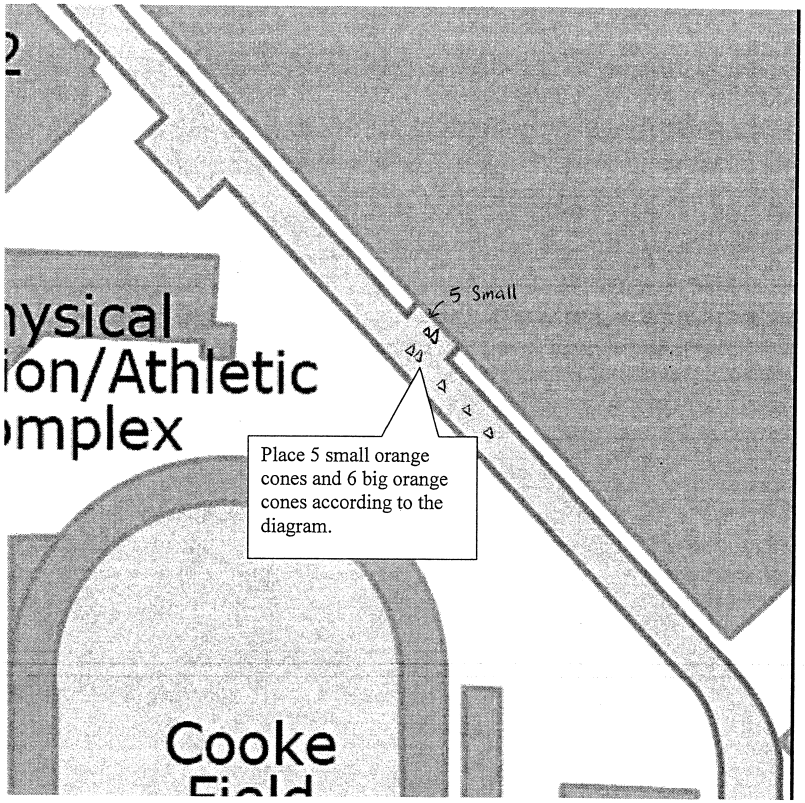
3 Big orange cones placed in the middle of the road at every light pole.


First entrance.
Give guard cones.
3 Big orange cones placed by speed bump
Continue cones in the middle of the road at every light pole.


First entrance
Klum Gym
1
Last light pole to place cones
Middle entrance
Throw 8 junk big junk cones out on the grass.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5 Small
Place 5 small orange cones and 6 big orange cones according to the diagram.
Cooke
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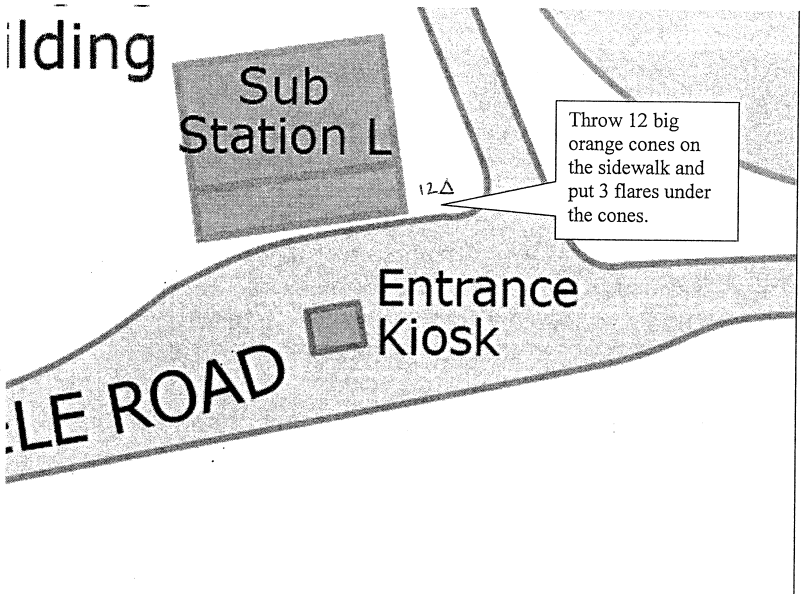
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12
Throw 12 big orange cones on the sidewalk and put 3 flares under the cones.
LE ROAD
Entrance
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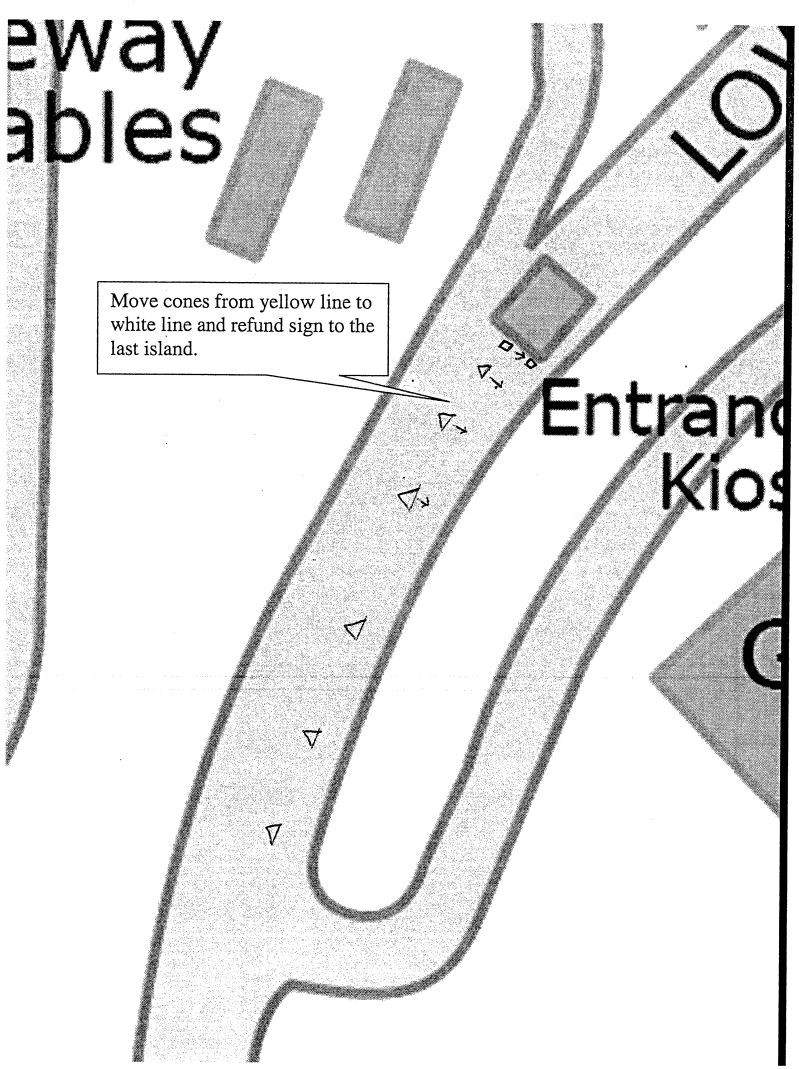
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Move cones from yellow line to white line and refund sign to the last island.
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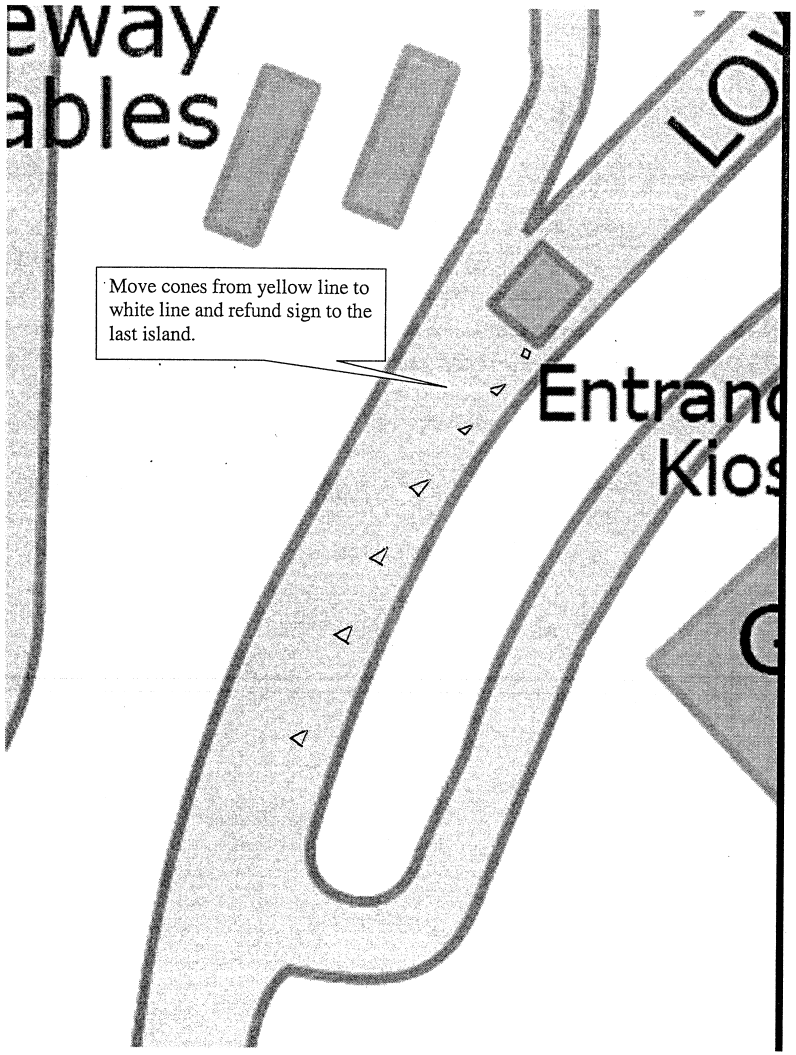
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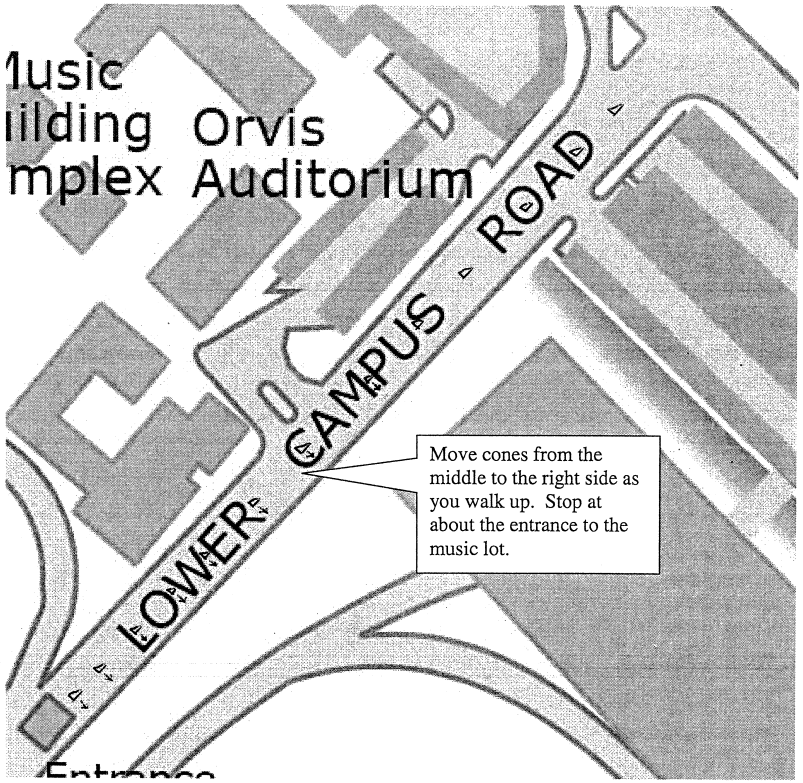
Music
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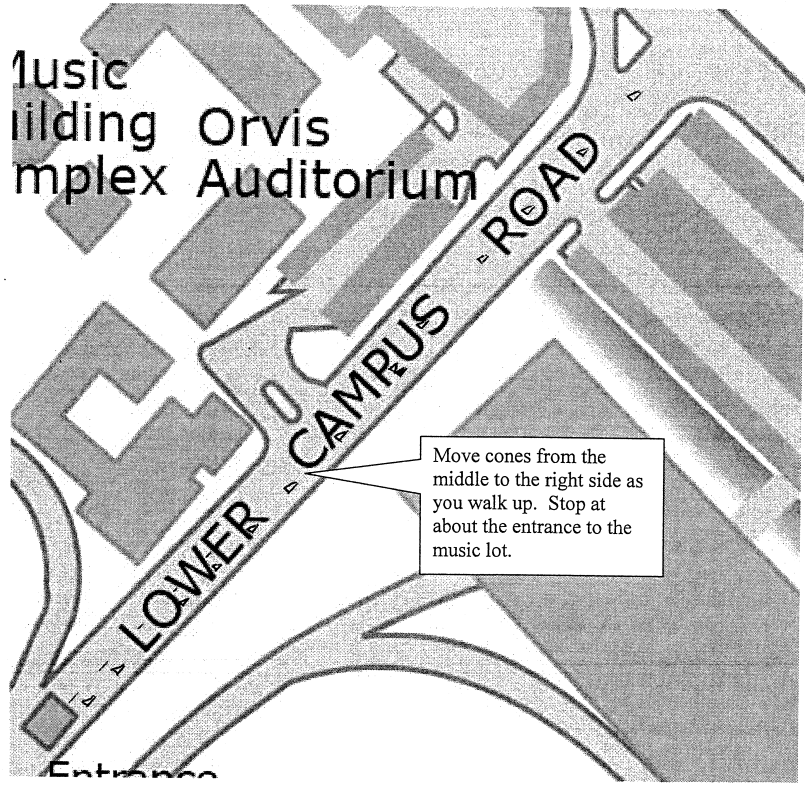
Orvis Auditorium
LOWER CAMPUS ROAD
Move cones from the middle to the right side as you walk up. Stop at about the entrance to the music lot.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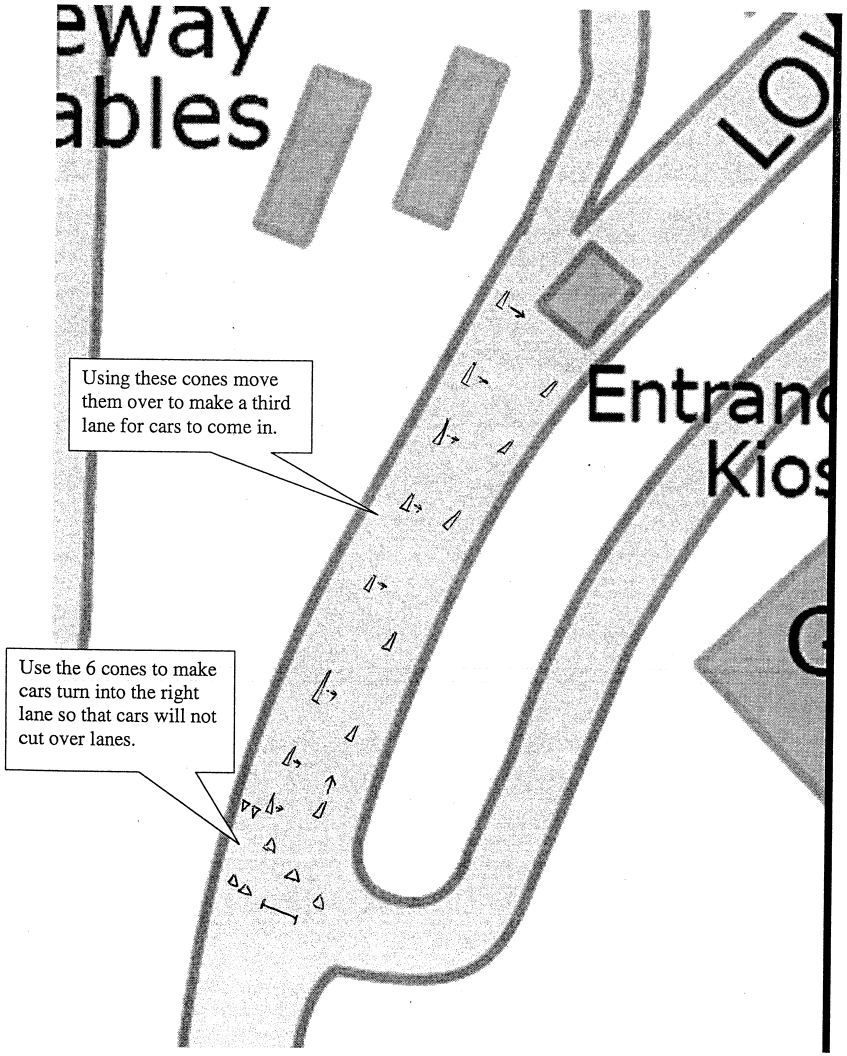
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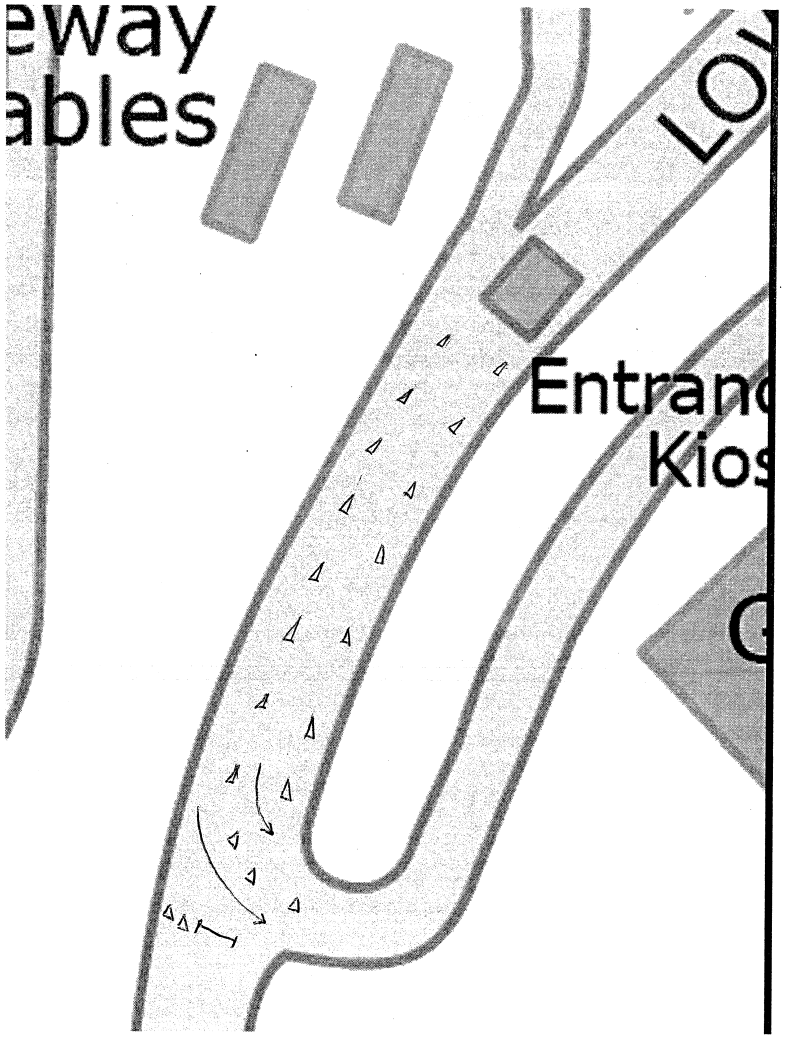
Using these cones move them over to make a third lane for cars to come in.
Use the 6 cones to make cars turn into the right lane so that cars will not cut over lanes.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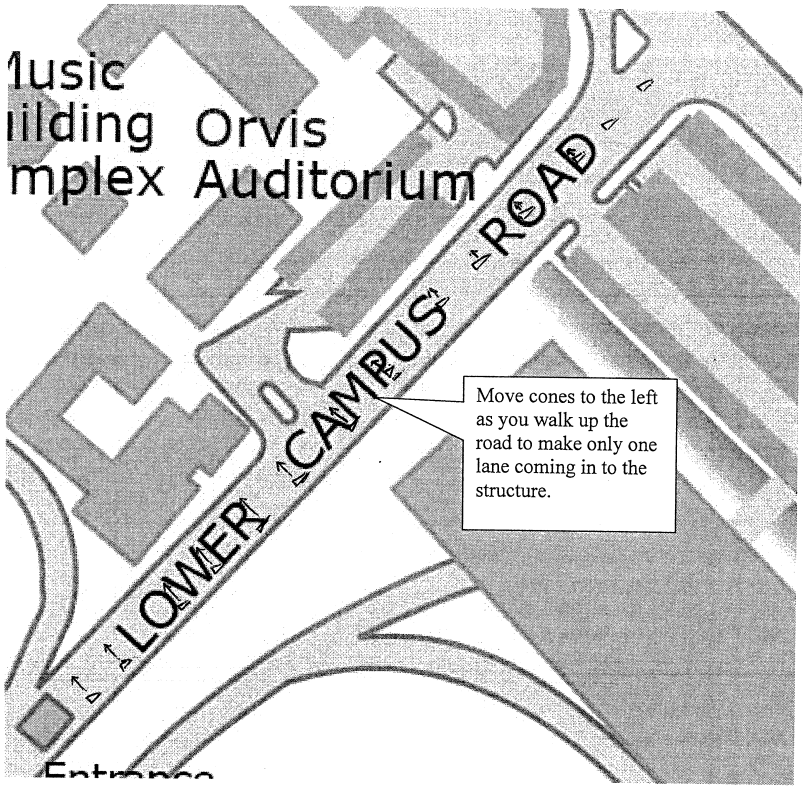
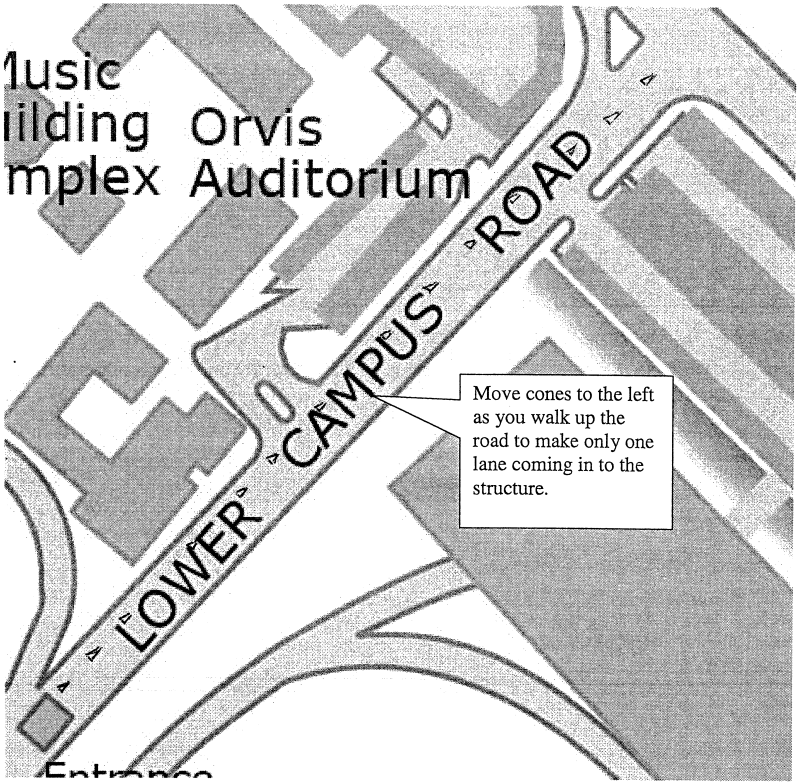

