



UNIVERSITY OF HAWAI'I AT MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

FINAL ENVIRONMENTAL ASSESSMENT

May 2009



PREPARED FOR:

kya design group

PREPARED BY:



PBR HAWAII
& ASSOCIATES, INC.

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI‘I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

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LIST OF ACRONYMS

The following is a list of terms, abbreviations, and acronyms used in this document.

A

ACOE	US Army Corps of Engineers
ADA	Americans with Disability Act
ALISH	Agricultural Lands of Importance to the State of Hawai'i
AM	Morning
ATA	Austin, Tsutsumi & Associates, Inc.

B

BMPs	Best Management Practices
BOR	Board of Regents, University of Hawai'i at Mānoa
BWS	City and County of Honolulu, Board of Water Supply
bgs	below ground surface

C

CATV	Cable television
CFC	Chlorofluorocarbons
CIA	Cultural Impact Assessment
CIP	Capital Improvement Project
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act

D

DAGS	State of Hawai'i, Department of Accounting and General Services
dba	Doing business as
DLNR	State of Hawai'i, Department of Land & Natural Resources
DOD	State of Hawai'i, Department of Defense
DOH	State of Hawai'i, Department of Health
DP	Development Plan
DPP	City and County of Honolulu, Department of Planning & Permitting
DTS	City and County of Honolulu, Department of Transportation Services

E

EA	Environmental Assessment
EB	Eastbound
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ETS	Environmental Tobacco Smoke

F

F	Fahrenheit
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map

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FM	Domestic/fire service (water meter)
FONSI	Finding of No Significant Impact
FPMO	UH Facilities Planning and Management Office
FSC	Forest Stewardship Council
FWCA	Fish and Wildlife Coordination Act
G	
GPD	Gallons per day
GPM	Gallons per minute
H	
H-POWER	Honolulu Program of Waste Energy Recovery
HAR	Hawai'i Administrative Rules
HCM	Highway Capacity Manual
HECO	Hawaiian Electric Company
HFD	Honolulu Fire Department
HHCTCP	Honolulu High-Capacity Transit Corridor project
HPD	Honolulu Police Department
HOV	High Occupancy Vehicle
HRS	Hawai'i Revised Statutes
HVAC	Heating, ventilation and air conditioning
I	
IBC	International Building Code
K	
kVA	Kilovolt Amperes
KW	Kilowatt
KWhr	Kilowatt hour
KYADG	KYA Design Group
L	
LEED	Leadership in Energy and Environmental Design
LEED NC	LEED New Construction
LOS	Level-of-service is a quantitative and qualitative assessment of traffic operations
LRDP	Long Range Development Plan
LSB	Land Study Bureau
LT	Left turn
LUC	State of Hawai'i, Land Use Commission
LUO	Land Use Ordinance
M	
MIA	Makiki Stony Clay Loam soil
MPH	Miles per hour
MSL	Mean sea level
MUTCD	Manual on Uniform Traffic Control Devices
MVA	Megavolt Amperes
N	
NEPA	National Environmental Policy Act
NFPA 10	National Fire Protection Association Standard for Portable Fire Extinguishers

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NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
O	
OCCL	Department of Land and Natural Resources, Office of Conservation and Coastal Lands
OHA	Office of Hawaiian Affairs
OSHA	Occupational Safety and Health Administration
OTWC	Oceanic Time Warner Cable
P	
PM	Afternoon
PRU	Plan Review Use approval
psi	Pounds per square inch
PUC	Primary Urban Center
R	
R-5	Residential Zoning District (City and County of Honolulu)
ROH	Revised Ordinances of Honolulu
RT	Right-turn
S	
SF	Square feet
SHPD	State Historic Preservation Division
SMA	Special Management Area
SMP	Special Management Area Use Permit
SOI	Secretary of the Interior
T	
TH	Through (traffic)
TIAR	Traffic Impact Analysis Report
TMDL	Total Maximum Daily Load
TMK	Tax Map Key
U	
UH	University of Hawai'i
UHM	University of Hawai'i at Mānoa
UHSM	University Health Services Mānoa
UIC	Underground Injection Control Line
USC	United States Code
USGS	U.S. Geological Survey
V	
VOC	Volatile organic compound
W	
WB	Westbound
WMP	Water Management Plan

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA
FINAL ENVIRONMENTAL ASSESSMENT

1.0 INTRODUCTION

This Draft Environmental Assessment (EA) is prepared in accordance with Chapter 343, Hawai'i Revised Statutes (HRS) for the proposed renovation and expansion of the Campus Center, renovation of Hemenway Hall, relocation or removal of two portable buildings and the removal of two buildings in the Engineering Quadrangle at the University of Hawai'i at Mānoa, hereinafter referred to as "Campus Center Renovation and Expansion."

1.1 PROJECT SUMMARY

Project Name:	Campus Center Renovation and Expansion
Location:	Honolulu, O'ahu
Tax Map Key (TMK):	(1) 2-8-23-03 (por.)
Applicant:	University of Hawai'i at Mānoa
Landowner:	State of Hawai'i - University of Hawai'i System (per Executive Order (EO) 1807 to the Board of Regents (BOR) of the University of Hawai'i)

	Campus Center	Engineering Quadrangle	Portable Buildings	Hemenway Hall Theater
Existing Use	Student programming and activities offices, food service, establishments, retail services, University Bookstore	Board of Publications	Facilities for PEACESAT & Family Resources	Classroom/meeting facilities
Proposed Action	Renovation and Addition	Removal and Preservation in place	Removal or Relocation	Renovation
Project Area	Approximately 206,100 square feet (SF) (This include both the existing Campus Center Structure, and the proposed Recreation Center Addition	2 buildings, approximately 6,606 SF will be removed 2 buildings, approximately 5,499 SF will be preserved in place	Approximately 3,528 SF	Approximately 3,517 SF

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Land Use Designations:	State Land Use: Urban City and County of Honolulu Primary Urban Center Development Plan: Institutional City and County of Honolulu Zoning: Residential (R-5)
Special Management Area:	The project is not in the Special Management Area (SMA)
Permits/Approvals Requested:	Approval of Project Construction Plans Building and Grading Permits Plan Review Use (PRU) permit State Historic Preservation review National Pollutant Discharge Elimination System (NPDES)
Approving Agency:	University of Hawai'i at Mānoa
Anticipated Determination:	Finding of No Significant Impact (FONSI)

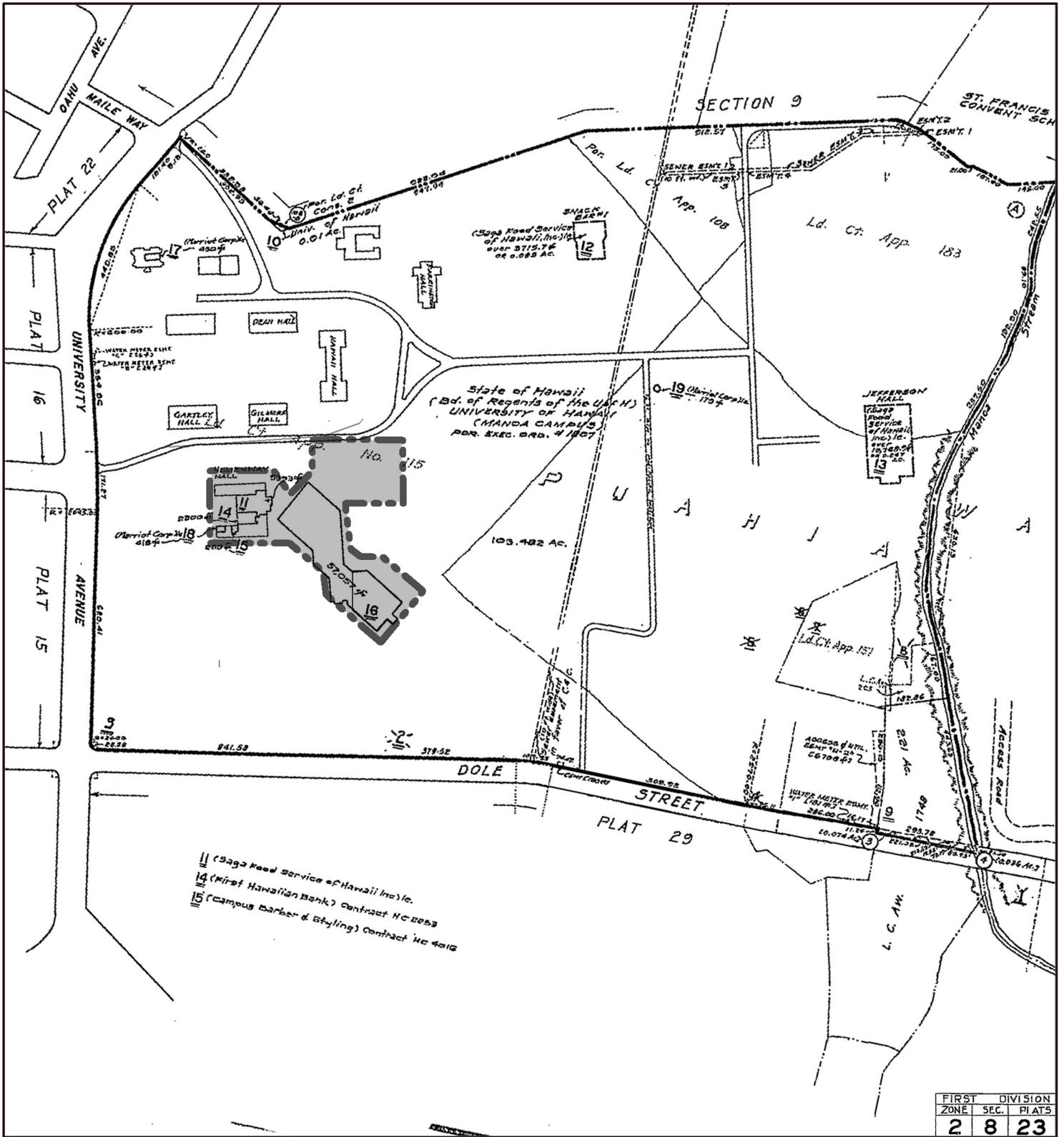
1.2 LOCATION

The proposed site for the Campus Center Renovation and Expansion is located within the University of Hawai'i at Mānoa Central Campus, in urban Honolulu on the Island of O'ahu, State of Hawai'i (Figures 1 and 2). The Campus Center Renovation and Expansion is located south of Campus Road and is surrounded by Gartley Hall, Miller Hall, the Art Building, Building 37, Kuykendall Hall, Bachmann Annex, Sinclair Library, Dean Hall, Hawai'i Hall, Krauss Annex 1, Krauss Annex 1, Administrative Services Building 1, Administrative Services Building 2 and Varsity Circle.