Orvis
Auditorium
LOWER CAMPUS ROAD
Move cones to the left as you walk up the road to make only one lane coming in to the structure.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LOWER CAMPUS ROAD
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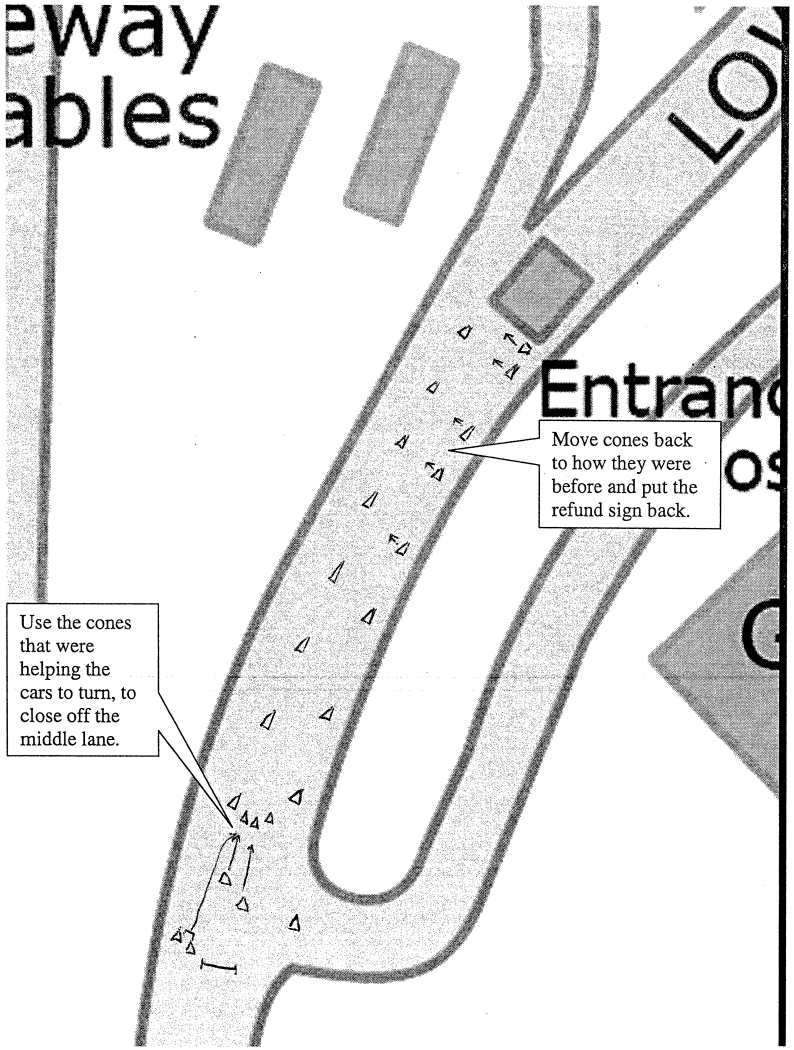
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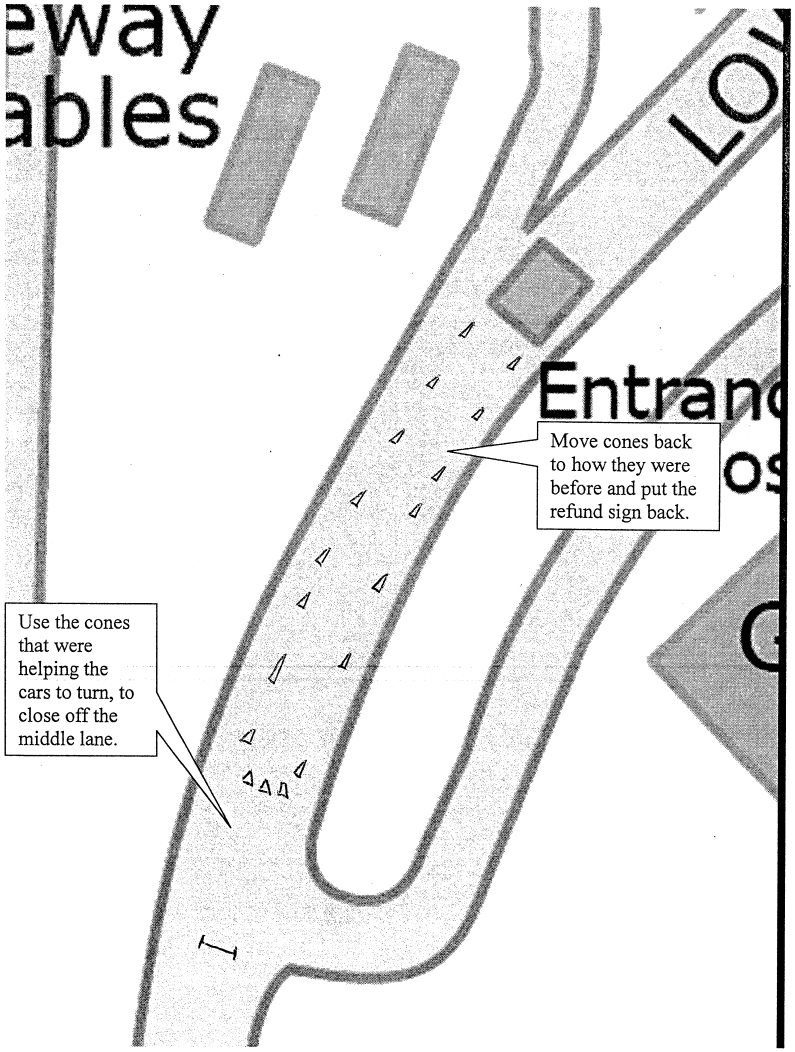
Move cones back to how they were before and put the refund sign back.
Use the cones that were helping the cars to turn, to close off the middle lane.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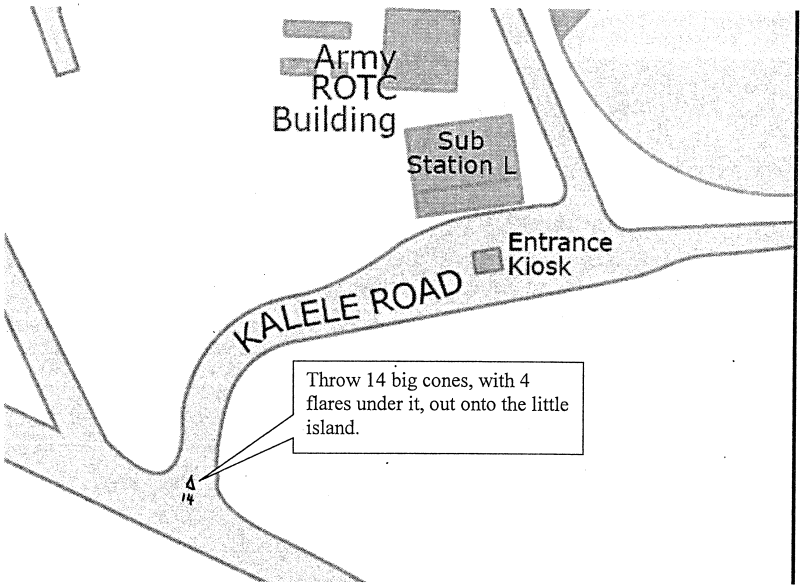
Army
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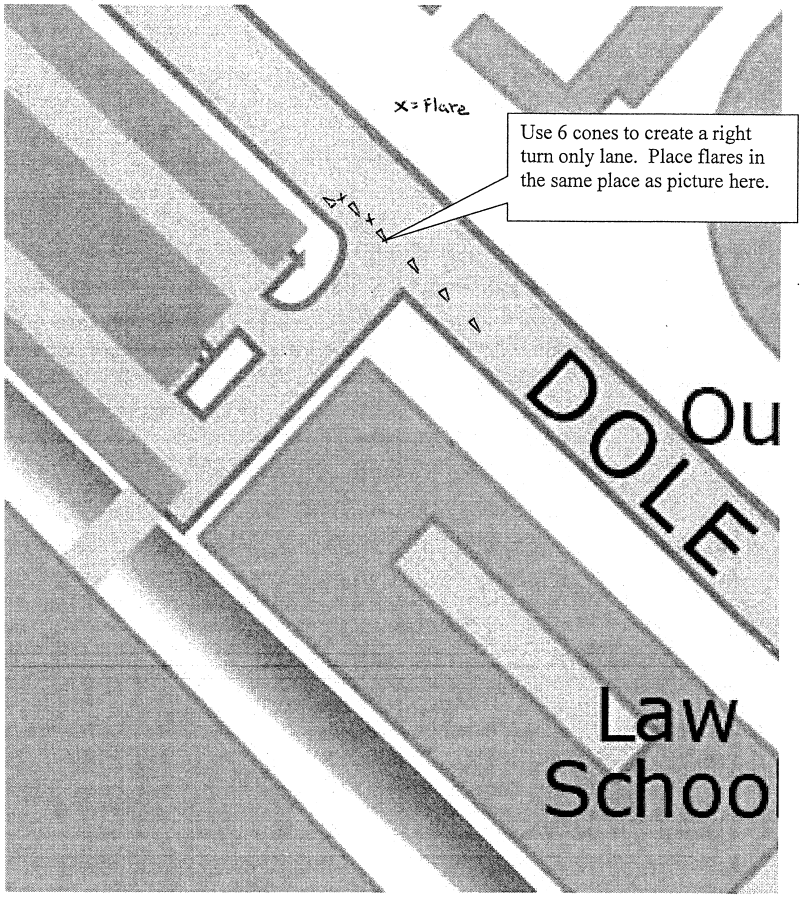
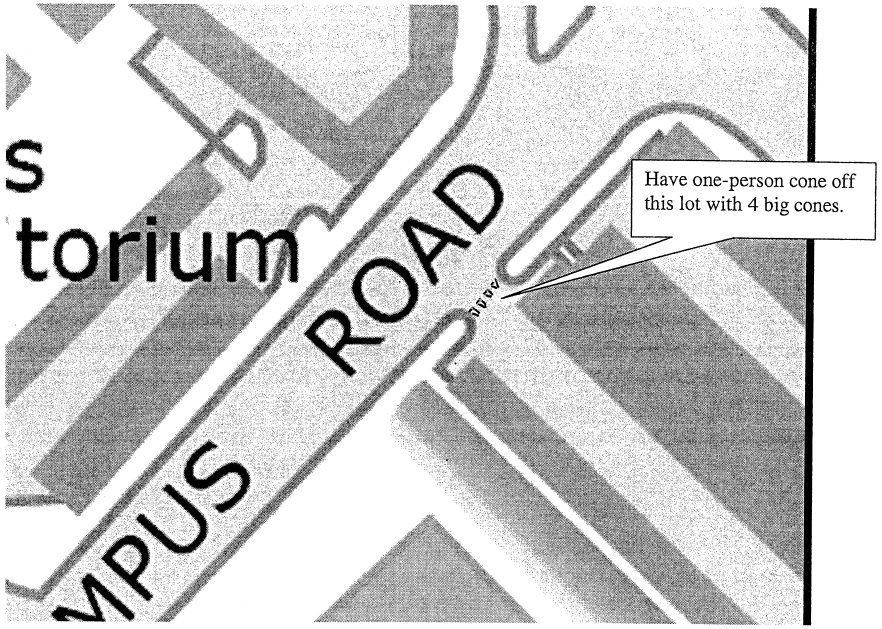
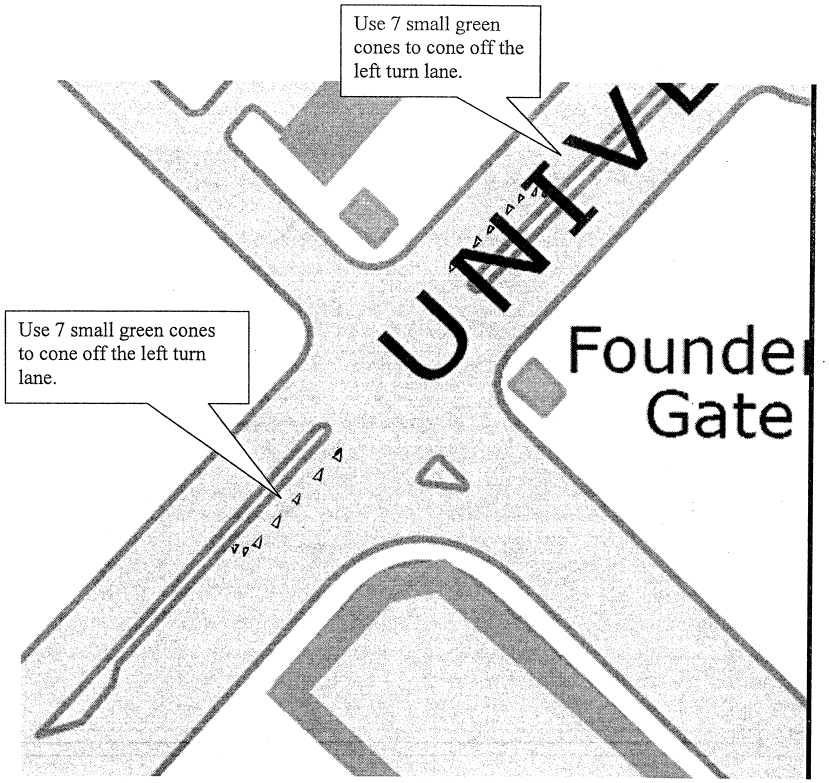
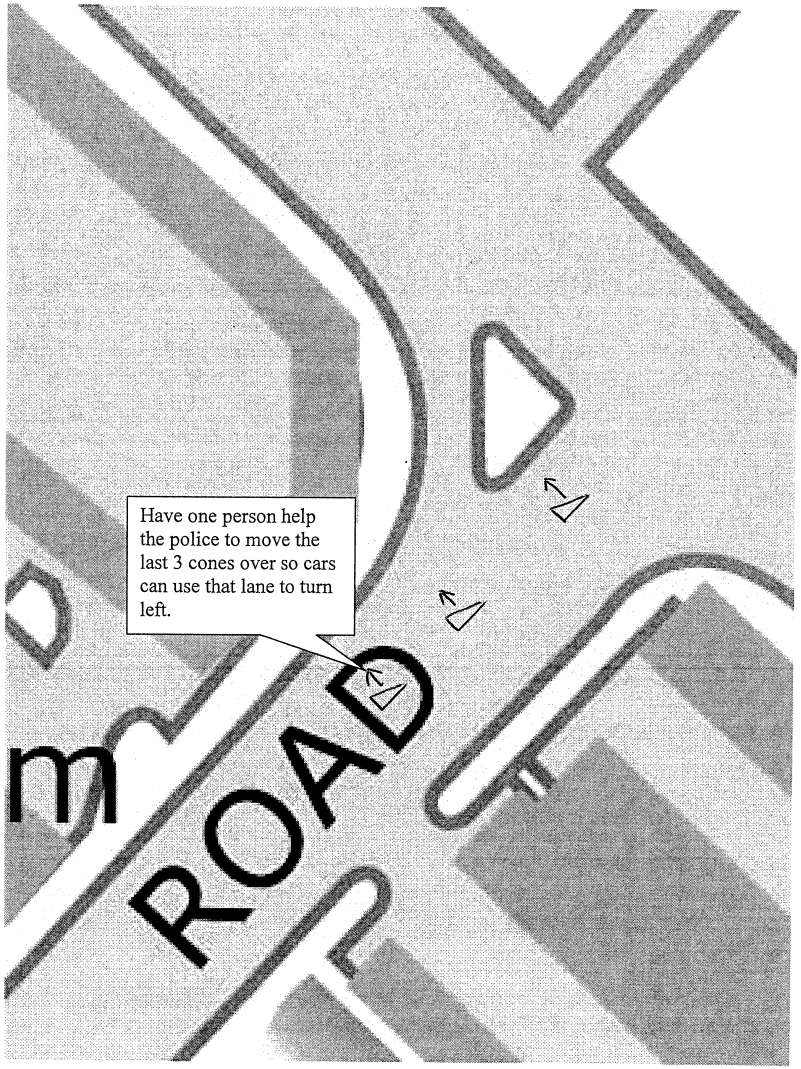
KALELE ROAD
Throw 14 big cones, with 4 flares under it, out onto the little island.
14


x = flare
Use 6 cones to create a right turn only lane. Place flares in the same place as picture here.
DOLE
Ou
Law
Schoo


s
torium
ROAD
MPUS
Have one-person cone off this lot with 4 big cones.


Use 7 small green cones to cone off the left turn lane.
Use 7 small green cones to cone off the left turn lane.
UNIVE
Founde
Gate


Have one person help the police to move the last 3 cones over so cars can use that lane to turn left.
ROAD
m

APPENDIX J. PARKING SUPPLY/DEMAND STUDY AND SITE ALTERNATIVES EVALUATION

Parking Planners

EffectiveSolutions

Parking Supply/Demand Study & Site Alternatives Evaluation

In conjunction with
2007 LRDP Update

For the
University of Hawaii at Manoa

Final Report
October 26, 2007









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Parking Planners

Introduction

The University of Hawaii at Manoa (UHM) is the flagship campus of the University of Hawaii system. It was founded in 1907 and is located in the Manoa valley on the island of O'ahu. UHM has a population of approximately 20,400 students and 4,000 faculty and staff during its peak semester.

For several decades after its establishment, UHM developed without the benefit of an approved master plan. In 1987, UHM commissioned a Long-Range Development Plan (LRDP) to provide an organizing vision for the campus and to guide subsequent development. Several updates to the LRDP have been made with the most recent being in 2007. As part of the LRDP 2007 update, we understand that UHM is interested in evaluating current parking inventory, usage and demand. More importantly, UHM is interested in mitigating potential future parking issues as they plan for the next 5-10 years.

Accordingly, and in conjunction with the 2007 LRDP update, Parking Planners was contracted by Group 70 International Inc. in June 2007 to conduct a parking study for the University of Hawaii at the Manoa campus. The scope of our service consisted of (1) a Supply & Demand Analysis and (2) a Site Alternatives Analysis. Beginning with the Supply & Demand Analysis we performed the following tasks:

1. Document/ verify campus records of current parking inventory
2. Assess current demand (utilization)
3. Index parking demand with University matriculation records
4. Quantify current parking generation rates (demand ratios) by user group
5. Determine present-day parking surpluses or deficits
6. Forecast future parking surpluses or deficits

Upon parking deficits being identified we, together with the University of Hawaii, were to evaluate several potential sites to effectively address parking shortfalls. Our methodology pertaining to the Supply & Demand Study and evaluation criteria used for the Site Alternatives Evaluation is discussed later in the report.

Inasmuch as parking and traffic are closely aligned, Parking Planners collaborated with Austin Tsutsumi & Associates, Inc. (ATA), who served as the traffic engineers for the 2007 LRDP update. Although this report is specific to parking, the solutions and recommendations have been coordinated with ATA to provide UHM a comprehensive solution for parking and traffic.

Supply & Demand Analysis

Definition of Terms

Throughout this report, certain terminology specific to parking and parking analysis is used. The following definitions are provided to help clarify their meaning to a broad audience who may be more or less familiar with parking concepts. More complete discussions are provided throughout the report as appropriate.

Physical Parking Supply - The total number of parking spaces within the defined study area.

Effective Parking Supply - The total number of available parking spaces, less a cushion (effective supply factor) to keep parking patrons from spending time looking for last available spaces, and to allow for the dynamics of vehicles moving in and out of spaces. It is also needed to provide extra spaces when parking facilities are under repair.

User Group - The amount of parking spaces supplied to or required by specific classifications of parking patrons. Examples include faculty, staff, commuter and resident students and visitors. Each of these populations may be classified as a user group.

Parking Demand - The number of parking spaces required to satisfy students, faculty/ staff and visitor needs on any given day. This is estimated by comparing the number of vehicles parked in the study area, the building destination of the user group and number of users in the study area.

Driving Ratio - The percentage of a particular user group that drives a vehicle to the University campus and parks.

Presence Factor - The portion of a user group present on the University Campus during the peak hour.

Utilization - The number of parking spaces occupied by vehicles. This information is gathered by performing parked vehicle counts in each parking facility located within the study area.

Demand Ratio - The ratio of the number of vehicles observed to occupy parking spaces compared to a reference population statistic. For example, if there are 1,000 employees and an observed peak occupancy of 400 vehicles in the employee lot, the Demand Ratio is 0.40 (400/100) per employee.

Supply & Demand Analysis

Objectives

Results from the supply & demand analysis addressed two key objectives as defined by UHM. First, UHM requested that a parking consultant conduct a comprehensive and independent assessment of the current parking environment. Based on preliminary meetings and interviews with UHM, it was deemed that the Manoa Campus was providing a relatively low Level of Service (LOS) with respect to parking. Our study would either prove or disprove this perception through a comprehensive evaluation of the current parking inventory correlated with utilization and demand. Second, and more importantly, UHM was interested in using present-day supply & demand results to effectively plan for the future. As previously mentioned, this parking study represents a small, but integral part of the overall 2007 LRDP update. Assessments of the current parking environment will be used to extrapolate future effects during the next 5-10 years.

Background and Preparation

The first step in our analysis was to understand campus dynamics affecting parking, learn of specific issues and concerns by UHM, confirm study objectives and clearly define expectations. These topics were addressed during the kick-off meeting with UHM, Group 70, ATA and Parking Planners on July 18, 2007. During this meeting, we were given a campus overview which included the following:

- General campus characteristics and boundaries
- Geographical parking zones and user groups by permits
- LRDP history and significance
- Sustainability and design guidelines
- Perceived campus-wide shortage of parking on a routine weekday basis
- Parking issues during key events (first day of school, graduation, special events)
- Problems with parking in surrounding neighborhoods
- Existing traffic issues within campus and immediately surrounding campus

Following the kick-off meeting, we reviewed the LRDP update draft and became more familiar with its initiatives and how they specifically relate to parking. In preparation for our next on-site evaluation, we requested UHM matriculation records, peak hour population data, parking stall inventories and permit usages. We used this information to prepare custom data-collection tools designed to capture site-specific utilization data.