1.3 LAND OWNERSHIP

The State of Hawai'i - University of Hawai'i System (per Executive Order (EO) 1807 to the Board of Regents of the University of Hawai'i) holds title to the land under the location of the proposed action. Utilizing the Tax Map Key system, the land under the project site is identified as TMK (1) 2-8-23:03 (por.) (Figure 1).

Contact: Kathleen Cutshaw
Vice Chancellor for Finance, Administration and Operations
University of Hawai'i at Mānoa
2500 Campus Road, Hawai'i Hall 307D
Honolulu, Hawai'i 96822
Phone: (808) 956-9190
Fax: (808) 956-5136



LEGEND

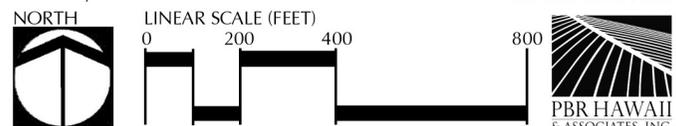
Project Area

Figure 1

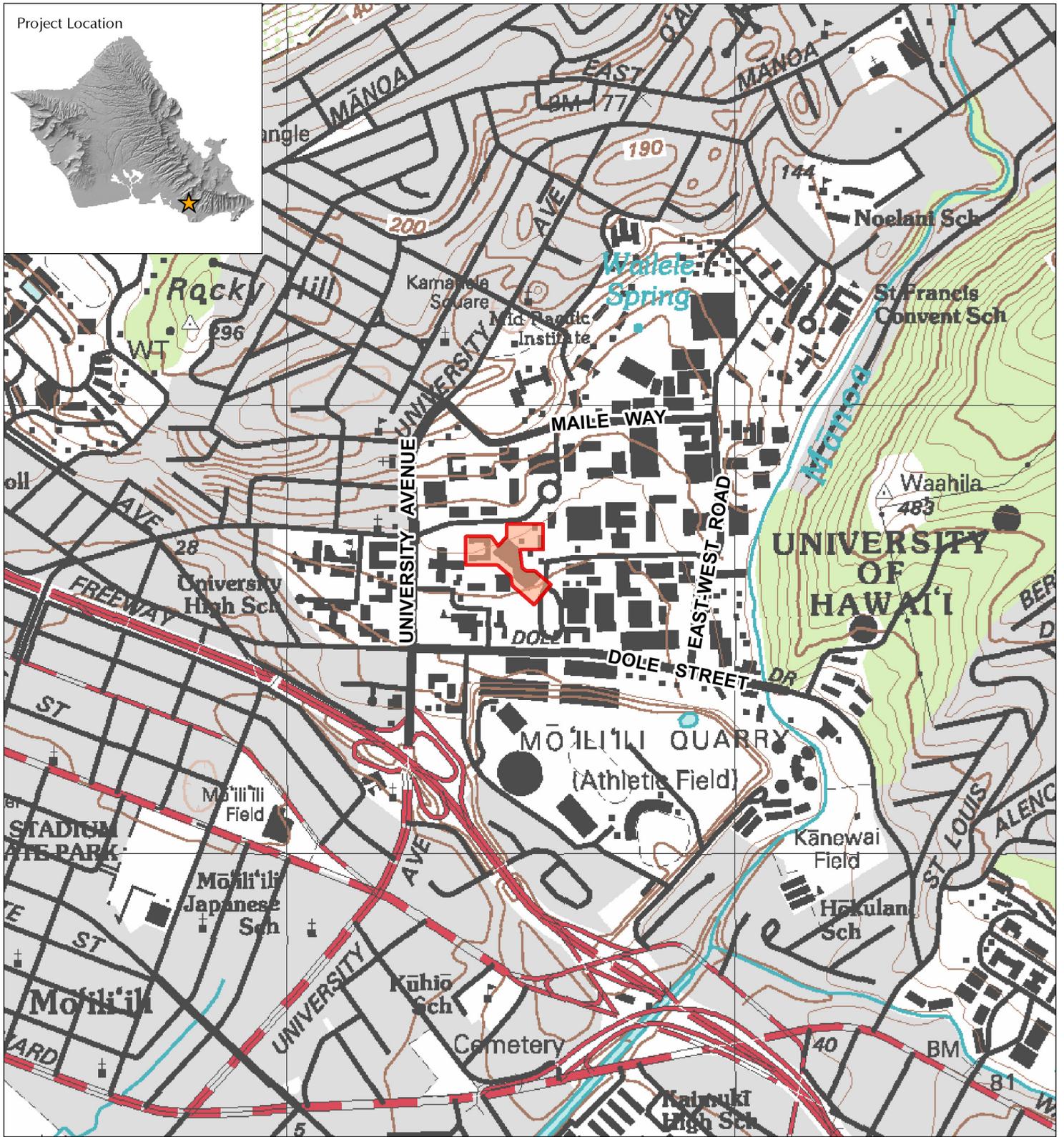
Tax Map Key

Campus Center Renovation & Expansion

University of Hawai'i at Mānoa ISLAND OF O'AHU



Source: Reality Atlas, State of Hawai'i (2007)
Disclaimer: This graphic has been prepared for general planning purposes only.



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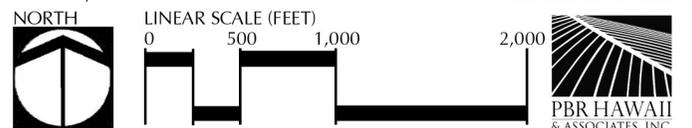
 Project Area

Figure 2

Regional Location

Campus Center Renovation & Expansion

University of Hawai'i at Mānoa ISLAND OF O'AHU



Source: U.S. Geological Survey
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CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

1.4 IDENTIFICATION OF APPLICANT

The University of Hawai'i at Mānoa is the project applicant.

Media Contact: Gregg Takayama, Director of Communications
Chancellor's Office
University of Hawai'i at Mānoa
2500 Campus Road, Hawai'i Hall, Suite 202
Honolulu, Hawai'i 96822
Phone: (808) 956-9836

Contact: Bruce Teramoto, Project Manager and Architect
Office of Capital Improvements
University of Hawai'i at Mānoa
1960 East-West Road, Biomedical Services Building, B-102
Honolulu, Hawai'i 96822
Phone: (808) 956-2739
Fax: (808) 956-3175

1.5 IDENTIFICATION OF ENVIRONMENTAL CONSULTANT

The environmental consultant is PBR HAWAII & Associates, Inc. dba PBR HAWAII, a sub-consultant under contract with KYA Design Group (KYADG).

Contact: Malia Cox
Planner
PBR HAWAII
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, Hawai'i 96813
Phone: (808) 521-5631
Fax: (808) 523-1402

1.6 IDENTIFICATION OF APPROVING AGENCY

The University of Hawai'i at Mānoa is the approving agency.

Contact: Brian Minaai
Associate Vice President for Capital Improvements
University of Hawai'i
1960 East-West Road, Biomed B-102
Honolulu, Hawai'i 96822
Phone: (808) 956-7935
Fax: (808) 956-3175

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1.7 COMPLIANCE WITH STATE OF HAWAI'I AND CITY AND COUNTY OF HONOLULU ENVIRONMENTAL LAWS

Preparation of this document falls in accordance with the provisions of Chapter 343, HRS (2007) and Title 11, Chapter 200, Hawai'i Administrative Rules (HAR) pertaining to Environmental Impact Statements. Section 343-5, HRS established nine "triggers" that require either an EA or an Environmental Impact Statement (EIS). The use of State or County lands or funds requires the preparation of an Environmental Assessment.

1.8 IDENTIFICATION OF AGENCIES CONSULTED

Various agencies (or agency documents) were consulted in preparation of this EA. Responses to the pre-consultation are attached in Appendix A. Responses to Draft EA comments are attached in Appendix B.

Federal

Army Corps of Engineers (ACOE)

State of Hawai'i

Office of Senator Brian Taniguchi

Office of Representative Isaac Choy

Department of Land and Natural Resources

Department of Land and Natural Resources, State Historic Preservation Division

Department of Health, Environmental Planning Office

Office of Environmental Quality Control

University of Hawai'i at Mānoa

City and County of Honolulu

Councilmember Duke Bainum, Honolulu County Council

Board of Water Supply

Department of Community Services

Department of Customer Services

Department of Design and Construction

Department of Environmental Services

Department of Facility Maintenance

Department of Planning and Permitting

Department of Transportation Services

Fire Department

Police Department

Neighborhood Commission Office, Mānoa Neighborhood Board, #7

Private

Hawaiian Electric Company

Historic Hawai'i Foundation

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI‘I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

2.0 PROJECT DESCRIPTION

This section provides background information and a general description of the Campus Center Renovation and Expansion project site.

2.1 LOCATION

The proposed site for the Campus Center Renovation and Expansion is located within the University of Hawai‘i at Mānoa Upper Campus in urban Honolulu on the Island of O‘ahu, State of Hawai‘i (Figure 1). Photographs of the site are included as Figures 3A and 3B. Specifically, the project is located south of Campus Road between Sinclair Library, Miller Hall, Kuykendall Hall, Buildings 31-C and 31-D of the Engineering Quadrangle, and Building 37 (Figure 4) Access to the Campus Center Area will be modified based on the location of the proposed Recreation Center as shown on Figure 5.

2.2 DESCRIPTION OF THE CAMPUS CENTER RENOVATION AND EXPANSION

The Campus Center Renovation and Expansion is being designed to provide students with a centrally located, state-of-the-art Recreation Center. The approximately 56,100 SF Recreation Center addition will include spaces for indoor intramural sports, cardiovascular exercise, fitness center, strength training, multi-purpose exercise rooms, indoor jogging track, and two indoor basketball courts. The University of Hawai‘i selected Ushijima Architects to design the Campus Center Recreation Center Facilities. A cross-sectional view of the proposed building is shown on Figure 6.

One of the key components of the Recreation Center addition is its integration with the primary Campus Center structure in the Central Campus. To ensure the seamless integration with the existing Campus Center facilities, several surrounding buildings will need to be removed and or relocated. The Engineering Materials Testing Laboratory (EMTL) and one of the four remaining buildings in the original Engineering Quadrangle¹ will be removed. In addition, two portables (the PEACESAT and Miller Annex buildings) will be removed or relocated. Buildings 31-C and 31-D (currently housing Ka Leo O Hawai‘i), part of the original Engineering Quadrangle, will be preserved in place. A portion of Hemenway Hall is being renovated to house some of the displaced organizations currently located in the two portables and in the Engineering Quadrangle. The project has been redesigned to integrate the Recreation Center with the existing Campus Center Structure, as well as improving the historical context of the two remaining Engineering Quadrangle buildings. Renderings prepared by Ushijima Architects illustrate this integration (Figures 7A through D).

¹ The UHM has been working with the State Historic Preservation Department (SHPD) and Historic Hawai‘i Foundation (HHF) to minimize the impact the Campus Center Renovation and Expansion will have on the Engineering Quadrangle complex. This is discussed in Section 4.1.

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

2.2.1 General Background

Campus Center

Built in 1973, the Campus Center is a four-level, 150,000 SF mixed use building designed as a hub for student programming and activities. The construction of the existing Campus Center facility required the demolition of one of the five original Engineering Quadrangle buildings.

Hemenway Hall

The University of Hawai'i opened Hemenway Hall (original referred to as the "Union Building") in 1939. As the first major non-academic building on campus, Hemenway Hall provided dining space, a lounge area, and student offices. In 1948, a wing was added which contained a barbershop, classrooms, and a recreation hall. The addition also created an enclosed outdoor courtyard used for dining and entertainment. Today, the two-story concrete structure is approximately 42,300 SF of total floor space (plus a 4,000 square foot courtyard area). Hemenway Hall was extensively renovated during the 1970's.

Engineering Quadrangle

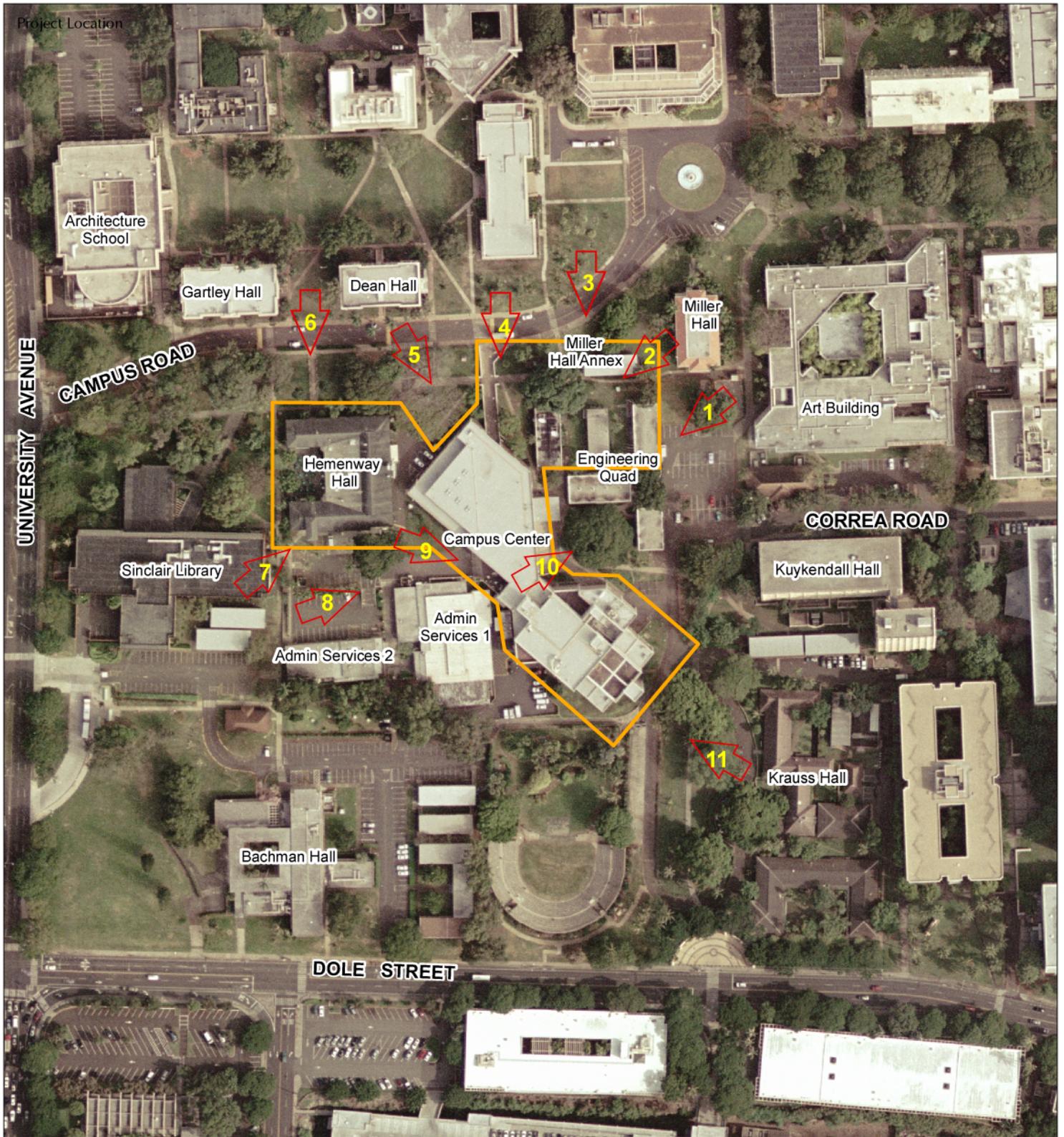
Built in 1915, the Engineering Materials Testing Laboratory is the second oldest building on campus. It was built to house the Reihle Universal Testing Machine, a 150,000-pound machine purchased second-hand, that was too large to be housed in Hawai'i Hall. Between 1915 and 1928, four single-story concrete buildings were erected to serve as classes and storage for the engineering department. Collectively, these five building became known as the Engineering Quadrangle. One of the buildings was demolished in the early 1970s to make way for the present day Campus Center. The complex was officially named for James Mason Young in 1965. The Engineering Department moved out of the Engineering Quadrangle in 1959 and became known as the College of Engineering. Since 1959, the Engineering Quadrangle has been the home to a variety of tenants. Today, the buildings house the Beau Press, Board of Publications (BOP) offices, Ka Leo O Hawai'i offices and printing, Duplicating Services, and Student Support Services.

Miller Annex Portable Building

The Miller Annex portable building contains the Family Resources Office and several offices for programs in the College of Tropical Agriculture and Human Resources. The final disposition of this building has not yet been determined. It may be moved to an alternate location on campus

PEACESAT Portable Building

The Pan-Pacific Education and Communication Experiments by Satellite (PEACESAT) program is housed in a portable building in the center of the Engineering Quadrangle. The final disposition of this building has not yet been determined. It may be moved to an alternate location on campus.



LEGEND



Project Area



Photo ID number & direction photo was taken

Figure 3b

Site Photograph Key

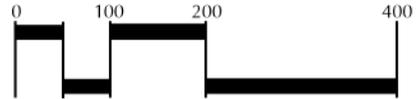
Campus Center Renovation & Expansion

University of Hawai'i at Mānoa

ISLAND OF O'AHU

NORTH

LINEAR SCALE (FEET)



Source: U.S. Geological Survey (2004)
 Disclaimer: This graphic has been prepared for general planning purposes only.



Photo 1: Facing southwest towards the Engineering Quad from Miller Hall.



Photo 2: Facing southwest between Engineering Quad buildings PEACESAT Portable.



Photo 3: Facing south towards Miller Annex and the Engineering Quad.



Photo 4: Facing south towards the Campus Center building from Campus Road.



Photo 5: Facing southeast towards the Campus Center building from Campus Road.



Photo 6: Facing South towards Hemenway Hall entrance.



Photo 7: Facing northeast towards the corner of Hemenway Hall.



Photo 8: Facing northeast towards the Campus Center building from the Admin Services 2 building parking lot.



Photo 9: Facing southeast towards the Campus Center building from Hemenway Hall parking lot.



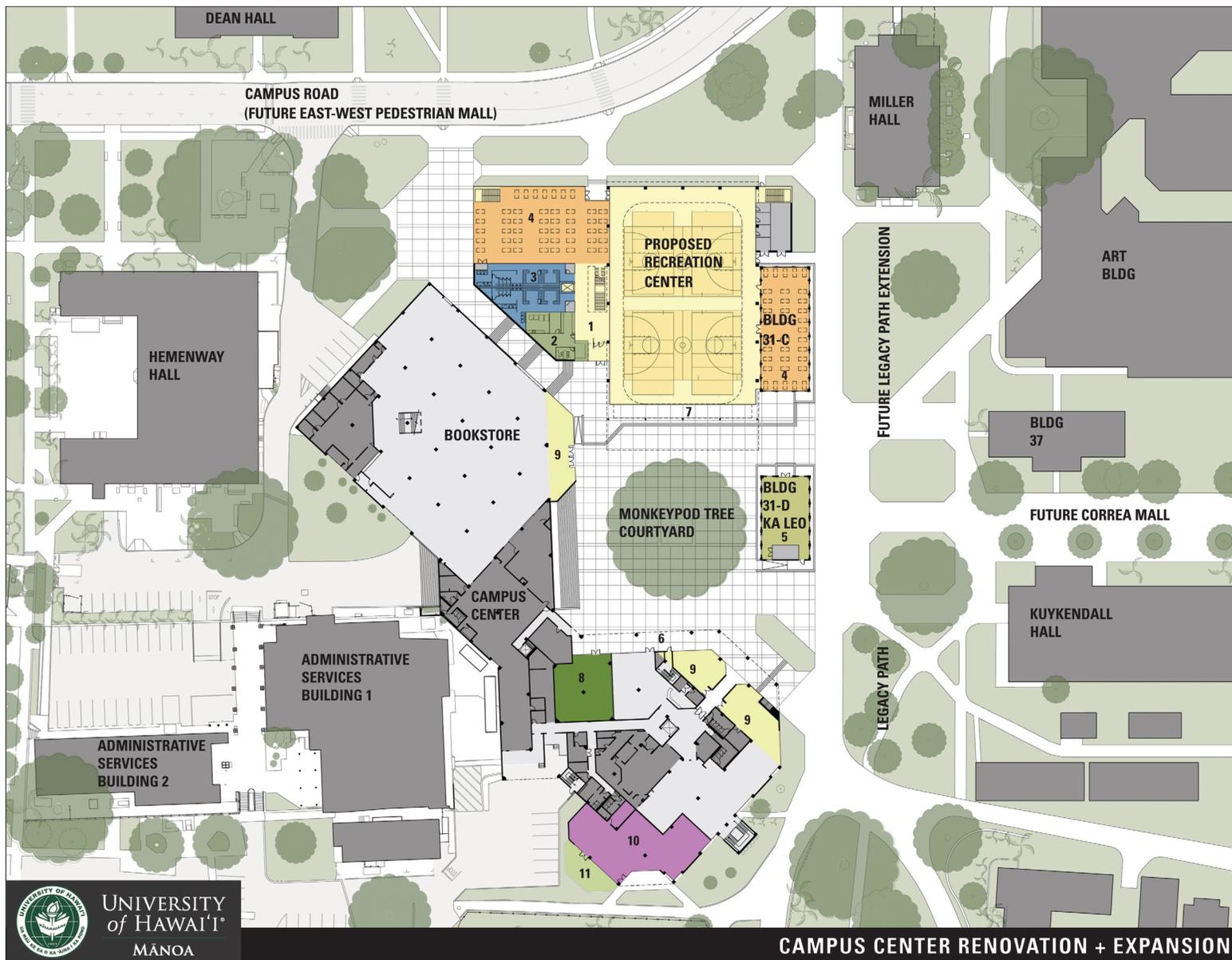
Photo 10: Facing northeast from the Campus Center building towards the Engineering Quad (& Ka Leo offices).