University of Hawai'i at Mānoa
Parking Supply/Demand Alternative Analysis

Supply & Demand Analysis

Study Area

The campus is generally bounded in the Northeast direction by Maile Way and Mid-Pacific Institute with the extreme Northeast section bounded by East Manoa Road and Lowery Avenue. It is bounded on the East by the Manoa Stream and on the Southwest by H-1 Freeway (refer to the Map#1 – *Present-Day Parking Inventory by Zone* located in the Appendix). Additional University facilities lie outside this area, but are not included within the context of this parking study.

The campus is divided into four main geographical zones: Central, Upper Central, Mauka and Makai. The relatively smaller and remote Mauka campus was excluded from our study based on direction from Group 70 during the kick-off meeting. For accuracy and correlation between on-site data collection and existing campus records showing parking inventory by zone, Central and Upper Central Campus were grouped together and are referred to as Central Campus for the remainder of this report. Lower Campus is bounded on the North by Dole Street, on the West by University Avenue, on the East by the Manoa Stream and on the South by H1 Freeway. Again, referring to Map #1, Lower Campus includes zones 7, 8, 18, 19, 20, 21 and 22. Central Campus includes zones 1-6, 9-14, 17, 24 and visitor lot A.

On-Site Data Collection

Parking Planners conducted our on-site supply & demand assessment September 11-13. The afternoon of the 11th was spent meeting with UHM personnel Wally Gretz, Darryl Nohara and Raymond Shito to review our game plan for data collection and to tour the campus' many surface lots and parking structures. Parking stall inventory counts were conducted between 8am and 4pm on Wednesday, Sept. 12 and between 8am and 2pm on Thursday, Sept. 13. Relatively large time-intervals were considered to ensure we captured the "peak demand" on both days. Data was categorized by zone and by user group, as defined by UHM, which correlates with their stall count information. Depending on observed occupancy of each lot, we either counted vehicles or empty spaces in order to document utilization per lot. Consistent campus-wide count cycles were conducted each day, one immediately following another, to chart trends in utilization. The duration of each count cycle was approximately 1½ hours. Four full cycles were completed on Wednesday and three were completed on Thursday. A clear peak demand was observed on both days. Refer to Table 1a – 1d in the Appendix for the raw data collection figures.

Total Parking Supply

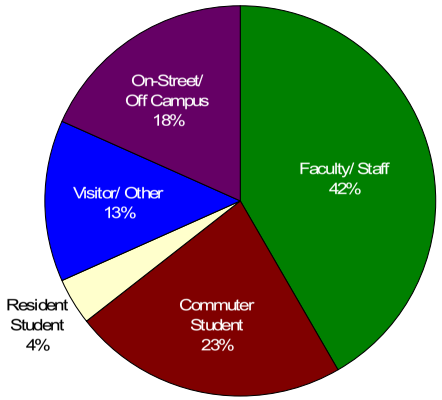
Table 2a below summarizes the current parking supply with regard to user group.

Table 2a: Existing Parking Inventory (Supply) Distribution by User Group

User Group	Space Inventory	Percentage of Total
Faculty/ Staff	2,806	41.6%
Commuter Student	1,529	22.7%
Resident Student	280	4.2%
Visitor/ Other	885	13.1%
Campus Sub-Total	5,500	81.6%
On-Street/ Off Campus	1,240	18.4%
Grand Total Parking Inventory	**6,740**	**100.0%**

Table 2a is expanded in the Appendix for a more detailed breakdown of the parking inventory by user group and zone. The distribution by user group is illustrated in the following figure.

Figure 2:
Existing Parking Inventory (Supply) Distribution by User Group



University of Hawai'i at Mānoa
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Supply & Demand Analysis

Categorized by zone, the present-day parking supply is represented in Table 2b below.

Table 2b: Existing Parking Inventory (Supply) Distribution by Zone

Zone	Space Inventory	Percentage of Total
Central Campus	1,991	29.5%
Lower Campus	3,509	52.1%
Campus Sub-Total	5,500	81.6%
On-Street/ Off Campus	1,240	18.4%
Grand Total Parking Inventory	**6,740**	**100.0%**

On-Street/ Off Campus Parking Inventory

Parking inventory within campus boundaries proved relatively straightforward to quantify as compared with the off-campus supply located in the surrounding neighborhoods. Within this particular area, it is difficult to determine the physical supply of parking due to an unknown number of residents who may be students, faculty or staff. It is also difficult to determine the demand specifically generated by UHM for non-resident population in this area because other demand generators are present, chiefly Mid-Pacific Institute, Noelani Elementary School and St. Francis School. We relied on input from UHM and ATA to help us make reasonable assumptions of demographics and usage in this area to estimate a parking supply of 1,240. Referring to Map #2 – *Off-Campus Parking Inventory*, in the Appendix, we used aerial photography to document the total number of on-street parking spaces available within a reasonable walking distance around campus. Incorporating feedback from UHM, we applied adjustment factors to translate gross number of spaces into a net effective inventory. Our methodology is as follows:

1. Aerial photography shows total gross spaces available as 1,903 and total housing units as 922.
2. Per UHM, we separated a small sub-area, located just Southeast of Lower Campus, from the larger area based on the fact that this particular area has a significantly higher population of students and faculty relative to the rest of the area. The following key points were used to determine the effective parking inventory for this sub-area:
   - Gross spaces available - 393
   - Total housing units - 178
   - Student/ Faculty occupancy - 50%
   - Assumed vehicles per house - 1.5
   - Demand usage (percent of parkers walking to UHM) - 90%

Spaces in this sub-area deducted from the effective inventory are:
(178 housing units x 1.5 vehicles/house x 50% student/faculty occupancy) = 133 spaces

Effective spaces equal:
(393 gross spaces x 90% demand usage) – 133 = 220 effective parking inventory

3. Focusing on the remaining area in the neighborhoods, we assumed the following:
   - Gross spaces available – 1,510
   - Total housing units - 744
   - Student/ Faculty occupancy - 10%
   - Assumed vehicles per house - 1.5
   - Demand usage (percent of parkers walking to UHM) - 75%

Spaces in this area deducted from the effective inventory are:
(744 housing units x 1.5 vehicles/ house x 10% student/faculty occupancy) = 112 spaces

Effective spaces equal:
(1,510 gross spaces x 75% demand usage) – 112 = 1,020 effective parking inventory

4. Combining the two areas results in a total off-campus parking inventory of:
   (220 + 1,020) = **1,240 spaces.**

1,240 represents the total off-campus parking inventory based on the known gross number of spaces and incorporating the assumptions cited above. It should be treated as an approximate figure and considered in *an order-of-magnitude* scale only. If UHM is interested in a more detailed estimate of parking supply in this area, we recommend they conduct a separate site-specific analysis including a demographic study of this population.

Effective Parking Supply

Tables 2a and 2b show the total current physical parking inventory on campus and in the surrounding neighborhoods as 6,740 spaces. However, in the context of a parking supply & demand analysis, it is a generally accepted principle that a parking supply achieves optimum efficiency at 85% to 95% occupancy. The 5% - 15% reduction in physical supply creates a "buffer" to allow for the dynamics of vehicles moving in and out of parking stalls and reduces the time required to search for the last remaining parking spaces. Other benefits provided by this buffer include allowance for miss-parked vehicles, maintenance, construction and temporary restriction of lots to certain users. As occupancy levels near 100% of the actual physical supply, delays and frustration in finding a parking space are typically observed. Thus, at levels of occupancy which exceed the effective parking supply, the parking system may be perceived to be inadequate even though parking spaces are available.

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As a result, the effective parking supply is used for determining the adequacy of the parking system rather than the actual physical supply. The effective supply factor refers to the adjustment used to convert physical inventory into effective inventory. The effective supply factor is influenced by the following:

1. Capacity – larger facilities operate more efficiently than smaller scattered lots. Conversely, it is more difficult to find the last remaining spaces in a larger lot or parking structure than in smaller lots.
2. Type of User – Routine users such as students, faculty and staff can find spaces more efficiently than infrequent users, such as visitors. However, expectations may differ even among routine users, which describe level of service (LOS). For example, faculty members may be less willing to hunt for the last remaining spaces as compared to students.
3. Zoning – In general, a facility or lot that has individually reserved spaces operates less efficiently than reserving spaces by zone.

For the UHM supply & demand analysis, an effective supply factor (ESF) of 90% is used for commuter students as the benchmark. Resident students, who move their vehicles less frequently than commuter students, will have an ESF of 95%. Conversely, an ESF of 85% is given to faculty, who are more likely to move their vehicle in and out of campus throughout the day. Visitors are given an ESF of 90% because although they are non-routine users, visitor lots are relatively small and the dynamics associated with in-and-out traffic flow is less significant. Off-campus parking is assigned a 90% ESF because these users are predominately commuter students. The effective supply equals the physical supply x the effective supply factor. Table 3 below summarizes the impact the varying effective supply factors have on the physical inventory.

Table 3: Effective Supply Summary

User Group	Physical Supply	Effective Supply Factor	Effective Supply
Faculty/ Staff	2,806	0.85	2,385
Commuter Student	1,529	0.90	1,376
Resident Student	280	0.95	266
Visitor/ Other	885	0.90	797
Campus Sub-Total	5,500		4,824
On-Street/ Off Campus	1,240	0.90	1,116
Grand Total Parking Inventory	**6,740**		**5,940**

Supply & Demand Analysis

Peak Demand Utilization

Utilization refers to the relative number of parking spaces occupied by vehicles as a percentage of total spaces. A lot with an effective supply of 100 spaces is said to be 50% utilized if 50 spaces are occupied. Utilization data was collected during our on-site assessment on Wednesday, Sept. 11 and Thursday, Sept. 12. By counting vehicles (or empty spaces) during prescribed intervals each day, we were able to ascertain peak demand utilization. The peak demand defines the time of the day in which most vehicles are parked.

On Wednesday, campus-wide demand peaked at 93% between 10am and 12pm, though we observed a relatively high and stable campus-wide utilization between 10am and 2pm. Lower campus had a more pronounced peak demand between 10am and 12pm. As Parking Planners was conducting its site counts throughout campus, UHM facilities personnel conducted stall counts for the lower campus parking structures each half hour between 7am and 1pm. Combining our observed utilization with that obtained by UHM, we conclude that the peak demand utilization occurred between 10:30am and 11:30 am.

On Thursday, campus-wide demand peaked at 91% between 10am and 12pm. As on Wednesday, we did not observe a sharp drop in utilization between 12pm and 2pm, which indicates that campus parking is staying relatively full into the afternoon hours. However, when reviewing the parking facility data obtained by UHM (Table 1c in the Appendix), we see a sharp spike in utilization at 10:30 am. Since the lower campus structures represent 2,939 spaces, or 53% of the total campus parking supply, this data has a higher relative weight as compared to smaller surface lots. We therefore conclude that the peak demand utilization also occurred between 10:30 and 11:30 am.

Table 1d and 1e on the next page summarize utilization data for central, lower and total campus. Refer to Tables 1a – 1d in the Appendix for a more detailed breakdown of utilization by zone.

University of Hawai'i at Mānoa
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Peak Demand Utilization
(# of empty spaces/ % utilization)

	Wednesday, September 12				Thursday, September 13		
	8am 10am	10am 12pm	12pm 2pm	2pm 4pm	8am 10am	10am 12pm	12pm 2pm
CENTRAL	**519** *72%*	**230** *88%*	**209** *89%*	**296** *84%*	**536** *71%*	**244** *87%*	**277** *85%*
LOWER	**673** *81%*	**120** *97%*	**358** *90%*	(see note 1)	**849** *76%*	**232** *93%*	**295** *92%*
TOTAL CAMPUS	**1192** *78%*	**350** *93%*	**567** *89%*	(see note 1)	**1385** *74%*	**476** *91%*	**572** *89%*

Notes:

1 Space counts were conducted by UH staff every half hour between 7:30am and 1:30pm each day for the parking structures.
- For the purposes of this campus-wide assessment, space counts occurring at 9am, 11am, and 1pm were considered.
- Refer to the "Daily Ticket and Space Count for Lower Campus Parking Structures" for more detailed parking facility utilization data.

2 Counts and corresponding utilization figures were omitted for visitor spaces within central campus with the exception of lots adjacent to Kennedy Theatre and to Bachman Hall.
- Per Darryl Nohara, UH recently re-classed small portions of student & employee permits zones for visitor access throughout the campus.
- During our assessment, we observed these recently converted visitor areas were substantially empty.
- However, UH anticipates these areas to become fully utilized in the future as faculty/staff become more familiar with their locations.
- Space counts and utilization figures for Kennedy Theatre and Bachmann Hall were included because these lot have always been dedicated for visitors and thus the data collected was representative of typical use.

Supply & Demand Analysis

Parking Surplus and Deficits

Understanding when peak demand utilization occurs allows us to determine parking surpluses or deficits campus-wide, by sub-zones and by user group. We average the observed peak demand usage for Wednesday and Thursday and subtract this figure from the corresponding effective supply. The difference results in a parking surplus if supply exceeds demand, or a parking deficit if demand exceeds supply. Table 4a below summarizes parking surpluses/ deficits by zone and user.

Table 4a: Peak Campus Survey Data (by Zone)

	Effective Supply	Survey-Day Peak Demand	Parking Surplus (Deficit)	% Utilization
Central Campus				
Faculty/ Staff	1,505	1,519	(14)	101%
Commuter Student	0	-	-	-
Resident Student	0	-	-	-
Visitor/ Other	198	152	46	77%
Central Campus Total	1,703	1,671	32	98%
Lower Campus				
Faculty/ Staff	880	943	(64)	107%
Commuter Student	1,376	1,477	(101)	107%
Resident Student	266	270	(4)	102%
Visitor/ Other	599	640	(42)	107%
Lower Campus Total	3,120	3,331	(211)	107%
Campus Total	**4,824**	**5,002**	**(178)**	**104%**
On-Street/ Off Campus	1,116	1,240	(124)	111%
Grand Total	**5,940**	**6,242**	**(302)**	**105%**

Notes:
1 Effective Supply is rounded to the nearest whole integer.
2 Utilization assumed to be 50% for recently converted visitor lots
3 Utilization for visitor lots at Kennedy Theatre, Bachmann Hall, Lower Campus Parking Structures and Dole Street Garage were based on observed occupancy.

From the data above, we see a present-day campus-wide parking deficit of 178 spaces. We further see that central campus is near its maximum threshold at 98% and lower campus is over-utilized at 107%.

University of Hawai'i at Mānoa
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Table 4b below, shows that visitor lots are at maximum capacity and that students and faculty/ staff have exceeded capacity and are therefore over-utilized. Solutions to address the present-day deficit will be discussed later in the "Site Alternatives" section.

Table 4b: Peak Campus Survey Data (by User Group)

User Group	Effective Supply	Survey-Day Peak Demand	Parking Surplus (Deficit)	% Utilization
Faculty/ Staff	2,385	2,462	(77)	103%
Commuter Student	1,376	1,477	(101)	107%
Resident Student	266	270	(4)	102%
Visitor/ Other	797	792	4	99%
Campus Sub-Total	**4,824**	**5,002**	**(178)**	**104%**

Demand Ratio

The demand ratio is defined as the number of spaces *required* by a particular user group. It is expressed in percentage terms and is calculated by correlating the number of vehicles parked in the study area with the population statistic of the particular user group. For example, if the peak demand is observed to be 500 spaces for a student population of 1,000, then the demand ratio is calculated as 500/ 1000 = 0.50. This figure means that each student requires ½ a parking space during the peak demand. The demand ratio is important because it allows us to benchmark present-day conditions against future scenarios and against other University data. Table 5a summarizes demand ratios for UHM.

Table 5a: University of Hawaii at Manoa Parking Demand Ratios

User Group	Effective Supply	Survey-Day Peak Demand	Population Statistic	Demand Ratio
Faculty/ Staff	2,385	2,462	4,042	0.61
Commuter Student	1,376	1,477	17,207	0.09
Resident Student	266	270	3,150	0.09
Visitor/ Other	797	792	4,042	0.20
Campus Sub-Total	4,824	5,002	28,441	
On-Street/ Off Campus	1,116	1,240	17,207	0.07
Grand Total	**5,940**	**6,242**		

Supply & Demand Analysis

Population data for students was obtained from UHM "Headcount of Credit Students, by Campus" and faculty/staff was obtained from "UH Manoa Headcount and FTE by Division/Branch/Section as of March 2007." Resident student population is based on 3,150 beds currently on campus. Population for visitors is based on a 1:1 ratio with faculty/staff. Population for on-street/ off-campus is based on a 1:1 ratio with commuter students.

A comparative analysis between UHM and other Universities for which we have similar data is presented in Table 6 in the Appendix. Comparing demand ratios for UHM with other Universities, we see that UHM falls below average for all user groups with the exception of visitors. That is, UHM is supplying fewer parking spaces for students, faculty and staff, on a per-person basis, as compared to other Universities. A closer look at the data reveals that UHM is producing a demand ratio of 0.61 for faculty and staff, which compares to a baseline average of 0.72. Equating the -0.11 difference into parking stalls, UHM would need to add 441 spaces to be in-line with the baseline average.

Conversely, UHM is supplying more parking spaces for visitors. With an observed demand ratio of 0.20, UHM is 0.05 higher than average, which equates to a surplus of 193 spaces.

Since UHM does not differentiate between commuter and resident students by permits or by zones, we elected not to make comparisons for the smaller resident population and chose to focus on the larger commuter population. Commuter students at UHM generate a demand ratio of 0.09 based on an effective in-campus supply of 1,376 spaces. This is much lower than the baseline average of 0.23 (down by 0.14). However, including off-campus parking inventory as shown in Table 5b and applying it to commuter student users (who predominately make-up the off-campus usage), we see that UHM falls more in-line with other Universities with a demand ratio of 0.16, still below the baseline average but by only 0.07, equating to a deficit of 1,223 spaces. As will be discussed later in the Site Alternatives section we recommend that UHM plan to include this off-campus parking inventory within campus boundaries at some point in the future. The demand ratio comparison shows that a loss of this supply would significantly impact level of service.

Table 5b: University of Hawaii at Manoa Parking Demand Ratios (including off-campus inventory with commuter students)

User Group	Effective Supply	Survey-Day Peak Demand	Population Statistic	Demand Ratio
Faculty/ Staff	2,385	2,462	4,042	0.61
Commuter Student	2,492	2,717	17,207	0.16
Resident Student	266	270	3,150	0.09
Visitor/ Other	797	792	4,042	0.20
Grand Total	**5,940**	**6,242**		

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Supply & Demand Analysis

We want to emphasize that the demand ratio comparison between UHM and other Universities was included to show *relative* parking usage only. There are many factors that influence demand ratios such as presence factors and driving ratios. Moreover, each campus is singularly unique and addresses parking differently. The fact that UHM falls *below* average in many areas is not intended to reflect that it is not providing adequate parking for its users. The comparison is included so that UHM can have relevant information from other Universities to influence future decisions pertaining to parking.

Present-Day Deficit Summary

Recapping our findings thus far, we have concluded that UHM has a present-day parking deficit of 178 spaces based purely on over-utilization. We also estimate that approximately 1,240 spaces exist as inventory in the surrounding neighborhoods which may be considered as in-campus inventory in the future. We understand that UHM is interested in relieving the parking congestion in the surrounding community by providing more capacity within campus - the effect of this will be shown in the Site Alternatives Analysis. We recommend that UHM consider and plan for a time when these spaces will no longer serve as effective supply due to neighborhoods adopting a resident permit system or otherwise restricting the use of this parking to UHM user groups. Table 9 below summarizes the observed present-day parking deficits. As was discussed earlier, understanding the present-day conditions is important, but more important are using present-day results to draw future correlations and to forecast potential future parking deficits, which is discussed in the next section.

Table 9: Parking Deficit Summary

	Objective	Spaces
1	Address current over-utilization	-178
2	Address potential future loss of off-campus/ on-street parking in neighborhoods	-1,240
	Total for Objective 1 and 2:	**-1,418**

Future Effects

When forecasting future parking deficits (or surpluses), we consider two key factors: (1) factors which effect the current supply and (2) factors which affect the future demand.

Supply & Demand Analysis

Future Supply

The future parking supply is primarily impacted by the planned projects cited in the LRDP during the next planning horizon. Table 7 summarizes future buildings and projects planned during the next 5-10 years and the effect they have on the present-day parking supply. Projects #5 and #6 will increase the parking supply and the effects of those increases will be discussed later in the Site Alternatives section of the report. Table 7 is intended to show the loss of surface spaces as the result of new construction.

Table 7: Future Buildings and Projects Planned (within 5-10 years) And corresponding loss of present-day surface spaces

	Project	Supply Change
1	Law School Expansion	-55
2	Campus Center Expansion to Northeast	0
3	Instruction Building at Henke Hall Site	0
4	Kennedy Theatre Expansion	-121
5	Parking Structure at Kennedy Theatre	
6	Parking Structure IIB/Bookstore	0
7	Research Buildings – North and East of Biomedical Building	0
8	Research Buildings - Mauka Campus	0
9	Research Space - Infill of South Courtyard of Biomedical Building	0
10	Instruction Building - College of Education	0
11	I.T.S. - Bilger Hall Addition, Phase II	-24
12	Media Facilities at KHET Site	0
13	Johnson Hall - Replacement Dormitory	0
14	Hale Noelani - Replacement Dormitory	51
15	Faculty Housing - Waʻahila Ridge or Mauka Campus	0
16	Klum Gym Replacement	0
17	School of Hawaiian Knowledge	-26
	Total for 5-10 planning horizon:	**-175**

Additionally, we understand that ATA (as part of the traffic portion of the 2007 LRDP Update) recommends an improvement to the intersection at Dole Street and University, which would result in the removal of approximately 30 spaces from surface lots adjacent to the Music Complex and Law School.

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Parking Supply/Demand Alternative Analysis

Supply & Demand Analysis

Future Demand

When considering the overall future parking landscape, factors affecting the future demand are of equal importance as those affecting the supply. Typical factors affecting the future demand of parking are:

1. Changes in student enrollment
2. Changes in student-to-faculty ratios
3. Changes in presence factors
4. Changes in driving ratios

Based on student enrollment projections as defined in UHM's "Headcount Enrollment of Credit Student by Campus, Middle Series Projections, Fall 2000 to Fall 2013" we see that enrollment remains essentially flat at 20,224 in 2007 to 20,401 in 2013. As a result, we assume that increases in student enrollment will not represent a new demand generator.

We understand from UHM that the Manoa Campus will serve as the pinnacle for graduate-level research for the UH system during the next 5-10 years. This increase in graduate students will be offset by a commensurate decrease in undergraduate students resulting in a neutral effect on overall student population. Furthermore, we understand from UHM that the increase in staff to support graduate-level studies will again be off-set by a commensurate decrease in faculty, resulting in a neutral effect on faculty and staff population. Based on this information, we assume that faculty/staff-to-student ratios are not expected to change significantly over the next planning horizon and therefore will not produce a change in parking demand.

Presence factors, when considered for Universities, are primarily influenced by class scheduling. Our research from other campuses shows higher student population occurring mid-week, typically peaking on Wednesdays during the Fall semester. UHM records reflect a higher student enrollment in the Fall, averaging a 6% increase over Spring enrollment from 1996-2006. According to the Facilities Department, UHM has a higher population on Wednesdays, as this day is deemed to be the "busiest" day for parking patrons. As stated earlier, parking is generally considered acceptable if it provides a sufficient supply during an "average busy day". If we consider that Wednesdays during the Fall semester represent the average busy day, changes in class scheduling affecting Wednesday's population will have a direct impact on demand. When considering the use of parking resources on campus, we recommend that UHM strive to schedule classes so that the student and faculty/staff population does not "peak" on any one day or at any particular time. Based on current scheduling and enrollment, we observe the peak demand occurring on Wednesday between 10:30am and 11:30am.

However, we understand that many other factors are considered besides parking when determining class schedule and introduce the concept of "presence factor" to UHM for their awareness and to be considered along with other key issues when scheduling classes. We assume that no significant change in class scheduling will occur during the next planning horizon and will therefore not impact the parking demand.

Driving ratios represent the fraction of population who drive to campus and park. We attribute UHM's relatively low demand ratios as cited in Table 5a and 5b, in part, to lower driving ratios. That is, on a relative basis as compared to other universities, UHM patrons are either making greater use of mass-transit, car-pooling, walking, or riding bikes or mopeds. We recommend that UHM continue to encourage alternative arrival methods and maintain a relatively low driving ratio and assume that this trend will not change during the next 5-10 years and thus not affect the current parking demand.

Future Deficit Summary

In conclusion, we forecast that differences from the present-day parking landscape will be driven entirely by future changes in supply. Changes in demand may occur, but only as the result of policy decisions made by UHM. Thus, incorporating the loss of parking supply mentioned above into the overall parking deficit summary, results in a total future deficit of 1,623 spaces occurring during the next 5-10 years. The decision to address any one or all of the objectives listed in Table 9 is will be made by UHM. The next section of this report discusses options to address this parking deficit.

Table 9.2: Parking Deficit Summary

	Objective	Spaces
1	Address current over-utilization	-178
2	Address potential future loss of off-campus/ on-street parking in neighborhoods	-1,240
3	Replace lost spaces resulting from planned projects (5-10 years)	-175
4	Replace lost spaces resulting from improvements made to Dole Street & University Avenue	-30
	Total for Objective 1-4:	**-1,623**

Site Alternatives Evaluation

Part 1 of our study was to determine present-day parking deficits and potential future deficits which correlate with the University's Long-Range Development Plan. Part 2 of our study evaluates different locations for parking facilities to address the estimated deficits. Seven different potential sites were evaluated and are listed below. They are also reflected in the Appendix on Map 4 – *Proposed Parking Facility Locations.*

Table 10: Proposed Parking Facility Options

1	Zone 1 Parking Facility - College of Education
2	Zone 14 Parking Facility - adjacent to Sinclair Library
3	Zone 4 Parking Facility - adjacent to Spalding Hall
4	Zone 5 Parking Facility - adjacent to Agricultural Science
5	Zone 10 Parking Facility - Kennedy Theatre
6	Zone 11 Parking Facility - adjacent to Pacific Ocean Science
7	Zone 20 Parking Facility - Lower Campus Structure Phase IIB

The first step in our evaluation is to determine the specific amount of parking to be added. Table 9.2 on page 17 outlines the parking deficits into four categories (objectives).

1. The first refers to the present-day over-utilization of 178 spaces. Increasing the parking supply by this amount will allow for a utilization of 100% and reflect a maximum theoretical efficiency threshold.
2. The second deficit group represents a *transfer* of parking supply from the neighboring communities to inside campus. UHM understands that it is a primary parking demand generator for the neighboring communities and wishes to help alleviate the present-day congestion by adding capacity within its campus. Serving as a leader in the community, UHM is interested in incorporating a major portion of the identified off-campus parking supply in on-campus facilities during the next 5-10 years.
3. The third deficit groups represent the replacement of spaces that will be lost as the result of planned campus improvements as outlined in the LRDP over the next 5-10 years.
4. The fourth deficit group represents the loss of spaces as the result of improvements made to the intersection at Dole Street and University Avenue. Thirty spaces is a conservative estimate based on southward expansion of Dole and the addition of dedicated turning lanes onto University and Lower Campus Road.

Site Alternatives Analysis

Each of these deficit groups may be addressed in part or in whole at the discretion of UHM. Furthermore, UHM may elect to increase parking inventory beyond what is cited here in order to improve the level of service to its parking patrons. For the purposes of our analysis at the present time, we are assuming that UHM will address deficit 1, 3, and 4 entirely and as much of deficit 2 as will allow based on planned expansion during the next 5-10 years.

Site Evaluation Criteria

In order to effectively evaluate each option, the criteria influencing an effective solution must first be established. Criteria should be considered both separately and together to arrive at a *balanced* solution which *best* addresses the overall goals as defined by UHM. The following criteria have been identified and approved by UHM during previous work sessions:

1. Effective Location – Increasing parking inventory to address present-day and future deficits is best placed in close proximity to demand. That is, adding parking close to where the user group can most benefit is more effective than adding parking which results in greater walking distances for patrons.

2. Minimize Cost – The cost of parking garages is influenced significantly by the following:
   - A. Size: Larger footprints (with fewer levels) are less expensive to build than smaller footprints (with more levels).
   - B. Location: Spaces in surface lots are less expensive than spaces in garages. In structures, spaces on-grade are less expensive than on supported levels. Spaces below buildings are more expensive than free-standing facilities. Spaces below-grade are the most expensive.
   - C. Number: The least expensive spaces are the ones never built. Realistic supply and demand analysis and shared parking methodologies with adequate buffers can reduce the number of spaces required.
   - D. Stalls: Overly large parking stall dimensions can increase the average cost per space. Miss parked full-size vehicles in compact spaces frequently take up two stalls.

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Site Alternatives Analysis

3. Maximize Capacity – Facilities which best accommodate a larger percentage of the unmet parking demand are more effective than those which provide less.

4. Mitigate Traffic Issues – Ideally, new parking facilities will be placed in areas where existing roadways or proposed roadway improvements will support increased traffic flow.

5. Compliance with design guidelines and initiatives as outlined in the Long-Range Development Plan (LRDP). The LRDP includes major campus-wide guidelines for all proposed improvements. The following represent guidelines pertaining to parking:
   - A. Parking located at perimeter portals: A major focus of the LRDP is to remove parking from within inner-campus and re-locate it to the periphery.
   - B. Improved pedestrian circulation to and from parking facilities: UHM is striving to be a more pedestrian friendly campus. Following this objective, parking should be located in areas which promote safe and easy pedestrian circulation to final destinations.
   - C. Increase permeable surfaces: As part of UHM's desire to be a leader in environmental sustainability, parking facilities should be good stewards of land use and occupy as little as possible to keep the campus "green".
   - D. Aesthetic design: Parking facilities should integrate with surrounding buildings to the greatest extent possible and minimize their characteristic obtrusiveness. Landscaping and screening should be incorporated as well as detailing in the façade to blend these structures with other campus buildings. Structures which diminish campus architecture will score lower than those which blend in or compliment.

Emphasis of Criteria

Each of the criteria listed above are essential in considering the most effective solution for addressing parking deficits, but they are not of equal importance. Only UHM can judge their relative importance to each other and their corresponding weight impacting the overall solution. Based on a work session conducted on October 5, 2007, with UHM, Group 70 and ATA, the following conclusions were reached, as shown in Table 11 on the next page:

Site Alternatives Analysis

Table 11: Alternative Site Evaluation Criteria

Criterion:		Weight
1	Proximity to Parking Demand	5%
2	Cost per Parking Space	15%
3	Capacity	30%
4	Traffic Issues:	5%
5	Consistency with LRDP Objectives:	45%
A:	Parking at perimeter portals	10%
B:	Improved pedestrian circulation from parking facilities to inner campus	20%
C:	Increase amount of permeable surface (LEED)	10%
D:	Design - Aesthetically unobtrusive/ integration with other buildings and/or providing mixed-use opportunities.	5%
	Total:	**100%**

Evaluation of Options

Parking Planners developed a custom evaluation matrix in order to effectively evaluate each option relative to the others and to incorporate the weight of each separate criterion. This matrix was presented to UHM during the work session conducted on October 5 and was used to produce the results shown in Table 12a and 12b on the following page.

Table 12 summarizes the subjective evaluation and ranking of each site based on the assigned criteria. Possible scores were: (1) Excellent, (2) Very Good, (3) Average, (4) Fair and (5) Poor. During the work session, UHM, Group 70, ATA and Parking Planners collaborated to produce the results shown. Based on the scoring of criteria, each parking facility was assigned a rank. The lowest overall score is best and produces a rank of first based on the weighted average of all criteria. Subsequent rakings of 2-7 represent the next best facilities, respectively. The rank may also be considered as the preferred build order of the facilities to address deficits in a phased approach over the planning horizon.

Recommendation

Table 12b summarizes the impact each option has on parking supply based on respective number of levels. Once the preferred build order was identified in Table 12a, the specific amount of parking supply each facility provides is calculated in 12b. This table also estimates construction cost based on (1) the number of levels (2) their relative efficiency, or SF per car, and (3) appropriate “cost per SF” estimates based on comparable garages constructed in Hawaii.

Table 12a: Alternative Site Evaluation and Ranking (Low Score Wins)

	Parking Facility	Proximity to Parking Demand	Traffic Issues:	Parking at Perimeter	Pedestrian Circulation	Permeability & LEED	Capacity	Design Aesthetics	Cost per Parking Space	Weighted Average Points	Weighted Average Rank
		5%	*5%*	*10%*	*20%*	*10%*	*30%*	*5%*	*15%*		
1	Zone 1 Parking Facility - College of Education	5	1	1	3	3	2	1	4	**2.55**	**4**
2	Zone 14 Parking Facility - adjacent to Sinclair Library	2	4	2	1	1	5	2	5	**3.15**	**7**
3	Zone 4 Parking Facility - adjacent to Spalding Hall	3	1	2	1	1	5	1	3	**2.7**	**5**
4	Zone 5 Parking Facility - adjacent to Agricultural Science	2	1	1	2	3	2	2	3	**2.1**	**2**
5	Zone 10 Parking Facility - Kennedy Theatre	1	1	3	1	3	2	3	3	**2.1**	**1**
6	Zone 11 Parking Facility - adjacent to Pacific Ocean Science	2	2	2	1	1	5	1	5	**3.0**	**6**
7	Zone 20 Parking Facility - Lower Campus Structure Phase IIB	5	5	1	2	5	1	3	3	**2.4**	**3**
				1 = Excellent	2 = Very Good	3 = Average	4 = Fair	5 = Poor			

Table 12b: Alternative Site Solution for 5-10 year Planning Horizon

	Parking Facility	Additional Spaces per level	Proposed Total Number of Levels	Supported Levels	Number of Below-Grade Levels	Additional Capacity (Cars)	Efficiency (SF per car)	Area (SF)	Estimated Cost per SF	Estimated Construction Cost	Cost per Space
1	Zone 1 Parking Facility - College of Education	100	0.0	0.0	0	0	330	0	$0	$0	$0
2	Zone 14 Parking Facility - adjacent to Sinclair Library	65	0.0	0.0	0	0	360	0	$0	$0	$0
3	Zone 4 Parking Facility - adjacent to Spalding Hall	60	0.0	0.0	0	0	360	0	$0	$0	$0
4	Zone 5 Parking Facility - adjacent to Agricultural Science	105	4.0	3.0	0	420	310	130,200	$79	$10,253,250	$24,413
5	Zone 10 Parking Facility - Kennedy Theatre	120	4.0	3.0	0	480	310	148,800	$79	$11,718,000	$24,413
6	Zone 11 Parking Facility - adjacent to Pacific Ocean Science	60	0.0	0.0	0	0	360	0	$0	$0	$0
7	Zone 20 Parking Facility - Lower Campus Structure Phase IIB	200	4.5	3.5	0	900	300	270,000	$80	$21,600,000	$24,000
	Total:					**1,800**				**$43,571,250**	**$24,206**

Notes:

1 Construction cost estimates for garages based on the following cost per SF: $45 on-grade, $90 for supported levels, $45 for excavation, $15 for surface lots.

2 A "proposed number of levels" of "one" denotes a surface lot.

Recommendation (continued)
Since the facility adjacent to the Agricultural building was ranked #2 and contributes to the increase in future parking supply, we must deduct the present-day spaces that will be lost by its construction. The surface lot in sub-zone 5 – Facilities Management will lose 60 spaces and the lot in sub-zone 23 – Agricultural Engineering will lose 35, for a total of 95 spaces lost. Table 9.3 below, reflects the updated deficit figure.

Table 9.3: Updated Parking Deficit Summary

	Objective	Spaces
1	Address current over-utilization	-178
2	Address potential future loss of off-campus/ on-street parking in neighborhoods	-1,240
3	Replace lost spaces resulting from planned projects (5-10 years)	-175
3b	Replace lost spaces resulting from building the Parking Facility adjacent to agricultural Sciences	-95
4	Replace lost spaces resulting from improvements made to Dole Street & University Avenue	-30
	Total for Objective 1-4:	**-1,718**

Table 12b shows the recommended solution to address the parking deficit of 1,718 spaces occurring during the next planning horizon of 5-10 years. Beginning with the highest ranked option, the parking facility adjacent to Kennedy Theatre would be built first and provide a supply of 480 spaces with 4-levels. Following that, the parking facility adjacent to Agricultural Sciences would be built and may produce as many as 420 spaces with a 4-level build-out. However, we understand that this facility is not currently in the planning stages and would result in the relocation of the Facilities Department to create the space required for this facility. As was discussed previously with UHM, the intent of scoring and ranking options is to provide a *guideline* as to general build-order and sequencing. It is not intended to be followed directly if circumstances at the time prevent a particular facility from being constructed. Therefore, we understand that UHM may elect to pass this option and proceed directly to #3, the Lower Campus Parking Structure Phase IIB.

In addition to addressing "everyday" parking demands, Phase IIB will also help remedy the shortage of parking during special events. We understand that sports events and graduation produce large-scale demands which force parking well into upper campus. The creation of 900 spaces through Phase IIB will relieve the stress felt by Upper Campus by 45% (considering there are 1,991 spaces currently in Upper Campus).

Recommendation (continued)
Phase IIB will provide 900 spaces and combined with the Kennedy Theatre facility, will provide a total of 1,380 spaces. This is short of the 1,718 goal by 338 spaces, but considering that 95 spaces are gained back until the Agricultural Facility is built, UHM will be short of goal by 243 spaces.

To qualify the calculated 243 space short-fall, we must revisit assumptions made concerning future supply. Future supply figures inside campus have a high degree of accuracy because (1) present-day counts correlated with UHM's records and (2) changes to supply were carefully analyzed by over-laying future planning maps with present-day conditions to identify incremental changes in supply by zone and sub-zone. Lost spaces resulting from recommended improvements to the intersection at Dole Street and University Avenue are based on planning maps provided by ATA. Future supply figures outside campus, conversely, have a lower degree of certainty for reasons mentioned on page 7. As previously discussed in this report, we recommend that UHM conduct additional studies focusing in the surrounding neighborhoods to obtain a more precise estimate, as appropriate, of the parking supply in this area. Considering that this deficit group of 1,240 spaces accounts for 76% of the total deficit of 1,623, we recommend that UHM build the Parking Facility adjacent to Kennedy Theatre and Phase IIB as planned and re-evaluate parking conditions prior to building the Facility adjacent to Agricultural Sciences. The Parking Structure at Kennedy Theatre and Phase IIB may fully address parking deficits occurring during the next 5-10 years.

If, during the 5-10 year planning horizon, UHM concludes internally or through another independently conducted parking supply/ demand analysis, that Kennedy and Phase IIB are not addressing parking demand, then we recommend constructing the Facility adjacent to Agricultural Science. Based on our analysis, we have determined that remaining four facilities identified in Table 10 and 12 are not required *unless* changes occur during the next 5-10 years which significantly affect supply and demand assumptions as defined in this report.

Appendix

Table 1a: Site Count Data Collection - Central Campus

Central Campus	Stalls Current	% over sell	Student Permits	Employee Permits	Daily Permits	Wednesday, September 12 (# empty spaces) 8am - 10am	10am - 12pm	12pm - 2pm	2pm - 4pm	Thursday, September 13 (# empty spaces) 8am - 10am	10am - 12pm	12pm - 2pm
COMMUNITY COLLEGE (A)	22		0	30	0	4	3	5	7	0	4	6
PUBLIC TELEVISION (B)	15		0	21	0	4	1	5	5	4	3	9
COLLEGE OF ED (C,D,E & F)	95		0	130	0	33	22	7	1	12	0	4
ZONE 1 PARKING STRUCTURE	0											
Zone 1	**132**	**137%**	**0**	**181**	**0**	**41**	**26**	**17**	**13**	**16**	**7**	**19**
					% utilization:	*69%*	*80%*	*87%*	*90%*	*88%*	*95%*	*86%*
ARCHITECTURE BUILDING	146		0	152	10	69	43	38	32	73	52	43
Zone 2	**146**	**112%**	**0**	**152**	**10**	**69**	**43**	**38**	**32**	**73**	**52**	**43**
					% utilization:	*49%*	*68%*	*72%*	*76%*	*46%*	*62%*	*68%*
POST OFFICE (A)	20		0	23	0	4	4	1	1	6	2	10
HEMINGWAY HALL (B)	13		0	15	0	9	6	3	4	8	2	6
CAMPUS CENTER (C)	6		0	7	0	2	0	0	0	6	1	0
CIRCLE TO SINCLAIR (D)	37		0	43	0	9	1	3	1	8	0	2
VARNEY CIRCLE (E)	23		0	0	23	-	-	-	-	-	-	-
MID-PAC (Zone 16 on the map)	19		0	22	0	12	2	1	0	12	7	3
MAILE WAY-FARRINGTON RD (F) (31)	0		0	0	0	(31) spaces present on Maile Way in Zone 3, but are included in the Zone 4 "Maile Way" count						
STUDENT SERVICES BUILDING	23		0	26	0	4	0	0	0	8	3	1
CRAWFORD HALL & SAUNDERS HALL	0											
Zone 3	**141**	**115%**	**0**	**136**	**23**	**40**	**13**	**8**	**6**	**48**	**15**	**22**
					% utilization:	*66%*	*89%*	*93%*	*95%*	*59%*	*87%*	*81%*
SPALDING HALL (A)	61		0	61	0	5	1	0	1	6	1	2
MAILE WAY	94		0	99	0	16	2	10	10	18	2	10
SHERMAN LAB(under construction)	10		0	10	0	-	-	-	-	-	-	-
ST. JOHN LAB	0											
HAMILTON LIBRARY	0											
ZONE 4 PARKING STRUCTURE	0											
Zone 4	**165**	**100%**	**0**	**170**	**0**	**21**	**3**	**10**	**11**	**24**	**3**	**12**
					% utilization:	*87%*	*98%*	*94%*	*93%*	*85%*	*98%*	*93%*
BIO-MED (A, B, C, D & E)	188		0	223	10	69	40	34	62	77	26	37
FACILITIES MANAGEMENT (G)	60		0	69	5	5	3	5	14	6	2	11
CREDIT UNION VISITOR	10		0	0	10	-	-	-	-	-	-	-
ZONE 5 PARKING STRUCTURE	0											
Zone 5	**258**	**125%**	**0**	**291**	**25**	**74**	**43**	**39**	**76**	**83**	**28**	**48**
					% utilization:	*68%*	*82%*	*83%*	*67%*	*64%*	*88%*	*79%*
EAST-WEST RD (B & C)	45		0	54	0	0	1	1	4	0	0	1
KOREAN STUDIES (D, F & G)	156		0	175	10	51	12	6	19	53	16	16
LINCOLN HALL	7		0	8	0	0	0	0	0	0	0	0
KENNEDY Theatre VISITOR	7		0	0	7	-	-	-	-	-	-	-
JEFFERSON HALL VISITOR	12		0	0	12	-	-	-	-	-	-	-
PARADISE PALMS CAFÉ	0											
HALE LAULIMA	0											
Zone 6	**227**	**120%**	**0**	**238**	**29**	**51**	**13**	**7**	**23**	**53**	**16**	**17**
					% utilization:	*74%*	*93%*	*96%*	*88%*	*73%*	*92%*	*91%*
TRANS SVCS-INSIDE	39		0	51	0	3	4	9	21	13	7	19
TRANS SVCS-OUTSIDE	12		0	16	0	0	0	0	6	1	0	0
Zone 24	**51**	**130%**	**0**	**66**	**0**	**3**	**4**	**9**	**27**	**14**	**7**	**19**
					% utilization:	*94%*	*92%*	*82%*	*47%*	*73%*	*86%*	*63%*
BURNS HALL (A)	38		0	38	0	6	0	1	2	7	3	1
BURNS-DIAMOND HEAD (RESERVED)	20		0	20	0	-	-	-	-	-	-	-
M SUBSTATION	0											
JEFFERSON HALL (C)	8		0	8	0	5	5	3	5	5	5	5
HALE MANOA (B)	17		0	17	0	8	0	6	4	7	6	6
Zone 9	**83**	**100%**	**0**	**83**	**0**	**19**	**5**	**10**	**11**	**19**	**14**	**12**
					% utilization:	*77%*	*94%*	*88%*	*87%*	*77%*	*83%*	*86%*
KENNEDY VISITOR	64		0	0	64	0	0	3	1	0	0	0
Zone 10	**64**	**100%**	**0**	**0**	**64**	**0**	**0**	**3**	**1**	**0**	**0**	**0**
					% utilization:	*100%*	*100%*	*95%*	*98%*	*100%*	*100%*	*100%*
POST	56		0	50	0	7	2	3	3	6	0	7
PACIFIC OCEAN SCIENCE	0											
MARINE SCIENCE & WATANABE HALL	0											
Zone 11	**56**	**90%**	**0**	**50**	**0**	**7**	**2**	**3**	**3**	**6**	**0**	**7**
					% utilization:	*88%*	*96%*	*95%*	*95%*	*89%*	*100%*	*88%*