Photo 11: Facing northwest towards the Campus Center building from Krauss Hall.

Figure 3a
Site Photographs
Campus Center Renovation & Expansion
University of Hawai'i at Mānoa ISLAND OF O'AHU





LEGEND

- | | |
|----------------------|--------------------------------|
| 1 ENTRY LOBBY | 7 LANAI |
| 2 CHECK-IN | 8 LEISURE CENTER |
| 3 LOCKER ROOMS | 9 CAMPUS CENTER ADDITION |
| 4 FITNESS | 10 SATELLITE CHILD CARE CENTER |
| 5 MULTI-PURPOSE ROOM | 11 OUTDOOR PLAY AREA |
| 6 COVERED WALKWAY | |

Source: Ushijima Architects
Yost Grube Hall Architecture
March 30, 2009

Disclaimer: This graphic has been prepared for general planning purposes only.

Figure 4

Site Plan & Building Concept

Campus Center Renovation & Expansion

University of Hawai'i at Mānoa

ISLAND OF O'AHU

NORTH



NOT TO SCALE



PBR HAWAII
& ASSOCIATES, INC.

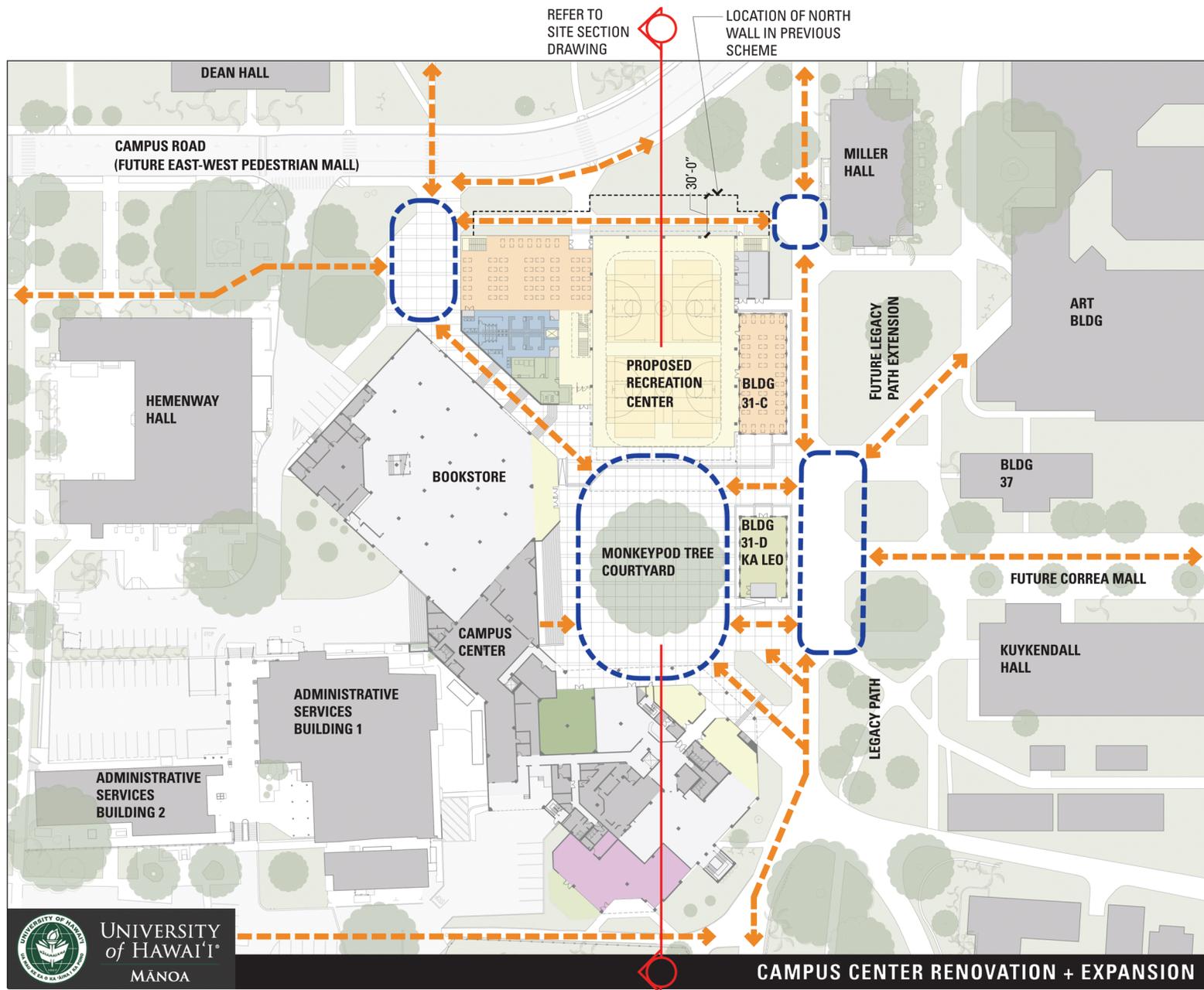


Figure 5
 Site Circulation & Campus Connections
 Campus Center Renovation & Expansion

University of Hawai'i at Mānoa

ISLAND OF O'AHU

NORTH



NOT TO SCALE



Source: Ushijima Architects
 Yost Grube Hall Architecture
 March 30, 2009

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CAMPUS CENTER RENOVATION + EXPANSION

Figure 6
 Site Section
Campus Center Renovation & Expansion
 University of Hawai'i at Mānoa ISLAND OF O'AHU

Source: Ushijima Architects
 Yost Grube Hall Architecture
 March 30, 2009

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NOT TO SCALE





CAMPUS CENTER RENOVATION + EXPANSION

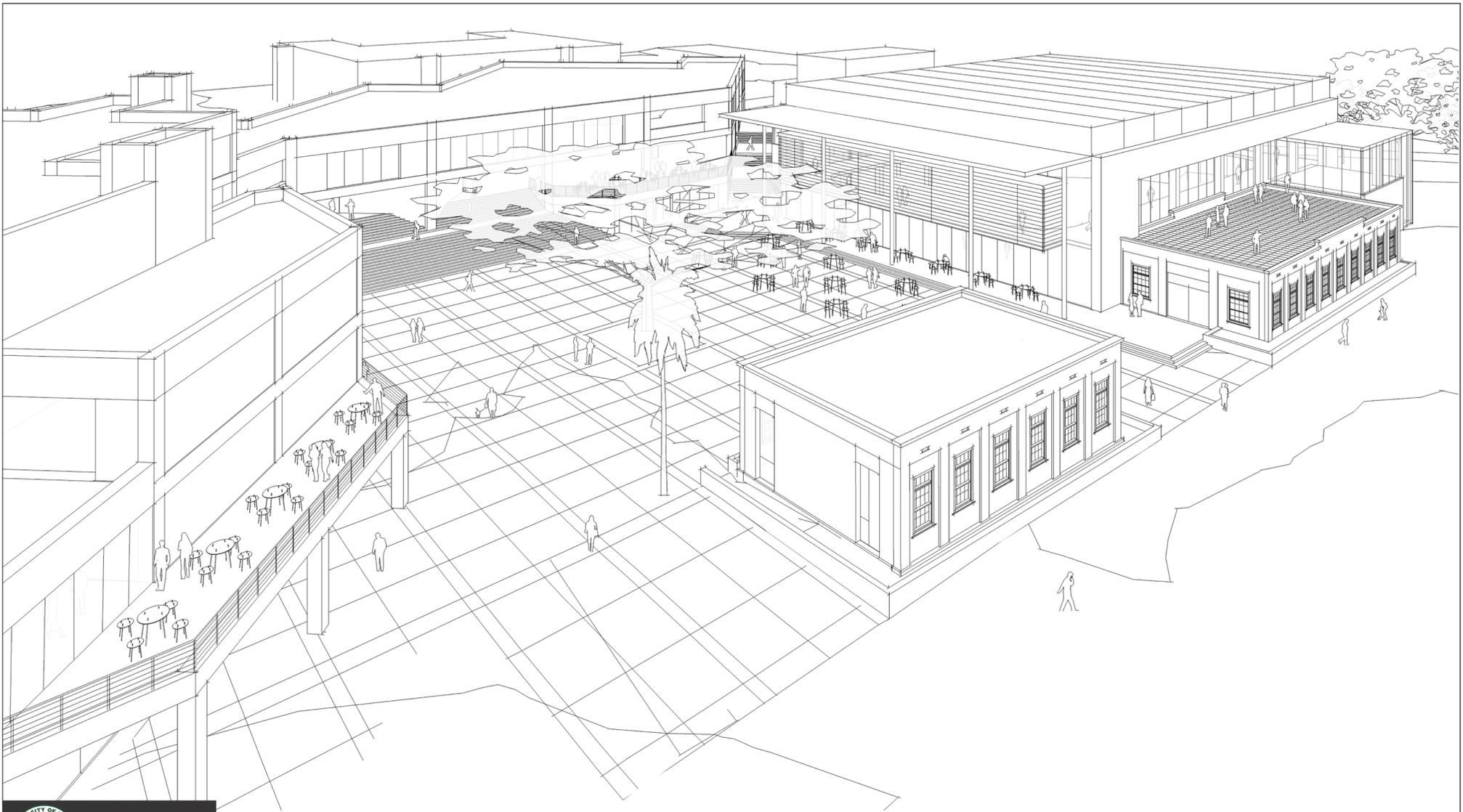
Figure 7A
Rendering, View from Legacy Path
Campus Center Renovation & Expansion
University of Hawai'i at Mānoa ISLAND OF O'AHU