Table 1a: Site Count Data Collection - Central Campus

Central Campus	Stalls Current	% over sell	Student Permits	Employee Permits	Daily Permits	Wednesday, September 12 (# empty spaces) 8am - 10am	10am - 12pm	12pm - 2pm	2pm - 4pm	Thursday, September 13 (# empty spaces) 8am - 10am	10am - 12pm	12pm - 2pm
SINCLAIR (A)	11		0	11	0	2	3	3	4	2	1	0
BACHMAN HALL (B, C, D & E)	95		0	95	0	31	9	31	11	23	10	19
CAMPUS CENTER (F)	7		0	7	0	0	0	1	1	0	0	1
Zone 12	**113**	**100%**	**0**	**113**	**0**	**33**	**12**	**35**	**16**	**25**	**11**	**20**
					% utilization:	*71%*	*89%*	*69%*	*86%*	*78%*	*90%*	*82%*
SUMMER SESSION (A)	17		0	22	0	2	0	0	1	2	0	0
ART BUILDING (B, C, D & E)	91		0	116	0	5	0	0	15	3	1	0
PHYS. SCIENCE (F, G & H)	114		0	145	0	9	1	3	24	13	0	1
STUDENT HEALTH (I & J)	12		0	15	0	0	0	2	0	3	0	0
KUYKENDAL (K)	14		0	0	14	-	-	-	-	-	-	-
KENNEDY Theatre (A OVERFLOW)	57		0	72	0	30	12	0	18	21	0	6
Zone 13	**305**	**127%**	**0**	**370**	**14**	**46**	**13**	**5**	**58**	**42**	**1**	**7**
					% utilization:	*84%*	*96%*	*98%*	*80%*	*86%*	*100%*	*98%*
BACHMAN VISITOR	35		0	0	35	0	5	6	11	12	12	6
ZONE 14 PARKING STRUCTURE	0											
Zone 14	**35**	**100%**	**0**	**0**	**35**	**0**	**5**	**6**	**11**	**12**	**12**	**6**
					% utilization:	*100%*	*86%*	*83%*	*69%*	*66%*	*66%*	*83%*
MUSIC BUILDING (A & B)	107		0	131	20	62	32	8	3	86	60	32
LAW SCHOOL (C)	65		0	98	0	33	9	12	2	29	18	5
Zone 17	**172**	**150%**	**0**	**228**	**20**	**95**	**41**	**20**	**5**	**115**	**78**	**37**
					% utilization:	*38%*	*73%*	*87%*	*97%*	*24%*	*49%*	*76%*
AUXILIARY SERVICES (F) RESERVED)	8		0	0	0	-	-	-	-	-	-	-
Zone AUX	**8**	**0%**	**0**	**0**	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
AG ENGINEERING BLDG (G)	35		0	34	0	20	12	8	15	18	12	14
Zone 23	**35**	**96%**	**0**	**34**	**0**	**20**	**12**	**8**	**15**	**18**	**12**	**14**
					% utilization:	*43%*	*66%*	*77%*	*57%*	*49%*	*66%*	*60%*
CENTRAL SUBTOTAL	**1,991**		**0**	**2,111**	**220**	**519**	**230**	**209**	**296**	**536**	**244**	**277**
					% utilization:	*72%*	*88%*	*89%*	*84%*	*71%*	*87%*	*85%*

Notes:

1 Counts and corresponding utilization figures were omitted for visitor spaces within central campus with the exception of lots adjacent to Kennedy Theatre and to Bachman Hall.

- Per Darryl Nohara, UH recently re-classed small portions of student & employee permits zones for visitor access throughout the campus.
- During our assessment, we observed these recently converted visitor areas were substantially empty, however, UH anticipates these areas to become fully utilized in the future as faculty/staff become more familiar with their locati
- All visitor spaces are included in our inventory assessment. However, the utilization calculations were omitted.
- Space counts and utilization figures for Kennedy Theatre and Bachmann Hall were included because these lot have always been dedicated for visitors and thus the data collected was representative of typical use.

2 Zone 4: 99 Employee permits for "Maile Way" results from the (31) spaces counted from zone 3 multiplied by the corresponding 11.5% oversell factor.

Table 1b: Site Count Data Collection - Lower Campus

Lower Campus	Stalls Current	% over sell	Student Permits	Employee Permits	Daily Permits	Wednesday, September 12 (# empty spaces) 8am - 10am	10am - 12pm	12pm - 2pm	2pm - 4pm	Thursday, September 13 (# empty spaces) 8am - 10am	10am - 12pm	12pm - 2pm
HAWAIIAN STUDIES	26		0	26	0	13	11	11	0	18	13	14
Zone 7	**26**	**100%**	**0**	**26**	**0**	**13**	**11**	**11**	**0**	**18**	**13**	**14**
					% utilization:	*50%*	*58%*	*58%*	*100%*	*31%*	*50%*	*46%*
ROTC-MAUKA	33		0	33	0	9	6	6	22	16	14	9
ROTC-MAKAI	49		0	49	0	24	24	30	37	31	27	29
BASEBALL STADIUM	9		0	9	0	7	7	7	5	7	7	7
HELP-MAUKA	20		0	20	0	11	10	10	9	12	13	10
Zone 18	**111**	**100%**	**0**	**111**	**0**	**51**	**47**	**53**	**73**	**66**	**61**	**55**
					% utilization:	*54%*	*58%*	*52%*	*34%*	*41%*	*45%*	*50%*
SPECIAL EVENTS LOADING DOCK	14		0	14	0	2	3	2	4	3	6	6
Zone 19	**14**	**100%**	**0**	**14**	**0**	**2**	**3**	**2**	**4**	**3**	**6**	**6**
					% utilization:	*86%*	*79%*	*86%*	*71%*	*79%*	*57%*	*57%*
PARKING STRUCTURE I	2039		1440	800	439	537	7	138	(see note 1)	655	86	143
PARKING STRUCTURE PHASE IIA	900		720	400	100	21	4	29	-	56	12	12
PARKING STRUCTURE PHASE IIB	0											
Zone 20	**2939**	**140%**	**2160**	**1200**	**539**	**558**	**11**	**167**	**-**	**711**	**98**	**155**
					% utilization:	*81%*	*100%*	*94%*		*76%*	*97%*	*95%*
DOLE STREET STRUCTURE	276		150	0	126	29	27	104	176	41	37	47
Zone 22	**276**	**100%**	**150**	**0**	**126**	**29**	**27**	**104**	**176**	**41**	**37**	**47**
					% utilization:	*89%*	*90%*	*62%*	*36%*	*85%*	*87%*	*83%*
STUDENT DORMS	94		71	23	0	13	16	14	21	6	10	9
Zone 8	**94**	**100%**	**71**	**23**	**0**	**13**	**16**	**14**	**21**	**6**	**10**	**9**
					% utilization:	*86%*	*83%*	*85%*	*78%*	*94%*	*89%*	*90%*
STUDENT APTS	49		45	4	0	7	5	7	13	4	7	9
Zone 21	**49**	**100%**	**45**	**4**	**0**	**7**	**5**	**7**	**13**	**4**	**7**	**9**
					% utilization:	*86%*	*90%*	*86%*	*73%*	*92%*	*86%*	*82%*
LOWER CAMPUS SUBTOTAL	**3,509**		**2,426**	**1,378**	**665**	**673**	**120**	**358**		**849**	**232**	**295**
					% utilization:	*81%*	*97%*	*90%*	(see note 1)	*76%*	*93%*	*92%*

Notes:

1 Space counts were conducted by UH staff every half hour between 7:30am and 1:30pm each day for the parking structures.

- For the purposes of this campus-wide assessment, space counts occurring at 9am, 11am, and 1pm were considered.
- Refer to the "Daily Ticket and Space Count for Lower Campus Parking Structures" for more detailed parking facility utilization data.

2 The following areas were not included in this study for reasons cited in our report:

- The gravel lot adjacent to Klum gym (20 spaces)
- Astronomy (123 spaces)
- PPMO / Accounting (6 spaces)

Table 1c: Site Count Data Collection - Daily Ticket and Space Count for Lower Campus Parking Structures

9/12/2007	Tickets Sold					Spaces Available		
TIME	LC1	LC2	LC3	WAI	Total	Phase 1	Phase IIA	Total
7:00	12	206	0	3	**221**			
7:30	57	348	5	21	**431**	1610	680	**2290**
8:00	159	499	12	58	**728**	1366	399	**1765**
8:30	179	550	12	79	**820**	912	140	**1052**
9:00	190	554	12	82	**838**	537	21	**558**
9:30	196	556	12	84	**848**	125	7	**132**
10:00	197	558	12	84	**851**	49	3	**52**
10:30	207	560	12	85	**864**	18	1	**19**
11:00	207	561	12	86	**866**	7	4	**11**
11:30	218	569	12	88	**887**	2	2	**4**
12:00	223	585	12	88	**908**	76	18	**94**
12:30	227	625	12	90	**954**	66	19	**85**
13:00			12			138	29	**167**
13:30			12			162	29	**191**
14:00								

Structures closed to daily users at 8:44 am with 150 tickets sold.

Structures re-opened to daily users at 11:34 am.

9/13/2007	Tickets Sold					Spaces Available		
TIME	LC1	LC2	LC3	WAI	Total	Phase 1	Phase IIA	Total
7:00	17	209	5	9	**240**			
7:30	49	300	6	25	**380**	1646	658	**2304**
8:00	90	467	12	56	**625**	1461	414	**1875**
8:30	158	554	15	84	**811**	913	189	**1102**
9:00	164	568	15	86	**833**	655	56	**711**
9:30	164	571	15	86	**836**	310	16	**326**
10:00	165	574	15	88	**842**	198	5	**203**
10:30	167	580	15	92	**854**	70	6	**76**
11:00	167	583	15	95	**860**	86	12	**98**
11:30	169	586	15	95	**865**	92	18	**110**
12:00	197	636	15	97	**945**	119	24	**143**
12:30	210	676	15	98	**999**	164	26	**190**
13:00						143	12	**155**
13:30						20	39	**59**
14:00								

Structures closed to daily users at 9:03 am with 152 tickets sold.

Structures re-opened to daily users at 11:30 am.

Table 1d: Site Count Data Collection - Total Campus

	Stalls	Student	Employee	Daily	Wednesday, September 12 (# empty spaces)				Thursday, September 13 (# empty spaces)		
	Current	Permits	Permits	Permits	8am - 10am	10am - 12pm	12pm - 2pm	2pm - 4pm	8am - 10am	10am - 12pm	12pm - 2pm
CENTRAL SUBTOTAL	**1,991**	**0**	**2,111**	**220**	**519**	**230**	**209**	**296**	**536**	**244**	**277**
				% utilization:	*72%*	*88%*	*89%*	*84%*	*71%*	*87%*	*85%*
LOWER CAMPUS SUBTOTAL	**3,509**	**2,426**	**1,378**	**665**	**673**	**120**	**358**	(see note 1)	**849**	**232**	**295**
				% utilization:	*81%*	*97%*	*90%*		*76%*	*93%*	*92%*
TOTAL CAMPUS	**5,500**	**2,426**	**3,489**	**885**	**1192**	**350**	**567**	(see note 1)	**1385**	**476**	**572**
				% utilization:	*78%*	*93%*	*89%*		*74%*	*91%*	*89%*

Notes:

1 Space counts were conducted by UH staff every half hour between 7:30am and 1:30pm each day for the parking structures.

- For the purposes of this campus-wide assessment, space counts occurring at 9am, 11am, and 1pm were considered.
- Refer to the "Daily Ticket and Space Count for Lower Campus Parking Structures" for more detailed parking facility utilization data.

Table 2a: Existing Parking Inventory (Supply) Distribution by User Group

User Group		Space Inventory	Percentage of Total
Faculty/ Staff		2,806	41.6%
	zone 1:	132	2.0%
	zone 2:	136	2.0%
	zone 3:	118	1.8%
	zone 4:	165	2.4%
	zone 5:	233	3.5%
	zone 6:	198	2.9%
	zone 24:	51	0.8%
	zone 9:	83	1.2%
	zone 11:	56	0.8%
	zone 12:	113	1.7%
	zone 13:	291	4.3%
	zone 17:	152	2.3%
	zone AUX:	8	0.1%
	zone 23:	35	0.5%
	zone 7:	26	0.4%
	zone 18:	111	1.6%
	zone 19:	14	0.2%
	zone 20:	857	12.7%
	zone 8:	23	0.3%
	zone 21:	4	0.1%
Commuter Student		1,529	22.7%
	zone 20:	1,304	19.3%
	zone 22:	127	1.9%
	zone 8:	60	0.9%
	zone 21:	38	0.6%
Resident Student		280	4.2%
	zone 20:	239	3.5%
	zone 22:	23	0.3%
	zone 8:	11	0.2%
	zone 21:	7	0.1%
Visitor/ Other		885	13.1%
	zone 2:	10	0.1%
	zone 3:	23	0.3%
	zone 5:	25	0.4%
	zone 6:	29	0.4%
	zone 10:	64	0.9%
	zone 13:	14	0.2%
	zone 14:	35	0.5%
	zone 17:	20	0.3%
	zone 20:	539	8.0%
	zone 22:	126	1.9%
Campus Sub-Total		5,500	81.6%
On-Street/ Off Campus		1,240	18.4%
Grand Total Parking Inventory		6,740	100.0%

Table 4a: Peak Campus Survey Data (by Zone)

		Effective Supply	Survey-Day Peak Demand	Parking Surplus (Deficit)	% Utilization
Central Campus					
Faculty/ Staff		1,505	1,519	(14)	101%
	Zone 1	112	115	(3)	102%
	Zone 2	116	88	28	76%
	Zone 3	100	102	(2)	102%
	Zone 4	140	162	(22)	116%
	Zone 5	198	197	1	99%
	Zone 6	168	183	(15)	109%
	Zone 24	43	45	(2)	104%
	Zone 9	71	73	(2)	103%
	Zone 11	48	55	(7)	116%
	Zone 12	96	101	(5)	105%
	Zone 13	247	283	(36)	114%
	Zone 17	129	92	37	71%
	Zone AUX	7	-	-	-
	Zone 23	30	23	7	77%
Commuter Student		0	-	-	-
Resident Student		0	-	-	-
Visitor/ Other		198	152	46	77%
	Zone 2	9	5	4	56%
	Zone 3	21	12	9	58%
	Zone 5	23	13	10	58%
	Zone 6	26	15	11	57%
	Zone 10	58	64	(6)	111%
	Zone 13	13	7	6	56%
	Zone 14	32	26	6	83%
	Zone 17	18	10	8	56%
Central Campus Total		1,703	1,671	32	98%

Table 4a: Peak Campus Survey Data (by Zone)

Lower Campus					
Faculty/ Staff		880	943	(64)	107%
	Zone 7	22	14	8	63%
	Zone 18	94	56	38	59%
	Zone 19	12	9	3	76%
	Zone 20	729	841	(113)	115%
	Zone 8	20	20	(0)	101%
	Zone 21	3	4	(0)	103%
Commuter Student		1,376	1,477	(101)	107%
	Zone 20	1,174	1,280	(106)	109%
	Zone 22	114	112	2	98%
	Zone 8	54	52	2	96%
	Zone 21	34	33	1	98%
Resident Student		266	270	(4)	102%
	Zone 20	227	234	(7)	103%
	Zone 22	22	21	2	93%
	Zone 8	10	9	1	91%
	Zone 21	7	6	1	92%
Visitor/ Other		599	640	(42)	107%
	Zone 20	485	529	(44)	109%
	Zone 22	113	111	2	98%
Lower Campus Total		3,120	3,331	(211)	107%
Campus Total		**4,824**	**5,002**	**(178)**	**104%**
On-Street/ Off Campus		1,116	1,240	(124)	111%
Grand Total		**5,940**	**6,242**	**(302)**	**105%**

Notes:

1 totals are rounded to the nearest whole integer.

2 Utilization assumed to be 50% for recently converted visitor lots

3 Utilization for visitor lots at Kennedy Theatre, Bachmann Hall, Lower Campus Parking Structures and Dole Street Garage were based on observed occupancy.

Table 4b: Peak Campus Survey Data (by User Group)

User Group		Effective Supply	Survey-Day Peak Demand	Parking Surplus (Deficit)	% Utilization
Faculty/ Staff		2,385	2,462	(77)	103%
	zone 1:	112	115	(3)	102%
	zone 2:	116	88	28	76%
	zone 3:	100	102	(2)	102%
	zone 4:	140	162	(22)	116%
	zone 5:	198	197	1	99%
	zone 6:	168	183	(15)	109%
	zone 24:	43	45	(2)	104%
	zone 9:	71	73	(2)	103%
	zone 11:	48	55	(7)	116%
	zone 12:	96	101	(5)	105%
	zone 13:	247	283	(36)	114%
	zone 17:	129	92	37	71%
	zone AUX:	7	-	-	-
	zone 23:	30	23	7	77%
	zone 7:	22	14	8	63%
	zone 18:	94	56	38	59%
	zone 19:	12	9	3	76%
	zone 20:	729	841	(113)	115%
	zone 8:	20	20	(0)	101%
	zone 21:	3	4	(0)	103%

Table 4b: Peak Campus Survey Data (by User Group)

Commuter Student		1,376	1,477	(101)	107%
	zone 20:	1,174	1,280	(106)	109%
	zone 22:	114	112	2	98%
	zone 8:	54	52	2	96%
	zone 21:	34	33	1	98%
Resident Student		266	270	(4)	102%
	zone 20:	227	234	(7)	103%
	zone 22:	22	21	2	93%
	zone 8:	10	9	1	91%
	zone 21:	7	6	1	92%
Visitor/ Other		797	792	4	99%
	zone 2:	9	5	4	56%
	zone 3:	21	12	9	58%
	zone 5:	23	13	10	58%
	zone 6:	26	15	11	57%
	zone 10:	58	64	(6)	111%
	zone 13:	13	7	6	56%
	zone 14:	32	26	6	83%
	zone 17:	18	10	8	56%
	zone 20:	485	529	(44)	109%
	zone 22:	113	111	2	98%
Campus Sub-Total		**4,824**	**5,002**	**(178)**	**104%**

Notes:

1 totals are rounded to the nearest whole integer.

2 Utilization assumed to be 50% for recently converted visitor lots

3 Utilization for visitor lots at Kennedy Theatre, Bachmann Hall, Lower Campus Parking Structures and Dole Street Garage were based on

Table 6: Summary of Mainland University Parking Demand Ratios

Institution	Year of Study	Faculty/ Staff Presence Factor	Faculty/ Staff Driving Ratio	Faculty/ Staff Parking Demand	Resident Students Presence Factor	Resident Students Driving Ratio	Resident Students Parking Demand	Commuter Students Presence Factor	Commuter Students Driving Ratio	Commuter Students Parking Demand	Visitors Presence Factor	Visitors Driving Ratio	Visitors Parking Demand
Illinois State University	1994	0.90	0.85	0.77	1.00	0.51	0.51	0.38	0.30	0.11	0.05	0.75	0.04
University of Georgia	1991	0.78	0.94	0.73	0.89	0.62	0.55	0.50	0.63	0.32	0.05	0.80	0.04
University of Denver	1993	0.85	0.85	0.72	0.85	0.60	0.51	0.16	0.70	0.11	0.10	0.80	0.08
Texas Tech University	2000	0.71	0.74	0.53	1.00	0.73	0.73	0.41	0.53	0.22	0.10	0.85	0.09
Wright State University	1991	0.78	0.93	0.73	0.95	0.46	0.44	0.36	0.65	0.23	0.07	0.95	0.07
University of New Mexico	1990	0.81	0.80	0.65	1.00	0.39	0.39	0.28	0.64	0.18	0.05	0.70	0.04
Northern Illinois Avenue	1992	0.89	0.91	0.81	1.00	0.29	0.29	0.32	0.36	0.12	0.05	0.67	0.03
Boise State University	1990	0.85	0.85	0.72	1.00	0.60	0.60	0.30	0.60	0.18	0.05	0.75	0.04
Cal State Poly, Pomona	1990	0.90	0.92	0.83	1.00	0.65	0.65	0.46	0.89	0.41	0.53	0.87	0.46
Western Illinois University	1990	0.90	0.85	0.77	1.00	0.40	0.40	0.56	0.36	0.20	0.05	0.72	0.04
Loyola University of Chicago	1990	0.84	0.58	0.49	1.00	0.23	0.23	0.60	0.56	0.34	0.05	0.46	0.02
University of Notre Dame	1994	0.85	0.90	0.77	0.95	0.31	0.29	0.16	0.73	0.12	0.10	0.85	0.09
Butler University	1989	0.78	0.84	0.66	1.00	0.59	0.59	0.41	0.70	0.29	0.46	0.77	0.35
Cal Poly State, San Luis Obispo	1989	0.90	0.84	0.76	0.90	0.71	0.64	0.39	0.47	0.18	0.47	0.80	0.38
Cal State University, Long Beach	1988	0.86	0.86	0.74	0.95	0.68	0.65	0.26	0.87	0.23	0.40	0.58	0.23
Cal Poly State, San Luis Obispo	1987	0.95	0.89	0.85	0.95	0.98	0.93	0.78	0.56	0.44	0.95	0.41	0.39
	Average:	0.85	0.85	0.72	0.97	0.55	0.52	0.40	0.60	0.23	0.22	0.73	0.15
	Maximum:	0.95	0.94	0.85	1.00	0.98	0.93	0.78	0.89	0.44	0.95	0.95	0.46
	Minimum:	0.71	0.58	0.49	0.85	0.23	0.23	0.16	0.30	0.11	0.05	0.41	0.02
University of Hawaii at Manoa	**Calculated:**			**0.61**			**0.09**			**0.16**			**0.20**
	Variation from Average:			**(0.11)**			**(0.44)**			**(0.07)**			**0.05**
	Increase or (Decrease) of Parking Stalls Required:			**441**			**1,383**			**1,223**			**(193)**

HEADCOUNT ENROLLMENT OF CREDIT STUDENTS, BY CAMPUS
UNIVERSITY OF HAWAIʻI
FALL 1996 TO FALL 2006

FALL SEMESTER	TOTAL		UH AT MĀNOA		UH AT HILO		UH WEST OʻAHU		UH COMMUNITY COLLEGES													
									SUBTOTAL		HAWAIʻI		HONOLULU		KAPIʻOLANI		KAUAʻI		LEEWARD		MAUI		WINDWARD	
	No.	Pct Chg	No.	Pct Chg	No.	Pct Chg	No.	Pct Chg	No.	Pct Chg	No.	Pct Chg	No.	Pct Chg	No.	Pct Chg	No.	Pct Chg	No.	Pct Chg	No.	Pct Chg	No.	Pct Chg
1996	47,379	-5.7	18,252	-7.8	2,800	-2.5	648	-9.5	25,679	-4.4	2,463	-12.4	4,090	-8.0	7,373	0.6	1,367	-6.4	6,014	-5.6	2,854	3.2	1,518	-9.3
1997.....	45,551	-3.9	17,365	-4.9	2,639	-5.8	648	0.0	24,899	-3.0	2,221	-9.8	3,970	-2.9	7,189	-2.5	1,283	-6.1	5,936	-1.3	2,787	-2.3	1,513	-0.3
1998	45,337	-0.5	17,013	-2.0	2,730	3.4	685	5.7	24,909	0.0	2,308	3.9	4,124	3.9	7,236	0.7	1,136	-11.5	5,765	-2.9	2,849	2.2	1,491	-1.5
1999 1/ ..	46,479	NA	17,612	NA	2,790	NA	687	0.3	25,390	NA	2,279	-1.3	4,769	NA	7,254	0.2	1,142	0.5	5,570	-3.4	2,862	0.5	1,514	1.5
2000	44,579	-4.1	17,263	-2.0	2,874	3.0	665	-3.2	23,777	-6.4	2,090	-8.3	4,487	-5.9	6,760	-6.8	1,052	-7.9	5,259	-5.6	2,678	-6.4	1,451	-4.2
2001	45,994	3.2	17,532	1.6	2,913	1.4	740	11.3	24,809	4.3	2,075	-0.7	4,653	3.7	7,081	4.7	1,185	12.6	5,562	5.8	2,699	0.8	1,554	7.1
2002 2/ ..	48,173	4.7	18,706	6.7	3,040	4.4	834	12.7	25,593	3.2	2,182	5.2	4,478	-3.8	7,041	-0.6	1,224	3.3	5,918	6.4	2,989	10.7	1,761	13.3
2003 3/ ..	50,317	4.5	19,863	6.2	3,300	8.6	810	-2.9	26,344	2.9	2,346	7.5	4,238	-5.4	7,491	6.4	1,210	-1.1	6,201	4.8	2,985	-0.1	1,873	6.4
2004	50,569	0.5	20,549	3.5	3,288	-0.4	834	3.0	25,898	-1.7	2,440	4.0	4,336	2.3	7,174	-4.2	1,117	-7.7	6,060	-2.3	2,996	0.4	1,775	-5.2
2005	50,157	-0.8	20,644	0.5	3,422	4.1	858	2.9	25,233	-2.6	2,377	-2.6	4,183	-3.5	7,289	1.6	1,059	-5.2	5,709	-5.8	2,903	-3.1	1,713	-3.5
2006	49,990	-0.3	20,357	-1.4	3,507	2.5	866	0.9	25,260	0.1	2,358	-0.8	4,143	-1.0	7,272	-0.2	1,119	5.7	5,746	0.6	2,841	-2.1	1,781	4.0

1/ Includes continuing education credit students at UH Manoa, UH Hilo and Honolulu CC, beginning Fall 1999. Fall 1999 percentage change calculations for these campuses, and for both the UH and UHCC systems, are incomparable to prior years and are not shown.

2/ Migration to new registration system at the UH Community Colleges.

3/ Migration to new registration system at UH Mānoa, UH Hilo and UH-West Oʻahu.

Note: Data include special students (concurrents, early admits and auditors) for all years shown.

SOURCE: University of Hawaiʻi, Institutional Research Office; September 2006.

UH Mānoa HEADCOUNT AND FTE BY DIVISION/BRANCH/SECTION AS OF MARCH 2007
DATA FROM DATAWAREHOUSE WHICH PULLS FROM PEOPLESOFT
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EAC	DIVISION	BRANCH	SECTION	UNIT	APT		CIVIL SERV		EXEC		FACULTY		GRAD ASST		LECTURER		NON		TOTAL	
					HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE
2210000001	OFF VP AC AF			MANOA CAMPUS			1	1.00											1	1.00
2210010001	OFF VP AC AF	OFF VP AC AF		MANOA CAMPUS	22	22.00	8	8.00	17	16.40	7	6.40	5	2.50					59	55.30
2210030001	OFF VP AC AF	UNIV OF HAWAII PRESS		MANOA CAMPUS	25	25.00	4	4.00	1	1.00									30	30.00
2210040001	OFF VP AC AF	CENTER ON AGING		MANOA CAMPUS			1	1.00											1	1.00
2210060001	OFF VP AC AF	MILITARY SCIENCE		MANOA CAMPUS			1	1.00									20	0.00	21	1.00
2210070001	OFF VP AC AF	AEROSPACE STUDIES		MANOA CAMPUS			1	1.00									15	0.00	16	1.00
2210080001	OFF VP AC AF	OFF FAC DEV & AC SUP		MANOA CAMPUS	7	7.00	2	2.00			3	2.93							12	11.93
2210090001	OFF VP AC AF	FACULTY SENATE		MANOA CAMPUS			2	2.00											2	2.00
2211010001	C ARTS & HUM	A&H DEANS OFF		MANOA CAMPUS	4	4.00	1	1.00	2	2.00	2	1.00							9	8.00
2211110001	C ARTS & HUM	AMER STUDIES DEPT		MANOA CAMPUS	1	1.00	2	1.50			13	13.00	5	2.50	4	1.93	4	0.00	29	19.93
2211120001	C ARTS & HUM	ART DEPT		MANOA CAMPUS	6	6.00	2	2.00			22	21.50	4	1.25	18	9.98	2	0.00	54	40.73
2211130001	C ARTS & HUM	THEATRE & DANCE DEPT		MANOA CAMPUS	3	3.00	2	2.00			15	15.00	15	7.00	10	2.54	3	0.00	48	29.54
2211140001	C ARTS & HUM	HISTORY DEPT		MANOA CAMPUS	2	1.50	2	2.00			24	23.50	20	10.19	6	1.93	7	0.00	61	39.12
2211150001	C ARTS & HUM	MUSIC DEPT		MANOA CAMPUS	4	3.64	1	1.00			23	23.00	10	4.50	21	4.90			59	37.04
2211160001	C ARTS & HUM	PHILOSOPHY DEPT		MANOA CAMPUS			3	2.50			14	13.40	11	3.75	1	0.43	2	0.00	31	20.08
2211170001	C ARTS & HUM	RELIGION DEPT		MANOA CAMPUS			1	1.00			7	7.00	6	2.50	2	0.43			16	10.93
2211180001	C ARTS & HUM	SPEECH DEPT		MANOA CAMPUS			2	2.00			8	8.00	8	4.00	4	2.12	1	0.00	23	16.12
2212300001	C OF L L L	LLL DEANS OFF		MANOA CAMPUS	8	7.80	6	6.00	2	1.40	1	1.00	1	0.50					18	16.70
2212310001	C OF L L L	E A LANG & LIT DEPT		MANOA CAMPUS	2	2.00	2	2.00			45	44.17	17	7.75	18	6.50	2	0.00	86	62.42
2212330001	C OF L L L	ENGLISH DEPT		MANOA CAMPUS	2	2.00	5	5.00			60	55.00	27	11.34	4	1.29	1	0.00	99	74.63
2212340001	C OF L L L	SECOND LANG STUDIES		MANOA CAMPUS	3	3.00	2	2.00			23	22.00	53	23.75			4	0.00	85	50.75
2212350001	C OF L L L	LANG & LIT EUROPE&AM		MANOA CAMPUS	1	1.00	2	2.00			37	35.90	25	12.00	9	5.43	1	0.00	75	56.33
2212360001	C OF L L L	LANG TELECOMM CTR		MANOA CAMPUS	7	7.00	1	1.00			1	1.00	1	0.50					10	9.50
2212370001	C OF L L L	INDO PAC LANG DEPT		MANOA CAMPUS	4	4.07	1	1.00			40	36.95	5	2.50	14	9.24			64	53.76
2212380001	C OF L L L	LINGUISTICS DEPT		MANOA CAMPUS			2	2.00			14	13.00	31	8.00			12	0.00	59	23.00
2212390001	C OF L L L	INTERPRT & TRANS STU		MANOA CAMPUS							3	2.50					1	0.00	4	2.50
2213400001	C OF NAT SCI	NAT SCI DEANS OFF		MANOA CAMPUS	7	7.00	1	1.00	1	1.00	1	1.00					1	0.00	11	10.00
2213410001	C OF NAT SCI	BIOLOGY PROG		MANOA CAMPUS	3	3.00	1	1.00			1	1.00	21	10.50	1	0.21	1	0.00	28	15.71
2213420001	C OF NAT SCI	BOTANY DEPT		MANOA CAMPUS	2	2.00					20	19.75	25	12.50			15	0.00	62	34.25
2213430001	C OF NAT SCI	CHEMISTRY DEPT		MANOA CAMPUS	6	6.00	4	4.00			18	15.25	34	17.00			3	0.00	65	42.25
2213460001	C OF NAT SCI	INFO & COMP SCI DEPT		MANOA CAMPUS	4	4.00	2	2.00			39	34.11	20	10.00			7	0.00	72	50.11
2213470001	C OF NAT SCI	MATHEMATICS DEPT		MANOA CAMPUS	1	1.00	3	3.00			32	31.40	14	7.19			2	0.00	52	42.59
2213490001	C OF NAT SCI	MICROBIOLOGY DEPT		MANOA CAMPUS	2	2.00	1	1.00			8	8.00	22	11.00	1	0.21	1	0.00	35	22.21
2213510001	C OF NAT SCI	PHYSICS & ASTRO DEPT		MANOA CAMPUS	2	2.00	2	2.00			25	25.00	42	21.00			7	0.00	78	50.00
2213520001	C OF NAT SCI	ZOOLOGY DEPT		MANOA CAMPUS	6	6.00	3	3.00			18	16.55	24	12.00			8	0.00	59	37.55
2213530001	C OF NAT SCI	EECB		MANOA CAMPUS	1	0.75											6	0.00	7	0.75
2213540001	C OF NAT SCI	MARINE OPTION PROG		MANOA CAMPUS	2	1.50													2	1.50
2213550001	C OF NAT SCI	LYON ARBORETUM		MANOA CAMPUS			1	1.00											1	1.00
2214600001	C OF SOC SCI	SOC SCI DEANS OFF		MANOA CAMPUS	7	7.00	2	3.00	2	2.00									11	12.00
2214610001	C OF SOC SCI	ANTHROPOLOGY DEPT		MANOA CAMPUS	2	2.00	1	1.00			16	15.40	9	4.90	5	2.89	21	0.00	54	26.19
2214620001	C OF SOC SCI	COMMUNICATION SCH OF		MANOA CAMPUS	1	1.00	2	2.00			12	12.00	6	3.00	6	2.04			27	20.04
2214630001	C OF SOC SCI	ECONOMICS DEPT		MANOA CAMPUS	1	1.00	1	1.00			17	17.00	14	7.00	3	2.25	6	0.00	42	28.25
2214640001	C OF SOC SCI	ETHNIC STUDIES PROG		MANOA CAMPUS							10	10.00	1	0.50	1	0.88			12	11.38
2214650001	C OF SOC SCI	GEOGRAPHY DEPT		MANOA CAMPUS	1	1.00	2	2.00			12	12.00	12	6.00	3	1.18	3	0.00	33	22.18
2214660001	C OF SOC SCI	INSTITUTE FOR PEACE		MANOA CAMPUS	2	2.00					3	3.00	1	0.50	1	0.21	1	0.00	8	5.71
2214680001	C OF SOC SCI	POLITICAL SCI DEPT		MANOA CAMPUS	1	1.00					21	20.50	13	6.71	11	2.79	3	0.00	49	31.00
2214690001	C OF SOC SCI	POP STUDIES PROG		MANOA CAMPUS													1	0.00	1	0.00
2214700001	C OF SOC SCI	PSYCHOLOGY DEPT		MANOA CAMPUS	1	1.00	2	2.00			25	25.00	29	14.64	2	0.43	9	0.00	68	43.07
2214710001	C OF SOC SCI	SOCIOLOGY DEPT		MANOA CAMPUS	1	1.00	1	1.00			16	15.50	10	5.00	4	2.11	6	0.00	38	24.61
2214720001	C OF SOC SCI	URB & REG PLAN DEPT		MANOA CAMPUS			1	1.00			10	10.00	11	5.50	4	0.86	2	0.00	28	17.36
2214730001	C OF SOC SCI	WOMENS STUDIES PROG		MANOA CAMPUS			1	1.00			5	5.00	2	1.00	2	0.43			10	7.43
2214740001	C OF SOC SCI	PUBLIC ADMIN		MANOA CAMPUS							6	6.00	1	0.50	1	0.21			8	6.71
2214750001	C OF SOC SCI	SOCIAL SCI RES INST		MANOA CAMPUS	14	14.00					9	9.00	35	17.93			2	0.00	60	40.93
2215830001	CL A&S DEANS	A&S ACADEMIC AFF		MANOA CAMPUS	10	10.00	2	2.00			9	9.00	1	0.50	2	1.07			24	22.57
2215830201	CL A&S DEANS	A&S ACADEMIC AFF	LIBERAL STU	MANOA CAMPUS			1	0.50			4	3.96							5	4.46
2215830301	CL A&S DEANS	A&S ACADEMIC AFF	HONORS PROG	MANOA CAMPUS			1	1.00			2	1.71							3	2.71
2215870001	CL A&S DEANS	A&S STUDENT SERV		MANOA CAMPUS							1	1.00							1	1.00
2215870101	CL A&S DEANS	A&S STUDENT SERV	CNSL & ADVSG	MANOA CAMPUS	4	4.00	2	2.00			18	17.40	3	1.50					27	24.90

UH Mānoa HEADCOUNT AND FTE BY DIVISION/BRANCH/SECTION AS OF MARCH 2007
DATA FROM DATAWAREHOUSE WHICH PULLS FROM PEOPLESOFT
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EAC	DIVISION	BRANCH	SECTION	UNIT	APT		CIVIL SERV		EXEC		FACULTY		GRAD ASST		LECTURER		NON		TOTAL	
					HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE
2216010001	C OF TA & HR	TA&HR DEANS OFF		MANOA CAMPUS			3	3.00	1	1.00									4	4.00
2216020001	C OF TA & HR	PUBLICATIONS & INFO		MANOA CAMPUS	6	6.00	1	1.00											7	7.00
2216030001	C OF TA & HR	ADMINISTRATIVE SERV		MANOA CAMPUS	9	9.00	3	3.00	1	1.00									13	13.00
2216040001	C OF TA & HR	ASSOC DEANS-ACAD AFF		MANOA CAMPUS	3	3.00	1	1.00	1	1.00									5	5.00
2216050001	C OF TA & HR	PLAN & MGMT SYS OFF		MANOA CAMPUS	4	4.00	1	1.00											5	5.00
2216060001	C OF TA & HR	ASSOC DEANS-RESEARCH		MANOA CAMPUS	2	2.00	2	2.00	1	1.00									5	5.00
2216070001	C OF TA & HR	ASSOC DEANS-EXTENSN		MANOA CAMPUS			1	1.00											1	1.00
2216130001	C OF TA & HR	MOL BIOSCI&BIOSYS EG		MANOA CAMPUS	8	8.00	4	4.00			25	24.20	34	17.00	1	0.21	14	0.00	86	53.41
2216140001	C OF TA & HR	NAT RES&ENVIRON MGMT		MANOA CAMPUS	2	2.00	2	2.00			14	13.40	24	11.44	1	0.21	6	0.00	49	29.05
2216150001	C OF TA & HR	HUM NUTR,FD&ANML SCI		MANOA CAMPUS	10	9.10	3	2.25			25	23.85	18	7.75	4	1.07	12	0.00	72	44.02
2216160001	C OF TA & HR	PLT&ENVIRON PROT SCI		MANOA CAMPUS	21	19.70	6	6.00			35	33.18	20	9.75			16	0.00	98	68.63
2216190001	C OF TA & HR	TROP PLANT&SOIL SCI		MANOA CAMPUS	12	11.40	5	5.00			25	23.90	25	12.50			13	0.00	80	52.80
2216230001	C OF TA & HR	FAMILY&CONSUMER SCI		MANOA CAMPUS	3	2.00	2	2.00			21	21.00	6	3.00	16	5.81	1	0.00	49	33.81
2216240001	C OF TA & HR	ADSC		MANOA CAMPUS	4	4.00	1	1.00											5	5.00
2216250001	C OF TA & HR	CTR ON THE FAMILY		MANOA CAMPUS			1	1.00			6	5.30	6	2.75					13	9.05
2216260001	C OF TA & HR	4-H OFFICE		MANOA CAMPUS			1	1.00											1	1.00
2216270001	C OF TA & HR	OAHU COUNTY		MANOA CAMPUS			1	1.00	1	1.00									2	2.00
2216290001	C OF TA & HR	HAWAII COUNTY		MANOA CAMPUS	1	1.00											1	0.00	2	1.00
2217000001	SCH OF ARCH			MANOA CAMPUS									4	1.00					4	1.00
2217010001	SCH OF ARCH	ARCH DEANS OFF		MANOA CAMPUS	2	2.00	2	2.00	2	2.00			2	1.00					8	7.00
2217110001	SCH OF ARCH	INSTRUCTION		MANOA CAMPUS	1	1.00					17	13.53	1	0.50	1	0.21	5	0.00	25	15.24
2218010001	C OF BUS ADM	BUS ADM DEANS OFF		MANOA CAMPUS	9	9.00	2	2.00	2	2.00	6	6.00	4	2.00					23	21.00
2218010101	C OF BUS ADM	BUS ADM DEANS OFF	C RES & TELE	MANOA CAMPUS	4	4.00													4	4.00
2218110001	C OF BUS ADM	SCH OF ACCOUNTANCY		MANOA CAMPUS			1	1.00			14	14.00			6	2.01			21	17.01
2218120001	C OF BUS ADM	FIN ECON & INS DEPT		MANOA CAMPUS	1	1.00	1	1.00			12	12.00			3	0.64	2	0.00	19	14.64
2218140001	C OF BUS ADM	DECISION SCI DEPT		MANOA CAMPUS			1	1.00			12	10.90	6	2.75			2	0.00	21	14.65
2218150001	C OF BUS ADM	MGMT & IR DEPT		MANOA CAMPUS			1	1.00			12	12.00			5	3.32	2	0.00	20	16.32
2218160001	C OF BUS ADM	MARKETING DEPT		MANOA CAMPUS			1	1.00			8	7.50			2	1.21	2	0.00	13	9.71
2218310001	C OF BUS ADM	PAMI		MANOA CAMPUS	5	5.00					4	4.00	22	10.50					31	19.50
2219010001	C OF EDUC	EDUCATION DEANS OFF		MANOA CAMPUS	12	12.00	6	5.50	3	3.00			1	0.50			3	0.00	25	21.00
2219110001	C OF EDUC	INST FOR TEACHER EDU		MANOA CAMPUS	2	2.00	2	2.00			42	42.00	1	0.93	19	6.64			66	53.57
2219120001	C OF EDUC	EDUC ADMIN DEPT		MANOA CAMPUS			1	1.00			4	4.00	2	1.00	2	0.43	1	0.00	10	6.43
2219130001	C OF EDUC	EDUC PSYCHOLOGY DEPT		MANOA CAMPUS			1	1.00			7	6.50	2	1.00	1	0.43	2	0.00	13	8.93
2219140001	C OF EDUC	KINESI LEISURE SCI		MANOA CAMPUS			1	1.00			8	8.00	16	8.00	20	5.43			45	22.43
2219150001	C OF EDUC	EDUC FOUNDATIONS		MANOA CAMPUS			1	1.00			8	8.00	2	1.00	4	1.29	5	0.00	20	11.29
2219160001	C OF EDUC	EDUC TECHNOLOGY		MANOA CAMPUS			1	1.00			9	8.75							10	9.75
2219170001	C OF EDUC	SPECIAL EDUC DEPT		MANOA CAMPUS	1	1.00	1	1.00			26	26.00	1	0.50					29	28.50
2219180001	C OF EDUC	CURRICULUM STUDIES		MANOA CAMPUS	4	4.00	1	1.00			18	15.35	1	0.50	1	0.75			25	21.60
2219190001	C OF EDUC	OUTREACH PROGRAMS		MANOA CAMPUS	3	2.50	1	1.00					5	2.50					9	6.00
2219200001	C OF EDUC	COUNSELOR EDUC DEPT		MANOA CAMPUS			1	1.00			6	6.00	2	0.75					9	7.75
2219310001	C OF EDUC	CURR RSCH DVLP GRP		MANOA CAMPUS	57	54.20	4	4.00			17	16.45	4	2.00	22	16.41			104	93.06
2219311101	C OF EDUC	CURR RSCH DVLP GRP	LAB SCH CAFE	MANOA CAMPUS			3	3.00											3	3.00
2219410001	C OF EDUC	CTR ON DIS STUD/UAP		MANOA CAMPUS	18	18.00	1	1.00			36	33.27	16	8.00			4	0.00	75	60.27
2219510001	C OF EDUC	OFF OF STUDENT SERV		MANOA CAMPUS	1	1.00	2	2.00	1	1.00	6	6.00	1	0.50					11	10.50
2220010001	C OF ENGINRG	ENGINRG DEANS OFF		MANOA CAMPUS	11	11.00	3	3.00	2	2.00	4	4.00							20	20.00
2220110001	C OF ENGINRG	CIVIL ENGINRG DEPT		MANOA CAMPUS	4	4.00	2	2.00			19	19.00	26	13.00	1	0.25	3	0.00	55	38.25
2220120001	C OF ENGINRG	ELECT ENGINRG DEPT		MANOA CAMPUS	4	4.00	1	1.00			21	20.50	33	16.50			6	0.00	65	42.00
2220140001	C OF ENGINRG	MECH ENGINRG DEPT		MANOA CAMPUS	4	4.00	2	2.00			20	20.00	26	13.00	1	0.21	1	0.00	54	39.21
2221000001	SCH OF LAW			MANOA CAMPUS	1	1.00					2	2.00							3	3.00
2221010001	SCH OF LAW	LAW DEANS OFF		MANOA CAMPUS	7	7.00	2	2.00	3	3.00	2	2.00							14	14.00
2221110001	SCH OF LAW	INSTRUCTION		MANOA CAMPUS	3	3.00					27	26.50			27	3.64	5	0.00	62	33.14
2221210001	SCH OF LAW	LIBRARY		MANOA CAMPUS			4	4.00			6	5.50							10	9.50
2223110001	C OF HLTH SCI & SW	SCH OF MED		MANOA CAMPUS			1	1.00											1	1.00
2223110101	C OF HLTH SCI & SW	SCH OF MED	MEDICINE DEANS OFF	MANOA CAMPUS	45	42.90	5	5.00	1	0.00	9	7.30	2	1.00			2	0.00	64	56.20
2223111101	C OF HLTH SCI & SW	SCH OF MED	ANAT, BIOCHEM, PHYS	MANOA CAMPUS	9	9.00	1	1.00			21	20.00	7	3.50			4	0.00	42	33.50
2223111201	C OF HLTH SCI & SW	SCH OF MED	ALLIED MED SCI DEPT	MANOA CAMPUS	1	1.00	1	1.00			15	12.64	2	1.00	8	3.42	2	0.00	29	19.07
2223111401	C OF HLTH SCI & SW	SCH OF MED	CELL & MOLECULAR BIO	MANOA CAMPUS	3	3.00					21	20.80	11	5.50			10	0.00	45	29.30
2223111501	C OF HLTH SCI & SW	SCH OF MED	MEDICINE DEPT	MANOA CAMPUS	1	0.50					2	2.00	1	0.50			3	0.00	7	3.00