Source: Ushijima Architects
Yost Grube Hall Architecture
March 30, 2009

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NOT TO SCALE





CAMPUS CENTER RENOVATION + EXPANSION

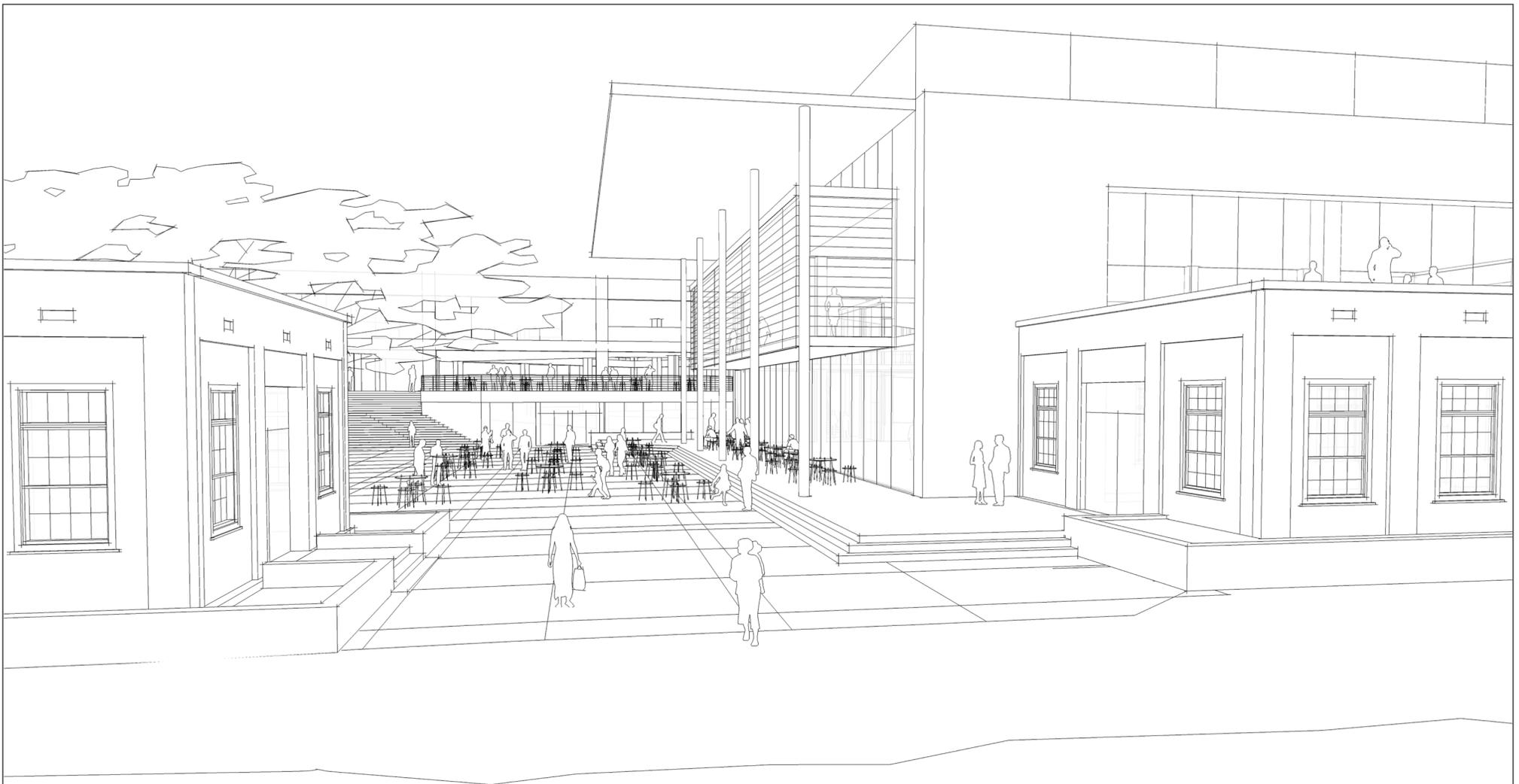
Figure 7B
Rendering, Aerial View
Campus Center Renovation & Expansion
University of Hawai'i at Mānoa ISLAND OF O'AHU

Source: Ushijima Architects
Yost Grube Hall Architecture
March 30, 2009

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NOT TO SCALE





UNIVERSITY
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MĀNOA

CAMPUS CENTER RENOVATION + EXPANSION

Figure 7C

Rendering, Plaza View 1

Campus Center Renovation & Expansion

University of Hawai'i at Mānoa

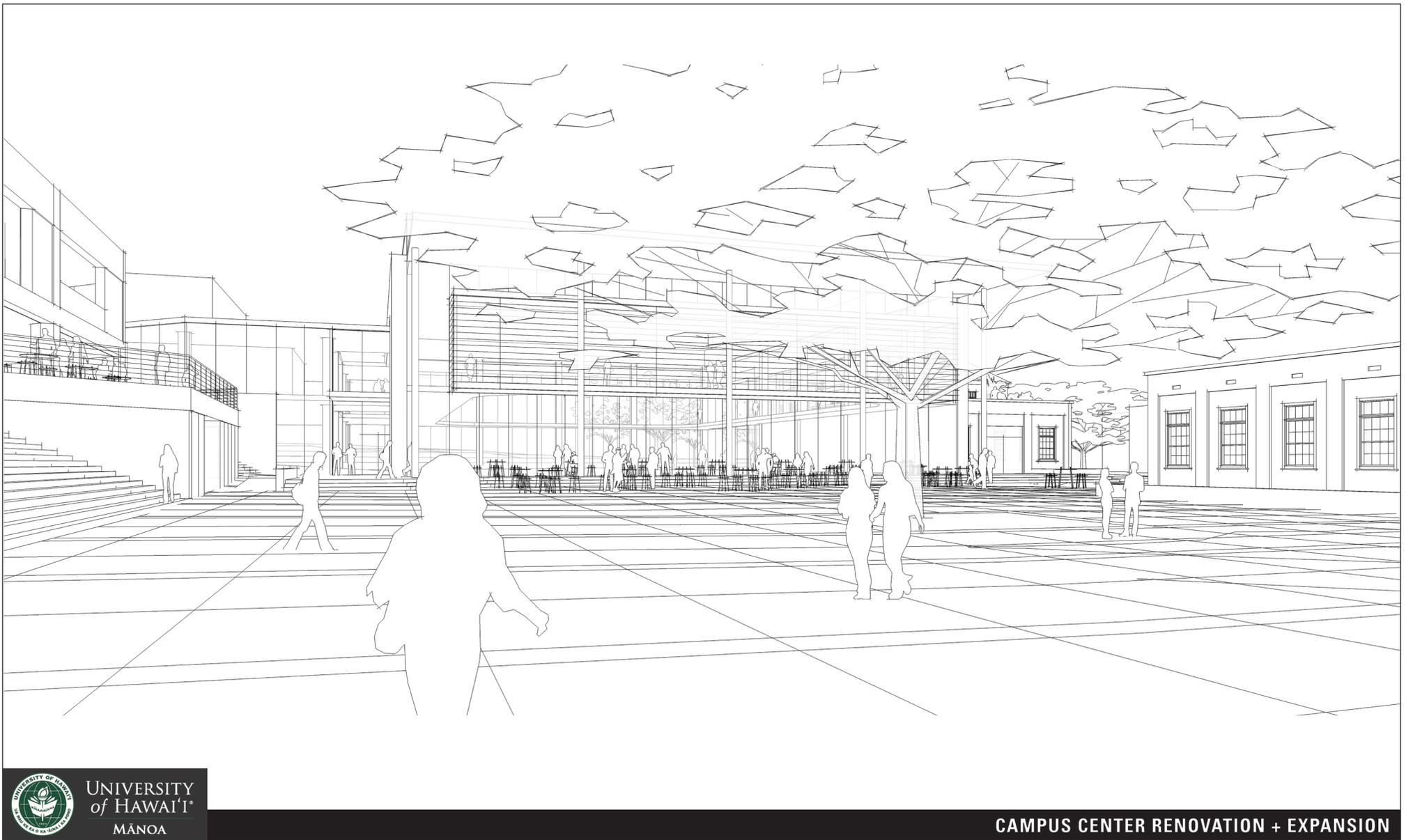
ISLAND OF O'AHU

Source: Ushijima Architects
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CAMPUS CENTER RENOVATION + EXPANSION

Figure 7D

Rendering, Plaza View 2

Campus Center Renovation & Expansion

University of Hawai'i at Mānoa

ISLAND OF O'AHU

Source: Ushijima Architects
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March 30, 2009

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CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

2.2.2 Environmental Sustainability

Since 1987, all major improvements to the University of Hawai'i, Mānoa Campus have been guided by a Long Range Development Plan (LRDP). Originally adopted in 1987, with updates approximately every five years, the plan reflects current and upcoming educational priorities. All proposed and future capital improvement projects are discussed in the plan and updates. An Environmental Assessment was released for the latest LRDP update, LRDP 2007. The development of Campus Center Renovation and Expansion project is in part guided by the themes and goals of the latest update and environmental planning documents.

One of the four major themes in the University's LRDP is "UHM – Leader in Environmental Sustainability." To that end, the University is attempting to achieve LEED certification at the Silver level for the Campus Center Recreation Center addition. LEED, or Leadership in Energy and Environmental Design, is a nationally recognized program for certifying the design, construction and operation of high performance green buildings. The Campus Center Renovation and Expansion project will be designed taking the following LEED concepts into consideration:

- Reduce environmental impacts through appropriate site development;
- Develop urban areas with existing infrastructure;
- Reduce pollution impacts through the implementation of transportation alternatives;
- Reduce use of potable water for land irrigation; and
- Maximize water efficiency to reduce water use.
- Ensure that building elements/systems are designed/installed/calibrated as intended;
- Establish minimum level of energy efficiency; and
- Reduction of waste generated and disposed of in landfills via the collection of recyclables and reusable during construction and operation;
- Increase demand in recycled content building materials.
- Prevent of indoor air quality problems through the development of a Construction indoor air quality (IAQ) Management Plan and minimum IAQ performance standards
- Reduce of the quantity of indoor air contaminants;
- Avoid exposure to potentially hazardous chemicals; and

According to the LRDP, existing conditions indicate that students traveling between the Campus Center, Hemenway Hall, Sinclair Library, University Avenue and Metcalf Street walk along Campus Road. Currently, Campus Road/Varney Circle is used for parking and as a service road to Hemenway Hall, Student Services Center, and Gartley Hall. The LRDP recommends that vehicular traffic be eliminated from the heart of the Central Campus by closing and converting the portion of Campus Road between Gartley Hall and

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

the Campus Center into a secondary path for access for emergency, maintenance and service vehicles. The LRDP further recommends that this mall (referred to as "East-West Mall" should be developed as a walk through a botanical garden, with a number of informal sitting areas and a few well-defined activity areas. An outdoor sidewalk café covered by an awning or trellis is envisioned for the mauka side of Hemenway Hall along the proposed East-West Mall and west of the Campus Center.

Historic Preservation Considerations - The Campus Center Renovation and Expansion project also includes historic preservation criteria and the architects are working closely with the State Historic Preservation Division (SHPD), Historic Hawai'i Foundation (HHF) and campus planners to minimize impact to the historic features of Hemenway Hall, and the Engineering Quadrangle. Because Hemenway Hall and the Engineering Quadrangle are considered historic buildings, modification or removal of these structures, is subject to the approval of the SHPD.

2.2.3 Project Implementation

Project construction is expected to occur in three phases. Phase One, already completed, included the renovation of existing Campus Center Facilities, and did not require an assessment of environmental impact. Phase Two will include the construction of the Recreation Center and the demolition of the Hemenway Hall Theater. In addition, Phase Two will include the renovation of a portion of Hemenway Hall to accommodate several organizations displaced from the Engineering Quad. The renovation and relocation of displaced organizations needs to be completed prior to the construction of the Recreation Center. Phase Three will include renovation and modification of the existing Campus Center structure. Construction on Phase Two is scheduled for the fall of 2009. Phase Three would commence upon completion of Phase Two.

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

3.0 DESCRIPTION OF THE NATURAL ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATIVE MEASURES

This section describes the existing conditions of the physical or natural environment, potential impacts of the Campus Center Renovation and Expansion to the environment, and mitigation measures to minimize impacts.

3.1 CLIMATE

O'ahu's geological features heavily influence its climate. The Ko'olau Mountain Range dominates ground-based atmospheric influences within Mānoa Valley. Trade winds are typical of the Hawaiian Islands, blowing predominantly from a northeast direction, and averaging approximately seven (7) miles per hour (mph) (NOAA, no date). These trade winds typically bunch moisture collected over the ocean along the mountain range creating optimal conditions for precipitation. National Weather Service rain gauges sited at Lyon Arboretum in the back of the valley have recorded an average annual rainfall of approximately 160 inches per year. Gauges at the Kapi'olani Community College record rainfall of approximately 25 inches per year (NWS Website). Rainfall at the project site lies between these two extremes.

Regional temperatures within the city of Honolulu range from 62 degrees Fahrenheit at an extreme low, to 89 degrees Fahrenheit at an extreme high.

Potential Impacts and Mitigation Measures

The Campus Center Renovation and Expansion is not anticipated to have any impact on climatic conditions and no mitigation measures are planned.

3.2 GEOLOGY AND TOPOGRAPHY

Geology

The project site sits at the foot of the Ko'olau Mountain Range – the eroded remnant of the Ko'olau Shield Volcano. The geology under the University of Hawai'i at Mānoa is highly influenced by three post-erosional volcanic vents associated with the larger Honolulu Volcanic Series: Pu'u 'Ualaka'a (Round Top), Pu'u Kākea (Sugarloaf), and Pu'u 'Ōhi'a (Tantalus). Honolulu Series eruptions did not occur rapidly and at one instance. Rather, they were scattered over a period of hundreds of thousands of years. All three vents are cinder cones derived from Strombolian-type eruptions. The approximately 67,000-year old flow from Pu'u Kākea spread out along Mānoa's valley floor creating a broad and nearly flat surface upon which the University of Hawai'i was constructed (Macdonald, 1983).

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

The Honolulu plain is underlain by a broad elevated coral reef partially covered by alluvium, evidence of higher sea level (approximately 7.5 meters) during an earlier interglacial stage.

Topography

The regional topography of the University of Hawai'i at Mānoa campus gently slopes at less than five (5) degrees in a southwesterly direction toward the ocean. The immediate site is partially influenced by its location at the foot of Mānoa Valley's eastern wall, creating the slight slope toward the west at the project site.

Also, because of the large amount of human development on the University campus, the areas around the existing Hemenway Hall, Campus Center, Engineering Quadrangle, Miller Annex and PEACESAT buildings have experienced profuse grading activity, as evidenced by the relatively level nature of the building site where the proposed renovation will occur.

Potential Impacts and Mitigation Measures

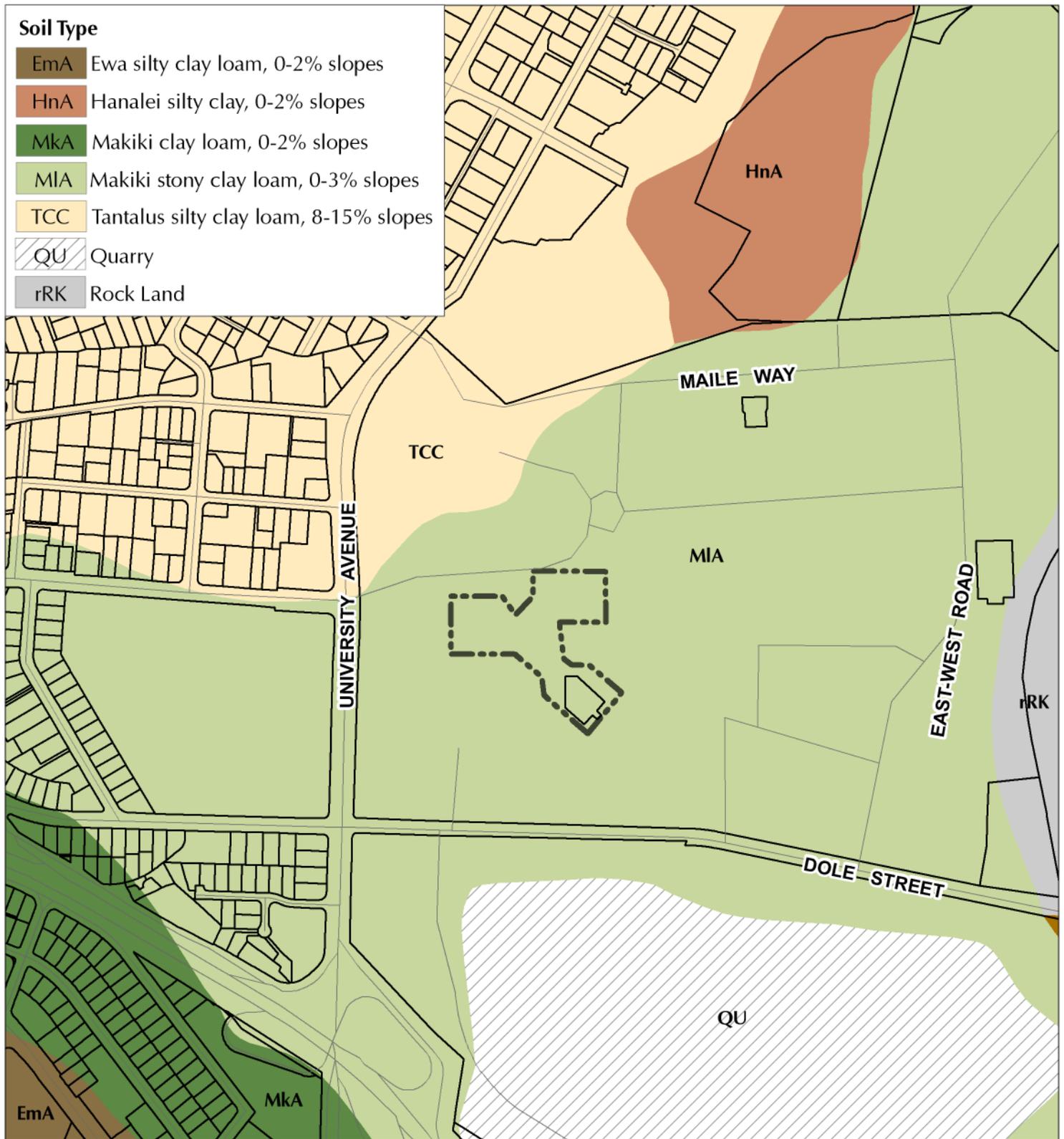
Due to the level conditions of the property, relatively minimal grading of the site will occur prior to renovation. The grading will not change the topographic nature of the Campus Center area relative to the surrounding lands.

3.3 SOILS

Three soil suitability studies prepared for lands in Hawai'i principally focus on the relative agricultural productivity of different land types. These studies are: 1) the U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) Soil Survey; 2) the University of Hawai'i Land Study Bureau Detailed Land Classification; and 3) the State Department of Agriculture's Agricultural Lands of Importance to the State of Hawai'i (ALISH).

3.3.1 Natural Resources Conservation Service (NRCS)

The ***Natural Resource Conservation Service, Soil Survey for the Island of O'ahu***, classifies the soil of the Campus Center Renovation and Expansion project site as: Makiki Stony Clay Loam, 0-3% Slope (Figure 8). The Makiki series of soils are generally described as consisting of well-drained soils on alluvial fans and terraces. These soils formed in alluvium mixed with volcanic ash and cinders. They are nearly level. Makiki Stony Clay Loam is a neutral to slightly acid soil described as being similar to Makiki Clay Loam, except containing enough stones to hinder cultivation. Makiki Clay Loam is described as having a surface layer is dark brown clay loam about 20 inches thick. The subsoil, about 10 inches thick, is dark-brown clay loam that has subangular blocky structure. It contains cinders and rock fragments. The subsoil is underlain by similar material, about 24 inches thick, that is massive. Below this are volcanic cinders. Makiki Stony Clay Loam is almost entirely in urban use.