UH Mānoa HEADCOUNT AND FTE BY DIVISION/BRANCH/SECTION AS OF MARCH 2007
DATA FROM DATAWAREHOUSE WHICH PULLS FROM PEOPLESOFT
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EAC	DIVISION	BRANCH	SECTION	UNIT	APT		CIVIL SERV		EXEC		FACULTY		GRAD ASST		LECTURER		NON		TOTAL	
					HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE
2223111601	C OF HLTH SCI & SW	SCH OF MED	PATHOLOGY DEPT	MANOA CAMPUS			1	1.00			11	5.90					17	0.00	29	6.90
2223111701	C OF HLTH SCI & SW	SCH OF MED	PHARMACOLOGY DEPT	MANOA CAMPUS			1	1.00											1	1.00
2223111901	C OF HLTH SCI & SW	SCH OF MED	PSYCHIATRY DEPT	MANOA CAMPUS			1	1.00			3	2.95	1	0.50			1	0.00	6	4.45
2223112001	C OF HLTH SCI & SW	SCH OF MED	TR MED-MED MCR & PHA	MANOA CAMPUS	2	2.00					6	5.15	2	1.00			1	0.00	11	8.15
2223112101	C OF HLTH SCI & SW	SCH OF MED	OB-GYN DEPT	MANOA CAMPUS	1	0.50					1	1.00					2	0.00	4	1.50
2223112201	C OF HLTH SCI & SW	SCH OF MED	PEDIATRICS DEPT	MANOA CAMPUS	2	2.00	2	1.50			2	1.05					1	0.00	7	4.55
2223112301	C OF HLTH SCI & SW	SCH OF MED	SURGERY DEPT	MANOA CAMPUS			1	1.00			1	1.00							2	2.00
2223112401	C OF HLTH SCI & SW	SCH OF MED	FAM PR-COM HLTH DEPT	MANOA CAMPUS	1	1.00					1	1.00					1	0.00	3	2.00
2223112501	C OF HLTH SCI & SW	SCH OF MED	COMPLEMENTARY & ALT	MANOA CAMPUS							3	3.00					7	0.00	10	3.00
2223112701	C OF HLTH SCI & SW	SCH OF MED	NATIVE HAWAIIAN HEAL	MANOA CAMPUS	4	3.50	1	1.00			12	10.30	1	0.50			1	0.00	19	15.30
2223210001	C OF HLTH SCI & SW	SCH OF NURSG		MANOA CAMPUS							1	1.00							1	1.00
2223210101	C OF HLTH SCI & SW	SCH OF NURSG	NURSING DEANS OFF	MANOA CAMPUS	7	7.00	3	3.00	2	2.00	7	6.50					1	0.00	20	18.50
2223211101	C OF HLTH SCI & SW	SCH OF NURSG	DENTAL HYGIENE DEPT	MANOA CAMPUS			2	2.00			14	9.40			2	2.00	1	0.00	19	13.40
2223211201	C OF HLTH SCI & SW	SCH OF NURSG	NURSING DEPT	MANOA CAMPUS	9	7.50	5	5.00			53	50.60	6	3.00	22	7.07	62	0.00	157	73.17
2223310001	C OF HLTH SCI & SW	SCH PUB HLTH		MANOA CAMPUS	1	1.00					1	1.00							2	2.00
2223310101	C OF HLTH SCI & SW	SCH PUB HLTH	PUB HLTH DEANS OFF	MANOA CAMPUS	4	4.00	2	2.00	1	1.00									7	7.00
2223311201	C OF HLTH SCI & SW	SCH PUB HLTH	COMM HLTH DEV DEPT	MANOA CAMPUS	2	1.50					2	1.20			1	0.21	12	0.00	17	2.91
2223311301	C OF HLTH SCI & SW	SCH PUB HLTH	PUB HLTH SCI DEPT	MANOA CAMPUS	3	3.00	1	1.00			17	16.57	4	2.00			18	0.00	43	22.57
2223410001	C OF HLTH SCI & SW	SCH SOC WORK		MANOA CAMPUS	4	3.60	3	3.00	1	1.00	38	36.85	3	1.50	9	2.14	34	0.00	92	48.09
2226000001	LIBRARY SERV			MANOA CAMPUS	1	0.50													1	0.50
2226010001	LIBRARY SERV	SINCLAIR LIBRARY		MANOA CAMPUS	1	1.00	5	5.00			4	3.50							10	9.50
2226020001	LIBRARY SERV	HAMILTON LIBRARY		MANOA CAMPUS	24	24.00	70	69.00	2	2.00	55	54.50							151	149.50
2227010001	SCH OF TIM	TIM DEANS OFF		MANOA CAMPUS	2	2.11	3	3.00	2	2.00	2	2.00					1	0.00	10	9.11
2227110001	SCH OF TIM	INSTRUCTION		MANOA CAMPUS	2	2.00					13	13.00			6	2.04			21	17.04
2228000001	OUTREACH COLLEGE			MANOA CAMPUS	28	28.00	12	12.00	2	2.00	14	14.00	1	0.50					57	56.50
2230010001	SCH OF HA&PS	HA&PS DEANS OFF		MANOA CAMPUS	3	3.00	1	1.00	1	1.00	6	6.00	7	3.50					18	14.50
2230110001	SCH OF HA&PS	CTR CHINESE STU		MANOA CAMPUS							6	6.00					1	0.00	7	6.00
2230120001	SCH OF HA&PS	CTR HAWAIIAN STU		MANOA CAMPUS	7	6.71	1	1.00			13	13.00	25	14.11	2	0.43			48	35.25
2230130001	SCH OF HA&PS	CTR JAPANESE STU		MANOA CAMPUS			1	1.00			4	3.75	1	0.46			3	0.00	9	5.21
2230140001	SCH OF HA&PS	CTR KOREAN STU		MANOA CAMPUS			1	1.00			4	4.00	1	0.25			5	0.00	11	5.25
2230150001	SCH OF HA&PS	CTR PAC ISLANDS STU		MANOA CAMPUS	1	1.00	1	1.00			6	6.00					5	0.00	13	8.00
2230160001	SCH OF HA&PS	CTR PHILIPPINE STU		MANOA CAMPUS	2	1.91	1	1.00			3	3.00							6	5.91
2230170001	SCH OF HA&PS	CTR SOUTH ASIAN STU		MANOA CAMPUS							1	1.00							1	1.00
2230180001	SCH OF HA&PS	CTR SE ASIAN STU		MANOA CAMPUS	1	1.00	1	1.00			2	2.00	1	0.50					5	4.50
2230600001	SCH OF HA&PS	COM P&S HAWN L A & C		MANOA CAMPUS	1	1.00													1	1.00
2238010001	RES & DEAN OF GRAD D	OFF VP R&GE		MANOA CAMPUS					1	1.00									1	1.00
2238040001	RES & DEAN OF GRAD D	CRDG		MANOA CAMPUS			1	1.00											1	1.00
2238050001	RES & DEAN OF GRAD D	GRADUATE DIV		MANOA CAMPUS	2	2.00													2	2.00
2238050101	RES & DEAN OF GRAD D	GRADUATE DIV	GRAD DIV DEANS OFF	MANOA CAMPUS	7	7.00	5	5.00	2	2.00			1	0.71					15	14.71
2238080001	RES & DEAN OF GRAD D	SCH O&ES&T		MANOA CAMPUS	34	34.00	5	5.00			21	17.56	5	2.50			22	0.00	87	59.06
2238080101	RES & DEAN OF GRAD D	SCH O&ES&T	O&ES&T DEANS OFF	MANOA CAMPUS	2	2.00	1	1.00	3	2.40			1	0.50			2	0.00	9	5.90
2238081101	RES & DEAN OF GRAD D	SCH O&ES&T	HI INST OF GEOP-PLTY	MANOA CAMPUS	10	8.30	3	3.00	1	1.00	44	41.28	16	8.00			12	0.00	86	61.58
2238081201	RES & DEAN OF GRAD D	SCH O&ES&T	HAW INST OF MAR BIO	MANOA CAMPUS			1	1.00			3	3.00	4	2.00			1	0.00	9	6.00
2238084501	RES & DEAN OF GRAD D	SCH O&ES&T	GEOLOGY & GEOPHYSICS	MANOA CAMPUS	5	4.37					27	25.45	32	15.75			21	0.00	85	45.57
2238084801	RES & DEAN OF GRAD D	SCH O&ES&T	METEOROLOGY	MANOA CAMPUS	1	1.00	1	1.00			14	13.50	26	13.00			9	0.00	51	28.50
2238085001	RES & DEAN OF GRAD D	SCH O&ES&T	OCEANOGRAPHY	MANOA CAMPUS	6	5.80	1	1.00			50	47.05	53	26.25			40	0.00	150	80.10
2238085101	RES & DEAN OF GRAD D	SCH O&ES&T	OCEAN AND RES ENGR	MANOA CAMPUS			1	1.00			8	8.00	18	8.75			13	0.00	40	17.75
2238086501	RES & DEAN OF GRAD D	SCH O&ES&T	HAW NAT ENERGY INST	MANOA CAMPUS	10	10.00			1	1.00	22	20.80	4	1.75			4	0.00	41	33.55
2238087101	RES & DEAN OF GRAD D	SCH O&ES&T	SEA GRANT COLL PROG	MANOA CAMPUS	7	7.00	1	1.00			10	9.58					6	0.00	24	17.58
2238130001	RES & DEAN OF GRAD D	WATR R R CTR		MANOA CAMPUS	9	9.00	2	2.00			3	2.50	18	8.50			1	0.00	33	22.00
2238130101	RES & DEAN OF GRAD D	WATR R R CTR	ENVIRONMENTAL CTR	MANOA CAMPUS			1	1.00			2	1.88					3	0.00	6	2.88
2238140001	RES & DEAN OF GRAD D	INST FOR AST		MANOA CAMPUS	32	32.00	5	5.00	2	2.00	52	51.40	29	14.50			30	0.00	150	104.90
2238210001	RES & DEAN OF GRAD D	PAC BI RS CT		MANOA CAMPUS	26	25.25	2	2.00			31	27.17	14	7.00			29	0.00	102	61.42
2238230001	RES & DEAN OF GRAD D	CANCER CT HI		MANOA CAMPUS	10	10.00	3	2.50	2	2.00	28	26.15	14	6.96			8	0.00	65	47.61
2238410001	RES & DEAN OF GRAD D	SOC SC RS IN		MANOA CAMPUS													2	0.00	2	0.00
2238420001	RES & DEAN OF GRAD D	INDS REL CTR		MANOA CAMPUS	2	1.40	1	1.00			2	1.40							5	3.80
2238610001	RES & DEAN OF GRAD D	LYON ARBORTM		MANOA CAMPUS	4	4.00													4	4.00
2238710001	RES & DEAN OF GRAD D	WAIKIKI AQU		MANOA CAMPUS	15	15.00	1	1.00	1	1.00									17	17.00

UH Mānoa HEADCOUNT AND FTE BY DIVISION/BRANCH/SECTION AS OF MARCH 2007
DATA FROM DATAWAREHOUSE WHICH PULLS FROM PEOPLESOFT
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EAC	DIVISION	BRANCH	SECTION	UNIT	APT		CIVIL SERV		EXEC		FACULTY		GRAD ASST		LECTURER		NON		TOTAL	
					HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE	HDCT	FTE
2238810001	RES & DEAN OF GRAD D	LAB ANML SV		MANOA CAMPUS	6	6.00					2	2.00							8	8.00
2245010001	STUDENT AFFAIRS	VP STU AFF		MANOA CAMPUS			2	2.00	1	1.00	1	1.00							4	4.00
2245010101	STUDENT AFFAIRS	VP STU AFF	OFF OF ADMIN SERV	MANOA CAMPUS	3	3.00													3	3.00
2245050001	STUDENT AFFAIRS	DN S & S SVS		MANOA CAMPUS	4	4.00	1	1.00	1	1.00	2	2.00							8	8.00
2245050501	STUDENT AFFAIRS	DN S & S SVS	CAPS	MANOA CAMPUS	12	11.25	13	13.00	1	1.00	9	9.00							35	34.25
2245051001	STUDENT AFFAIRS	DN S & S SVS	CAREER SERVICES	MANOA CAMPUS							3	3.00							3	3.00
2245051501	STUDENT AFFAIRS	DN S & S SVS	COUNSL & STU DEV CTR	MANOA CAMPUS	2	2.00	1	1.00			6	4.90							9	7.90
2245052001	STUDENT AFFAIRS	DN S & S SVS	CHILDRENS CENTER	MANOA CAMPUS	16	15.95													16	15.95
2245052501	STUDENT AFFAIRS	DN S & S SVS	INTL STUDENT SERV	MANOA CAMPUS	1	1.00	2	2.00			4	4.00							7	7.00
2245053001	STUDENT AFFAIRS	DN S & S SVS	SCHOOL & COLL SERV	MANOA CAMPUS	3	3.00	2	2.00											5	5.00
2245053501	STUDENT AFFAIRS	DN S & S SVS	STU EMP & COOP EDUC	MANOA CAMPUS	2	2.00	4	3.75			3	3.00							9	8.75
2245054001	STUDENT AFFAIRS	DN S & S SVS	STUDENT HEALTH SERV	MANOA CAMPUS	6	5.00	15	14.13			12	9.00							33	28.13
2245054501	STUDENT AFFAIRS	DN S & S SVS	STUDENT HOUSING SERV	MANOA CAMPUS	11	11.00	18	18.00	1	1.00									30	30.00
2245100001	STUDENT AFFAIRS	DIR OF SEED		MANOA CAMPUS	10	8.50			1	1.00	6	6.00							17	15.50
2245101001	STUDENT AFFAIRS	DIR OF SEED	COP	MANOA CAMPUS	1	1.00	1	1.00			1	1.00							3	3.00
2245102001	STUDENT AFFAIRS	DIR OF SEED	KOKUA	MANOA CAMPUS	6	6.00													6	6.00
2245102501	STUDENT AFFAIRS	DIR OF SEED	KUAANA	MANOA CAMPUS	3	3.00													3	3.00
2245103001	STUDENT AFFAIRS	DIR OF SEED	MANONG	MANOA CAMPUS	3	3.00													3	3.00
2245103501	STUDENT AFFAIRS	DIR OF SEED	WOMENS CENTER	MANOA CAMPUS							4	4.00							4	4.00
2245150501	STUDENT AFFAIRS	D U S A-A VP	ADMISSIONS & RECORDS	MANOA CAMPUS	25	24.75	29	29.00											54	53.75
2245151001	STUDENT AFFAIRS	D U S A-A VP	FINANCIAL AID SERV	MANOA CAMPUS	8	8.00	1	1.00											9	9.00
2246000001	INT ATHLETICS UHM			MANOA CAMPUS	88	86.75	55	41.05	4	4.00									147	131.80
2250711001	ADMINISTRATION	AUXIL ENT	DIR AUXIL ENT	MANOA CAMPUS	24	22.70	4	4.00	1	1.00									29	27.70
2250713001	ADMINISTRATION	AUXIL ENT	BOOKSTORE SYSTEM	MANOA CAMPUS	15	15.00	27	27.00											42	42.00
2250716001	ADMINISTRATION	AUXIL ENT	AUXILIARY SERVICES	MANOA CAMPUS	11	11.00	29	29.00											40	40.00
2250717001	ADMINISTRATION	AUXIL ENT	CAMPUS SECURITY	MANOA CAMPUS	3	3.00	39	39.00											42	42.00
2250811001	ADMINISTRATION	FAC GRD & SFTY	DIR FAC GRNDS & SFTY	MANOA CAMPUS	7	7.00	2	2.00	1	1.00									10	10.00
2250813001	ADMINISTRATION	FAC GRD & SFTY	BLDGS & GRNDS MGT	MANOA CAMPUS	4	4.00	221	221.00											225	225.00
2250817001	ADMINISTRATION	FAC GRD & SFTY	ENV HLTH & SFTY OFF	MANOA CAMPUS	21	21.00	1	1.00											22	22.00
2250819001	ADMINISTRATION	FAC GRD & SFTY	FAC PLNG & MGT OFF	MANOA CAMPUS	33	33.00	60	60.00											93	93.00
			TOTALS		1,103	1,077.42	872	853.18	79	76.20	1,988	1,890.93	1,216	588.02	345	131.98	684	0.00	6,287	4,617.72
																			4,042	3,897.72

Notes:

1 Faculty & Staff figure includes APT, Civil Serv, Exec and Faculty.
2 Grad Asst are assumed to be graduate students and are counted in the student population
3 lecturerers and non comp are assumed to be visitors and are counted in the visitor's population

TABLE 2
HEADCOUNT ENROLLMENT OF CREDIT STUDENTS BY CAMPUS
MIDDLE SERIES PROJECTIONS
UNIVERSITY OF HAWAI'I
FALL 2000 TO FALL 2013

CAMPUS	HISTORICAL							PROJECTED						
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
UH SYSTEM TOTAL 1/	44,579	45,994	48,173	50,317	50,569	50,157	49,990	50,119	50,581	50,997	51,265	51,442	51,683	51,955
UH AT MANOA 2/	17,263	17,532	18,706	19,863	20,549	20,644	20,357	20,224	20,203	20,196	20,221	20,246	20,308	20,401
UH AT HILO 2/	2,874	2,913	3,040	3,300	3,288	3,422	3,507	3,550	3,622	3,683	3,711	3,739	3,771	3,804
UH - WEST O'AHU	665	740	834	810	834	858	866	985	1,191	1,489	1,616	1,676	1,776	1,872
UH COMMUNITY COLLEGES	23,777	24,809	25,593	26,344	25,898	25,233	25,260	25,360	25,565	25,629	25,717	25,781	25,828	25,878
Hawai'i Community College	2,090	2,075	2,182	2,346	2,440	2,377	2,358	2,368	2,384	2,397	2,410	2,424	2,438	2,452
Honolulu Community College 2/ .	4,487	4,653	4,478	4,238	4,336	4,183	4,143	4,174	4,193	4,186	4,182	4,179	4,174	4,171
Kapi'olani Community College	6,760	7,081	7,041	7,491	7,174	7,289	7,272	7,273	7,320	7,362	7,414	7,440	7,452	7,459
Kaua'i Community College	1,052	1,185	1,224	1,210	1,117	1,059	1,119	1,146	1,167	1,176	1,179	1,181	1,178	1,174
Leeward Community College	5,259	5,562	5,918	6,201	6,060	5,709	5,746	5,803	5,857	5,821	5,800	5,786	5,781	5,782
Maui Community College	2,678	2,699	2,989	2,985	2,996	2,903	2,841	2,802	2,815	2,837	2,863	2,895	2,929	2,965
Windward Community College	1,451	1,554	1,761	1,873	1,775	1,713	1,781	1,794	1,829	1,850	1,869	1,876	1,876	1,875

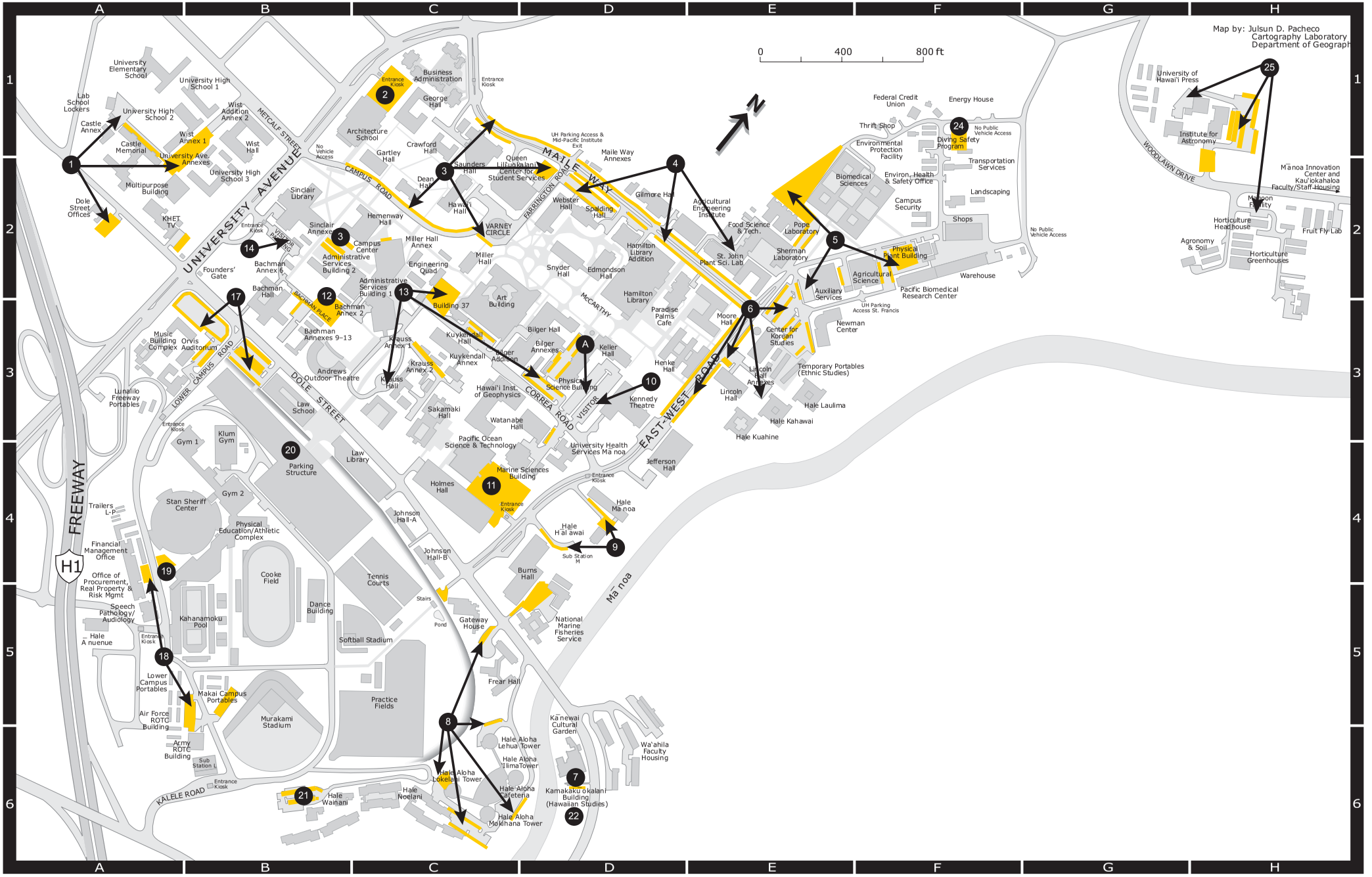
1/ Headcounts include specials (early admits and concurrent students) for all years.
2/ Headcounts include continuing education credit enrollments, beginning Fall 1999.