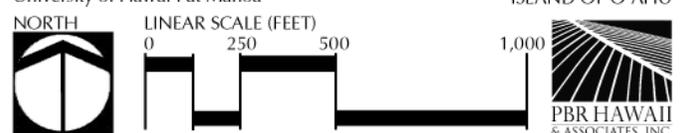
LEGEND

Project Area

Figure 8

Soil Classification

Campus Center Renovation & Expansion
 University of Hawai'i at Mānoa ISLAND OF O'AHU



Source: Natural Resources Conservation Service (2007)
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CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

3.3.2 Land Study Bureau Detailed Land Classification

The University of Hawai'i Land Study Bureau document, *Detailed Land Classification, Island of O'ahu*, classifies soils based on a productivity rating. Letters indicate class of productivity with A representing the highest class and E the lowest. The soils of the Campus Center Renovation and Expansion project site are listed as Unclassified (Figure 9).

3.3.3 Agricultural Lands of Importance to the State of Hawai'i (ALISH)

The Agricultural Lands of Importance to the State of Hawai'i (ALISH) system classify important agricultural lands as Prime, Unique, or Other Agricultural Land. The Campus Center Renovation and Expansion project site lands are not classified (Figure 10).

3.3.4 Soils Study

Due to the various below-grade conditions on the University campus, geo-technical surveys will be conducted prior to any project involving foundations or new buildings. The results from several soil samples collected from borings advanced near the Campus Center area indicated that the underlying silty clay has a moderate to high expansion potential.

Potential Impacts and Mitigation Measures

The Campus Center Expansion and Renovation will not have a deleterious effect on the soil in the project site. Because soils at the project site are not well suited for crop cultivation, and the site's development history, the proposed development should not impact the availability of agricultural land for cultivation.

The stability of the underlying strata is critical to the integrity of the Campus Center Expansion and Renovation project. Soils engineers will be involved in the design of building footings and subsurface soil modification taking into account the expansion rate of the underlying soil. This may include the removal of high expansion substrate. The foundation of the proposed Recreation Center will be spread footings and continuous footings, and where necessary, bearing directly on moderately weathered basalt. The Hemenway Hall renovation will include constructing a new level concrete floor slab-on-grade. The disposition of excavated soil, has not been determined, however the goal is to re-inter all excavated soil within the University of Hawai'i at Mānoa boundaries.

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

3.4 FLORA AND FAUNA

The University of Hawai'i at Mānoa has been subject to intense human utilization over the past century. Within the immediate proximity of the project site, there are no known habitats for rare, threatened, or endangered flora or faunal species.

There are several large trees within the project area. In 1975, the City and County of Honolulu enacted the Exceptional Tree Law to protect and honor trees in the community. In 2004, the State of Hawai'i defined an exceptional tree as a tree, stand or grove of trees with historic or cultural value because of its age, rarity, location, size, beauty or endemic status. There are no listed trees on the City and County of Honolulu's Exceptional Trees on the Campus Center Renovation and Expansion project site.

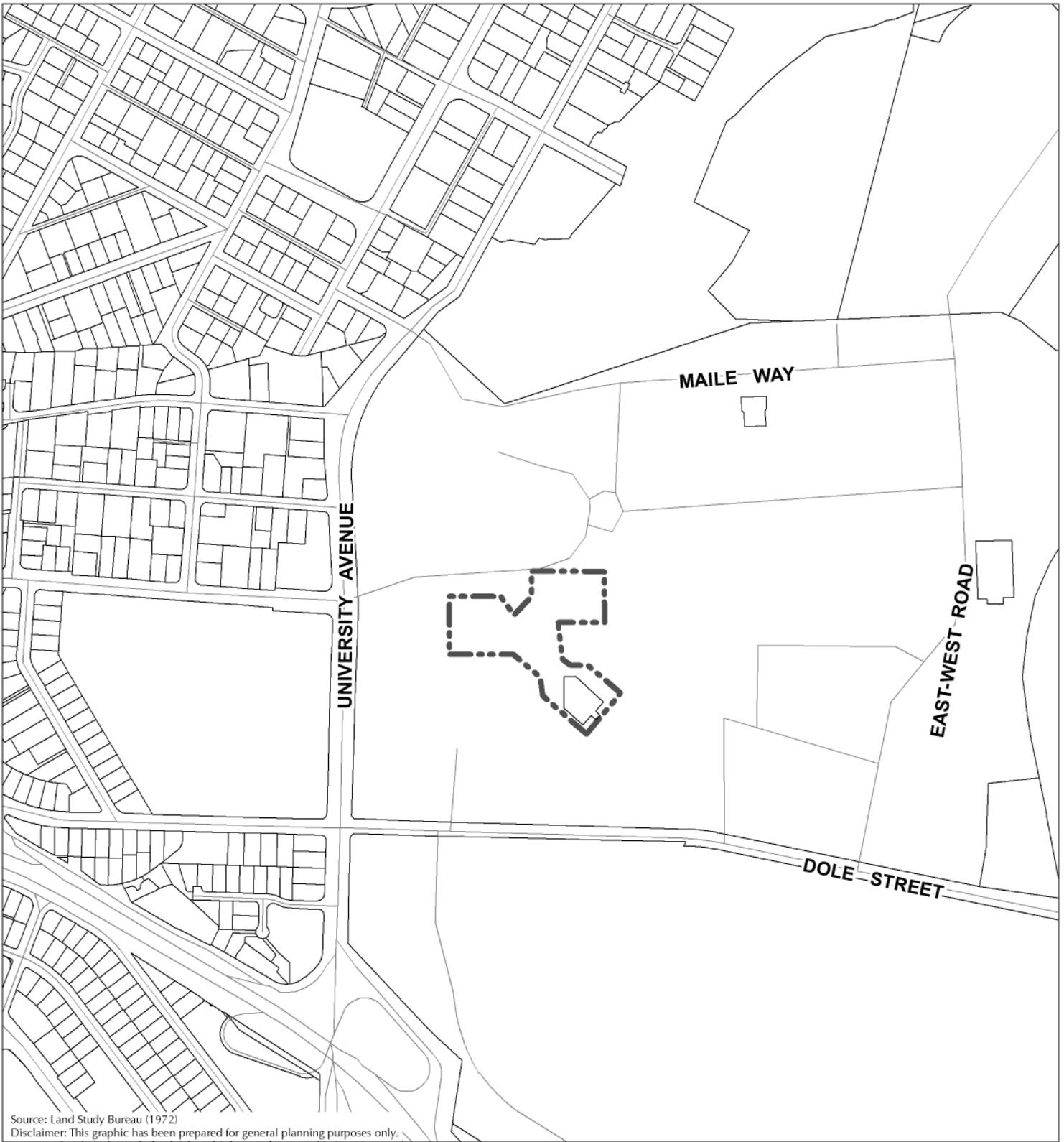
In 2008, the Heritage Center of the University of Hawai'i School of Architecture published the *University of Hawai'i at Mānoa Campus Heritage Report*. Chapter 4 of the report described "Heritage Landscape Patterns" and identified on a map, historical landscapes within the Mānoa campus. No historical landscapes were identified in the proposed Campus Center renovation and expansion area. On another map within Chapter 4 of the *Campus Heritage Report*, "Exceptional," "Memorial," "Exceptional & Memorial," and "Trees of Note" are identified. There are no "Exceptional," "Memorial," "Exceptional & Memorial," trees identified in the area proposed of development. Only one "Tree of Note" is mapped in the existing Campus Center courtyard. This presumably is the large Monkey Pod tree on the Diamond Head side of the Campus Center.

The *University of Hawai'i at Mānoa Campus Heritage Report* also included a comprehensive list of plants on campus including their location. At least 12 trees referencing either "Campus Center" or "Engineering Quad" are listed, although some may not be located where development is proposed to occur.

Potential Impacts and Mitigation Measures

As proposed, the renovation and expansion will not impact the large Monkey Pod tree at the center of the existing Campus Center building grounds. No "Exceptional," "Memorial," "Exceptional & Memorial," and "Trees of Note" will be affected by the project. Whenever possible existing trees and shrubs within the affected project area will be relocated to new locations on campus. Existing trees with a diameter greater than 36 inches that cannot be relocated or do not survive transplantation will be replaced at a minimum of one new tree for each tree that is removed or does not survive transplantation. The type, location, and size of the new replacement trees will be at the discretion of the University of Hawai'i Landscape Manager with the approval of a licensed landscape architect and certified arborist.

The location of the Campus Center Renovation and Expansion is not anticipated to have any significant impact on endangered flora or faunal species. No mitigation measures are planned.



Source: Land Study Bureau (1972)
 Disclaimer: This graphic has been prepared for general planning purposes only.

LEGEND

 Project Area

Agricultural Productivity Rating

-  A - Excellent
-  B - Good
-  C - Fair
-  D - Poor
-  E - Very Poor
-  Unclassified