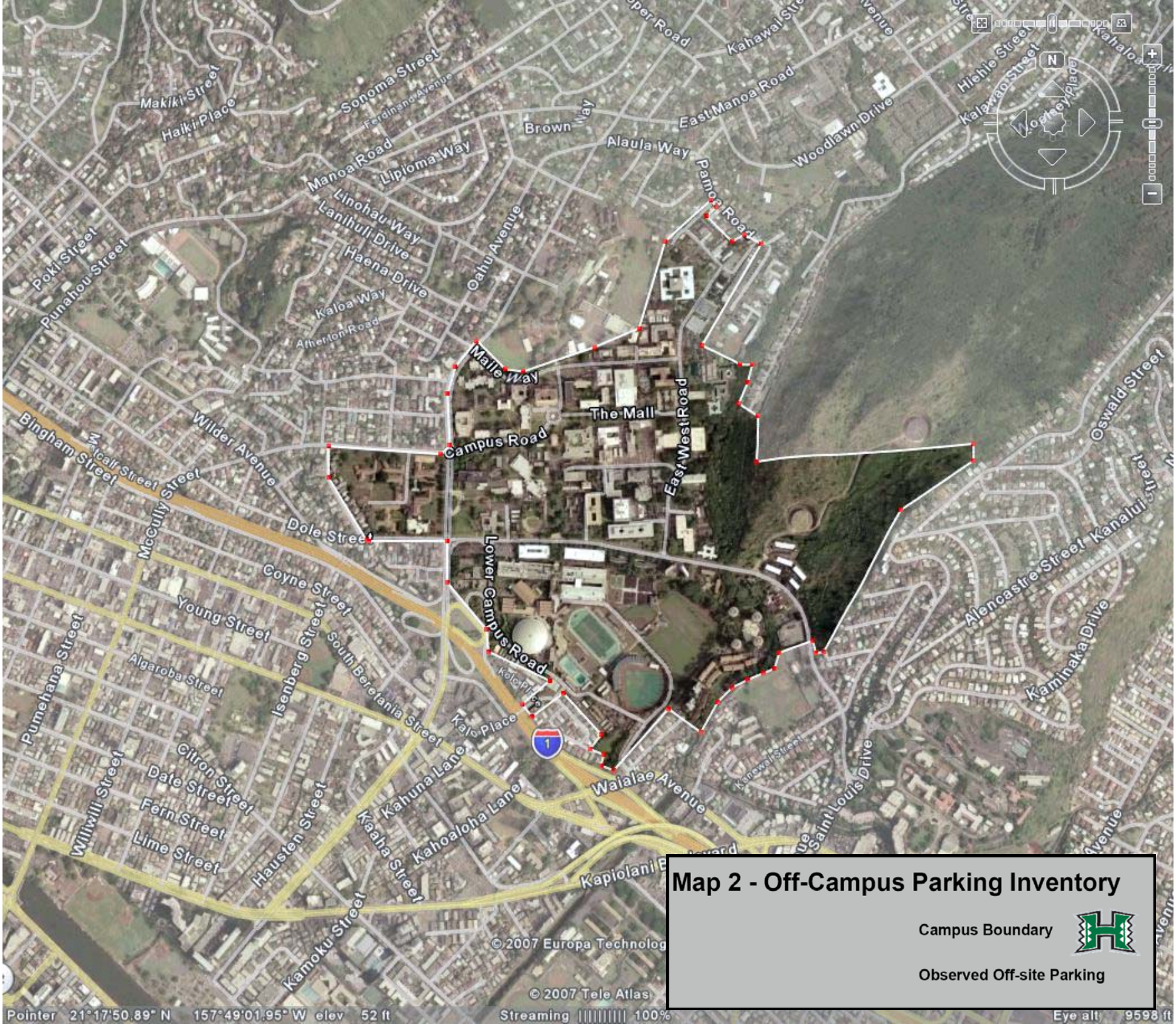
TABLE 3
HEADCOUNT ENROLLMENT OF CREDIT STUDENTS BY REGISTRATION STATUS
MIDDLE SERIES PROJECTIONS
UNIVERSITY OF HAWAI'I
FALL 2000 TO FALL 2013

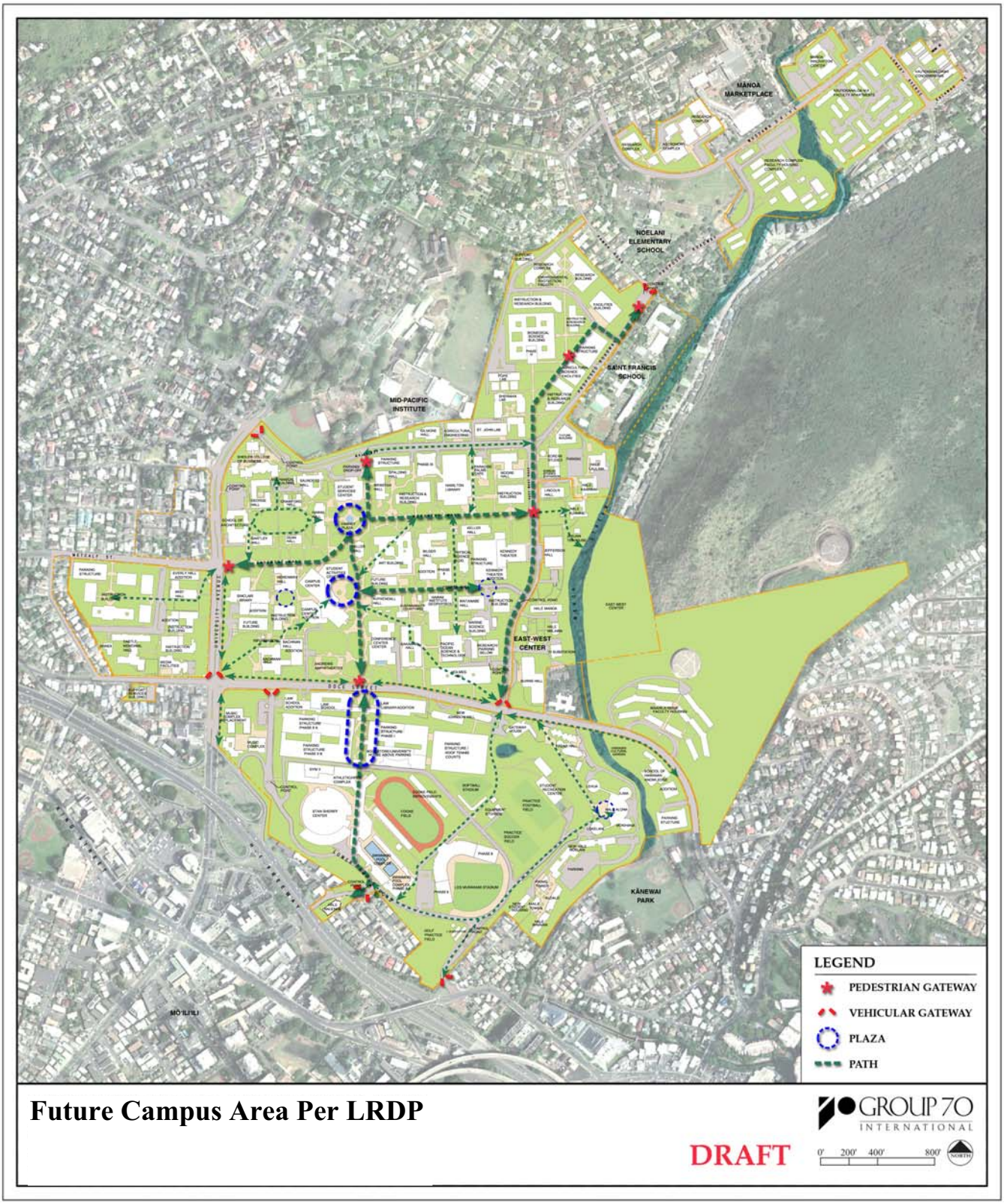
EDUCATION LEVEL AND	HISTORICAL							PROJECTED						
REGISTRATION STATUS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
UH SYSTEM TOTAL 1/	44,579	45,994	48,173	50,317	50,569	50,157	49,990	50,119	50,581	50,997	51,265	51,442	51,683	51,955
Classified	40,627	41,441	42,990	43,072	42,937	42,648	42,097	42,039	42,353	42,664	42,866	42,998	43,209	43,455
Undergraduates	36,004	36,812	38,079	37,817	37,449	37,073	36,565	36,530	36,848	37,155	37,338	37,437	37,591	37,780
First-Time Students 2/	6,656	6,964	7,096	7,005	6,764	6,791	6,572	6,770	6,928	6,834	6,818	6,803	6,815	6,843
Transfer	4,414	4,938	5,240	4,695	4,547	5,139	4,716	4,795	4,863	4,946	5,014	5,073	5,132	5,192
Returning	2,090	2,348	2,278	2,256	2,060	2,367	1,978	2,169	2,216	2,265	2,296	2,307	2,318	2,324
Continuing	22,844	22,562	23,465	23,861	24,078	22,776	23,299	22,796	22,841	23,110	23,210	23,254	23,326	23,421
Graduates	4,623	4,629	4,911	5,255	5,488	5,575	5,532	5,509	5,505	5,509	5,528	5,561	5,618	5,675
Unclassified & No Data	3,952	4,553	5,183	7,245	7,632	7,509	7,893	8,080	8,228	8,333	8,399	8,444	8,474	8,500
Undergraduates 3/	2,804	3,512	4,069	3,287	3,248	3,082	3,233	3,290	3,329	3,354	3,373	3,388	3,397	3,408
Graduates	1,148	1,041	1,114	942	916	925	1,019	999	999	999	999	999	999	999
Home-Based at Other UH 4/				3,016	3,468	3,502	3,641	3,791	3,900	3,980	4,027	4,057	4,078	4,093

1/ Headcounts include specials (early admits and concurrent students) for all years; include continuing education credit enrollments, beginning Fall 1999.
2/ Includes first-time freshmen at UH Manoa and UH Hilo, includes all first-time classified students at the UH Community Colleges.
3/ Includes records with invalid data on education level.
4/ Students whose home-campus, as defined in Banner / ODS, is not the campus at which they are registered for classes.

Note: In AY 2002-03, the UH campuses migrated to a new student registration system. The breakout by registration status may have been affected, with lower numbers for classified students and a corresponding increase in unclassified and records with invalid data.


Map by: Julsun D. Pacheco
Cartography Laboratory
Department of Geography
0 400 800 ft
N
A B C D E F G H
1 2 3 4 5 6
UNIVERSITY AVENUE
METCALF STREET
CAMPUS ROAD
MAILE WAY
FARRINGTON ROAD
VARNEY CIRCLE
McCARTHY
BACHMAN PLACE
DOLE STREET
CORREA ROAD
VISITOR
EAST-WEST ROAD
LOWER CAMPUS ROAD
KALELE ROAD
WOODLAWN DRIVE
FREEWAY
H1
Mānoa
University Elementary School
University High School 1
University High School 2
University High School 3
Lab School Lockers
Castle Annex
Castle Memorial
Wist Annex 1
Wist Addition Annex 2
Wist Hall
University Ave. Annexes
Multipurpose Building
Dole Street Offices
KHET TV
Sinclair Library
Sinclair Annexes
Hemenway Hall
Founders' Gate
Bachman Annex 6
Bachman Hall
Bachman Annex 2
Bachman Annexes 9–13
Administrative Services Building 1
Administrative Services Building 2
Campus Center
Miller Hall Annex
Miller Hall
Engineering Quad
Building 37
Art Building
Music Building Complex
Orvis Auditorium
Andrews Outdoor Theatre
Krauss Annex 1
Krauss Annex 2
Krauss Hall
Kuykendall Hall
Kuykendall Annex
Bilger Hall
Bilger Annexes
Bilger Addition
Physical Science Building
Keller Hall
Hawai'i Inst. of Geophysics
Sakamaki Hall
Watanabe Hall
Pacific Ocean Science & Technology
Lunalilo Freeway Portables
Law School
Law Library
Parking Structure
Gym 1
Klum Gym
Gym 2
Stan Sheriff Center
Trailers L-P
Physical Education/Athletic Complex
Financial Management Office
Office of Procurement, Real Property & Risk Mgmt
Speech Pathology/ Audiology
Hale A nuenue
Kahanamoku Pool
Cooke Field
Dance Building
Tennis Courts
Softball Stadium
Johnson Hall-A
Johnson Hall-B
Holmes Hall
Marine Sciences Building
Hale Mā noa
Hale Hā awai
Sub Station M
Burns Hall
National Marine Fisheries Service
Gateway House
Frear Hall
Stairs
Pond
Lower Campus Portables
Makai Campus Portables
Air Force ROTC Building
Army ROTC Building
Sub Station L
Murakami Stadium
Practice Fields
Hale Wainani
Hale Noelani
Hale Aloha Lokelani Tower
Hale Aloha Lehua Tower
Hale Aloha 'Ilima Tower
Hale Aloha Cafeteria
Hale Aloha Mokihana Tower
Kamakakūokalani Building (Hawaiian Studies)
Kānewai Cultural Garden
Wa'ahila Faculty Housing
Business Administration
George Hall
Architecture School
Gartley Hall
Crawford Hall
Dean Hall
Saunders Hall
Hawai'i Hall
Queen Lili'uokalani Center for Student Services
Maile Way Annexes
Webster Hall
Spalding Hall
Gilmore Hall
Agricultural Engineering Institute
Snyder Hall
Edmondson Hall
Hamilton Library Addition
Hamilton Library
Paradise Palms Cafe
Henke Hall
Kennedy Theatre
Jefferson Hall
University Health Services Mā noa
Moore Hall
Center for Korean Studies
Lincoln Hall
Lincoln Hall Annexes
Temporary Portables (Ethnic Studies)
Hale Laulima
Hale Kahawai
Hale Kuahine
Newman Center
Auxiliary Services
Agricultural Science
Physical Plant Building
Sherman Laboratory
St. John Plant Sci. Lab
Food Science & Tech.
Pope Laboratory
Pacific Biomedical Research Center
Warehouse
Biomedical Sciences
Environmental Protection Facility
Federal Credit Union
Energy House
Thrift Shop
Diving Safety Program
Transportation Services
Environ., Health & Safety Office
Campus Security
Landscaping
Shops
No Public Vehicle Access
UH Parking Access & Mid-Pacific Institute Exit
UH Parking Access St. Francis
Entrance Kiosk
VISITOR PARKING
No Vehicle Access
University of Hawai'i Press
Institute for Astronomy
Mānoa Innovation Center and Kau'iokahaloa Faculty/Staff-Housing
Maluhia Facility
Horticulture Headhouse
Horticulture Greenhouses
Agronomy & Soil
Fruit Fly Lab


Map 2 - Off-Campus Parking Inventory
Campus Boundary
Observed Off-site Parking
Dole Street
Campus Road
The Mall
Lower Campus Road
East West Road
Malle Way
Waialae Avenue
Kapiolani Boulevard
Kalo Place
Kahuna Lane
Kahoaloha Lane
Kaaha Street
Hausten Street
Isenberg Street
Coyne Street
Young Street
Algaroba Street
South Beretania Street
Pumehana Street
Citron Street
Date Street
Fern Street
Lime Street
Willwill Street
Kamoku Street
McCully Street
Wilder Avenue
Bingham Street
Punahou Street
Poki Street
Makiki Street
Haiki Place
Sonoma Street
Ferdinand Avenue
Manoa Road
Lipioma Way
Linohau Way
Lanihuli Drive
Haena Drive
Kaloa Way
Atherton Road
Oahu Avenue
Brown Way
Alaula Way
East Manoa Road
Pamoa Road
Woodlawn Drive
Kalawao Street
Hilehie Street
Courtney Place
Oswald Street
Alencastre Street
Kanalui Street
Kaminaka Drive
Saint Louis Drive
Kenewai Street
© 2007 Europa Technolog
© 2007 Tele Atlas
Pointer 21°17'50.89" N 157°49'01.95" W elev 52 ft
Streaming 100%
Eye alt 9598 ft

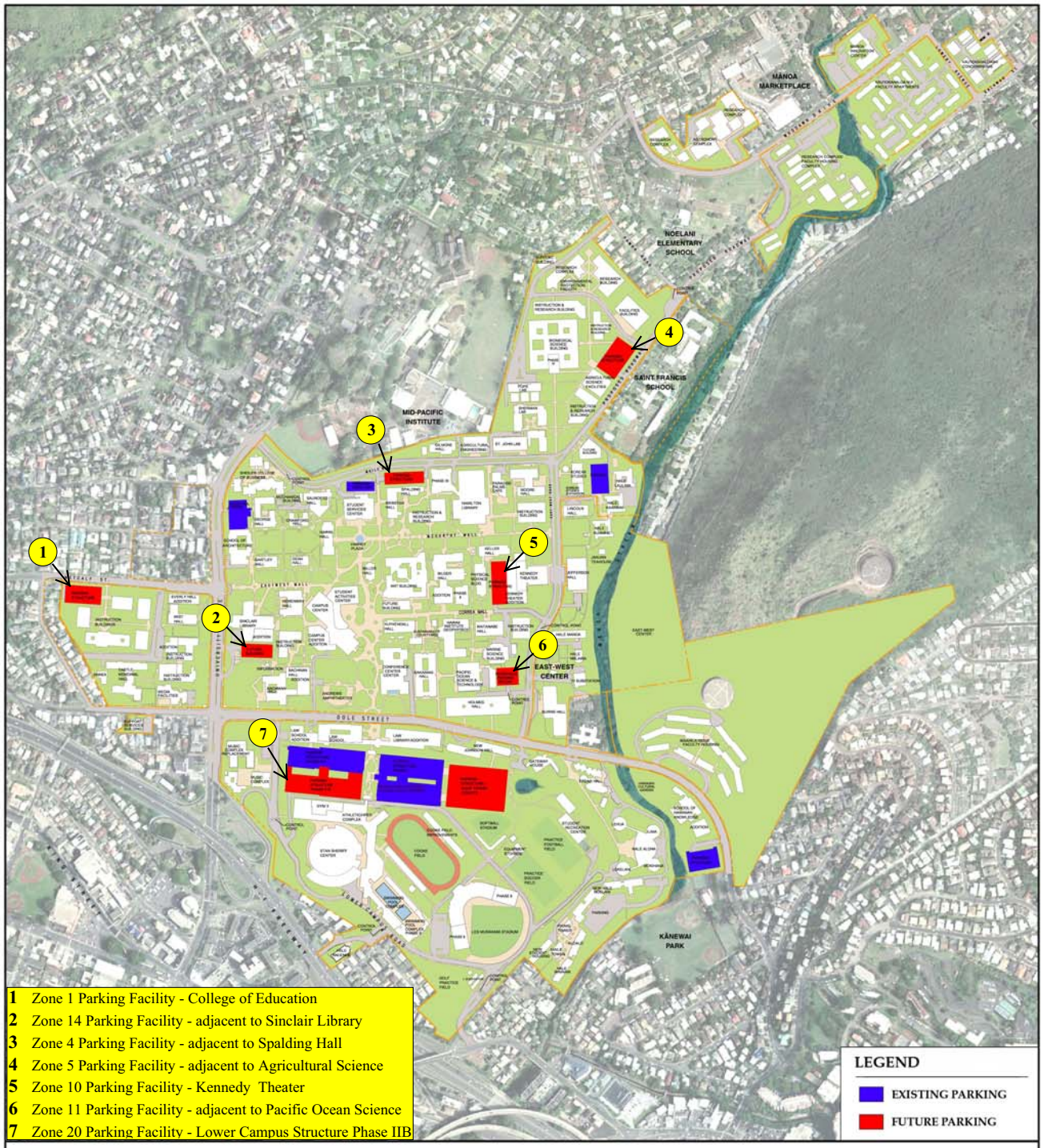


Future Campus Area Per LRDP

DRAFT

GROUP 70 INTERNATIONAL

0' 200' 400' 800'



1 Zone 1 Parking Facility - College of Education
2 Zone 14 Parking Facility - adjacent to Sinclair Library
3 Zone 4 Parking Facility - adjacent to Spalding Hall
4 Zone 5 Parking Facility - adjacent to Agricultural Science
5 Zone 10 Parking Facility - Kennedy Theater
6 Zone 11 Parking Facility - adjacent to Pacific Ocean Science
7 Zone 20 Parking Facility - Lower Campus Structure Phase IIB

PARKING STRUCTURES & PARKING FACILITIES
UNIVERSITY OF HAWAI'I, MĀNOA
2007 UPDATE

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GROUP 70 INTERNATIONAL

0' 200' 400' 800'

APPENDIX K. UH MĀNOA LONG RANGE DEVELOPMENT PLAN 2007 UPDATE (ATTACHED SEPARATELY)