Figure 9

Detailed Land Use Classification

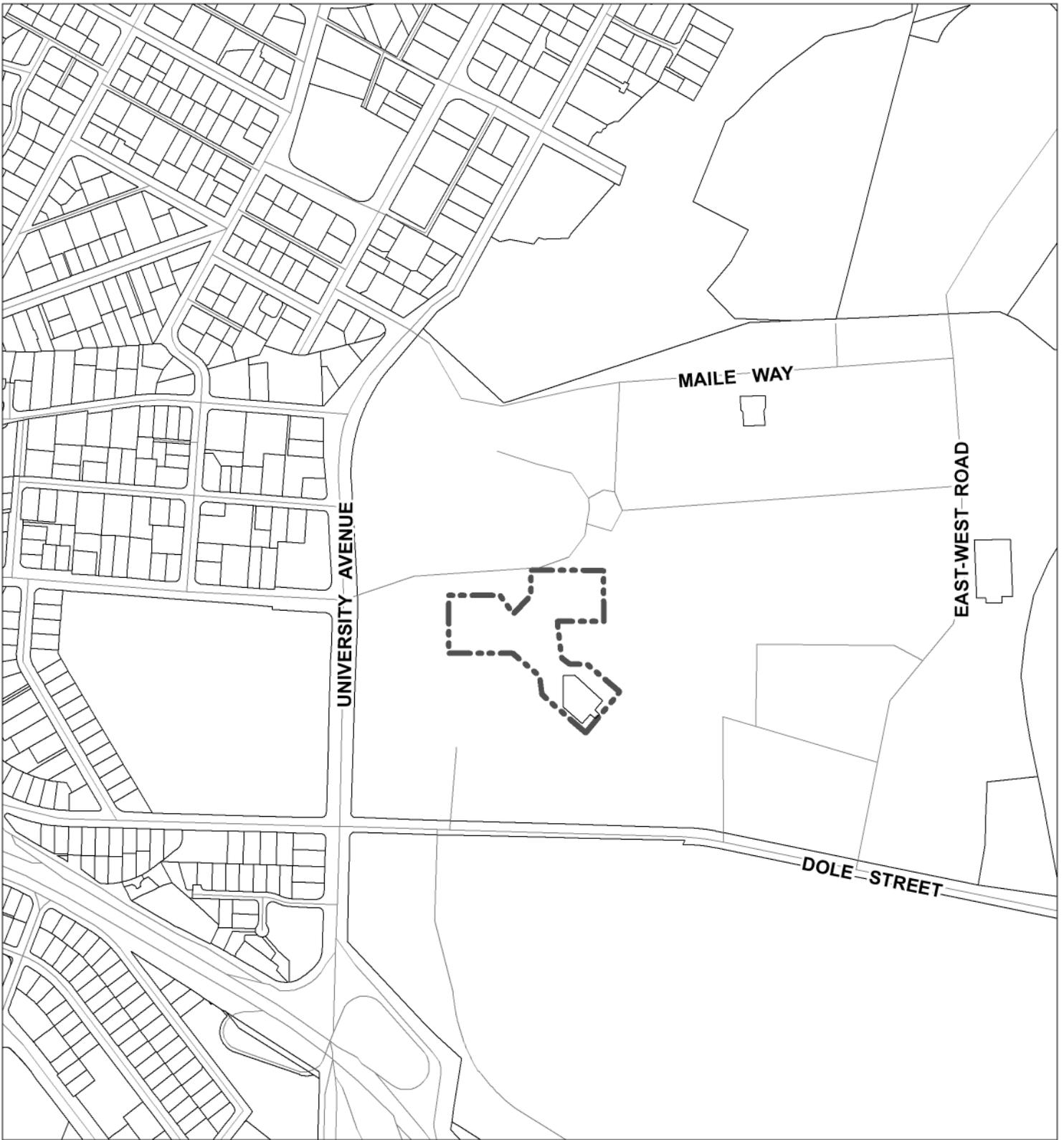
Campus Center Renovation & Expansion

University of Hawai'i at Mānoa ISLAND OF O'AHU

NORTH 

LINEAR SCALE (FEET)
 0 250 500 1,000 

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LEGEND

 Project Area

Agriculture Type

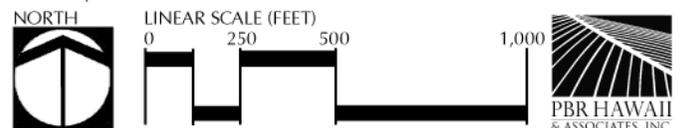
-  Prime ALISH Land
-  Unique ALISH Land
-  Other ALISH Land
-  Unclassified

Figure 10

Agricultural Lands of Importance to the State of Hawai'i

Campus Center Renovation & Expansion

University of Hawai'i at Mānoa ISLAND OF O'AHU



Source: State Department of Agriculture (1977)
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CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI‘I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

**Table 3-1
Existing Plants within the Project Area**

QTY	PLANT NAME	HEIGHT	INSTRUCTIONS	LOCATION RELATIVE TO CAMPUS CENTER
Palms				
1	Cocos nucifera (Coconut Palm)	25 feet	Relocate on Campus	north-east
4	Small Palms	various	Relocate on Campus	north-east
Trees				
1	<i>Spathodea campanulata</i> (African Tulip)	40 feet	Remove	north-east
1	<i>Ficus benghalensis</i> Banyan Tree	60 feet	Relocate on Campus	north-east
1	Banyan Tree	40 feet	Relocate on Campus	north-east
1	Banyan Tree	35 feet	Relocate on Campus	north-east
1	<i>Artocarpus atilis</i> (Breadfruit Tree)	30 feet	Relocate on Campus	north-east
1	Breadfruit Tree	15 feet	Relocate on Campus	north-east
1	Breadfruit Tree	30 feet	Relocate on Campus	north-east
1	Breadfruit Tree	30 feet	Relocate on Campus	north-east
1	<i>(Bauhinia blakeana)</i> Hong Kong Orchid –	13 feet	Relocate on Campus	north-east
1	(Indian) Banyan Tree	40 feet	Relocate on Campus	north-east
1	<i>(Samanea samaea)</i> Yellow Monkeypod –	30 feet	Remain	east north-east
1	Banyan Tree	50 feet	Remain	west south-west
2	Jackfruit Tree - <i>Artocarpus heterophyllus</i>	13 feet	Relocate on Campus	west south-west
Shrubs				
MASS	Brexia – <i>Brexia madagascarensis</i>	Height - 8' Spread - 20'	Remove	north-east
MASS	Firespike - <i>Odontonema strictum</i>	Height - 4' Spread - 4'	Relocate on Campus	north-east
4	Bougainvillea – <i>Bougainvillea spectabilis</i>	Various	Relocate on Campus	west south-west

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI‘I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

3.5 NATURAL HAZARDS

Natural hazards like flooding, tsunami inundation, hurricanes, earthquakes, and volcanic eruptions have historically impacted Hawai‘i Island.

Flooding

According to the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), National Flood Insurance Program, the project site is located in “Zone X”, out of the 500-year flood plain (Figure 11).

The site sits in a dry and arid environment where the risks of flooding are low due to a combination of factors, including low rainfall, thin soil layer, slope, and the porosity of the bedrock. During periods of heavy rainfall, localized ponding and some scouring by flowing surface water may occur. However, those conditions typically dissipate as the water rapidly percolates through the substrate.

Although the proposed project site lies outside the denoted flood zone, the Mānoa campus experienced a catastrophic flood event on October 30, 2004. The flood was the result of a 25-year flood event that caused an estimated \$80 million in damage to the University of Hawai‘i, as well \$5 million worth of damage to residences upstream of the campus. The Army Corps of Engineers (ACOE) conducted a post-flood, rainfall-runoff and stream hydraulic computer modeling of Mānoa Stream. The model results indicated that Mānoa Stream between Woodlawn and Kahaloa Drives had insufficient channel capacity to contain the flood waters caused by the October 30, 2004 storm event. Flood damage was further aggravated by debris clogged at the East Mānoa Road and Woodlawn Drive bridges over Mānoa Stream. Alternatives evaluated by the ACOE included floodwalls or levees along selected portions of Mānoa Stream channel between the East Mānoa Road and Woodlawn Drive bridges, and creating an artificial channel between East Mānoa Road and Woodlawn Drive.

In October 2007, Austin Tsutsumi & Associates, Inc. (ATA) prepared a report entitled: *Utility Systems Report, University of Hawai‘i at Mānoa, Long Range Development Plan 2007 Update, (Category I), Mānoa, Honolulu, Hawai‘i*. ATA reported that: “The U.S. Department of Agriculture Natural Resources Conservation Services is currently investigating the flood mitigation and restoration of Mānoa Stream in the Mānoa Watershed Project. The project is a partnership between city, state and federal agencies including U.S. Natural Resources Conservation Service (NRCS) and the Mānoa Watershed Project. 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 ACOE’s 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 Mānoa Watershed Project meetings to review their recommendations and monitor the Project’s



LEGEND

Project Area

Zone

- Floodway
- 100-Year Floodplain
- 500-Year Floodplain
- Outside of the 500-Year Floodplain
- Undetermined Flood Hazards

Figure 11
 Flood Insurance Rate Map
 Campus Center Renovation & Expansion
 University of Hawai'i at Mānoa ISLAND OF O'AHU

NORTH

LINEAR SCALE (FEET)
 0 250 500 1,000

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CAMPUS CENTER RENOVATION AND EXPANSION

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implementation of the recommendations in order to coordinate improvements affecting the University's property."

After the flood event, the debris at Woodlawn Drive was removed. Mālama O Mānoa has "adopted" the reach of Mānoa Stream between East Mānoa Road and Woodlawn Drive and conduct stream clean-ups quarterly.

To date the FIRM has not been adjusted to take in to account the October 30, 2004 flood and may not be contemplated until the ACOE implements the recommendations of its flood study of Mānoa Stream.

Tsunami

Since the early 1800s, approximately 50 tsunamis have inundated Hawai'i's shores. Seven historical events have caused major damage. Two tsunamis were generated locally. The proposed Campus Center Renovation and Expansion is located well outside the defined tsunami inundation area.

Hurricanes

Since 1980, two hurricanes have had a devastating effect on Hawai'i: Hurricane 'Iwa in 1982 and Hurricane 'Iniki in 1992. Long-term prediction of future hurricanes is virtually impossible. However, one should reasonably anticipate the prospect of another hurricane impacting the islands.

Earthquake & Volcanic Hazards

In Hawai'i, volcanic activity produces most earthquakes in contrast to other areas sitting on tectonic plate margins. Thousands of earthquakes occur in Hawai'i each year. However, the vast majority of them are undetectable through normal human senses. A few historical earthquakes have reached moderate and even disastrous magnitudes.

The last earthquakes felt statewide were magnitudes of 6.7 and 6.0. These earthquakes occurred at Kīholo Bay along Hawai'i Island's Kona Coast on October 15, 2006. These earthquakes resulted in more than \$100 million in damages to the northwest area of Hawai'i Island and minimal damage on O'ahu. From that same event, O'ahu was also subject to an earthquake induced electrical blackout that paralyzed the City of Honolulu and shut down the Honolulu International Airport for nearly a day.

Potential Impacts and Mitigation Measures

The Campus Center Renovation and Expansion should not have any impact or any deleterious effects on natural hazard conditions and no unique mitigation measures are planned, other than observing the International Building Code and the 1997 Uniform Fire Code in the design of the renovation (to address the potential impacts from hurricanes and earthquakes).

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA

FINAL ENVIRONMENTAL ASSESSMENT

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CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

4.0 DESCRIPTION OF THE HUMAN ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATIVE MEASURES

This section describes the existing conditions of the human environment, potential impacts of the Campus Center Renovation and Expansion, and mitigation measures to minimize any impacts.

4.1 HISTORIC, ARCHAEOLOGICAL AND CULTURAL RESOURCES

4.1.1 Historic Resources

Existing Conditions

SHPD lists the following University of Hawai'i, Mānoa Campus structures as site number 80-14-1352 on the Hawai'i Register of Historic Places. These are located in Tax Map Key 2-8-15:01 and 2-8-23:03:

Hawai'i Hall,
George Hall,
Dean Hall,
Gartley Hall,
Crawford Hall,
Varney Circle,
Founders Gate,
Andrews Amphitheater,
Wist Hall, and
Pineapple Research Center.

Although eligible, neither the Engineering Quadrangle nor Hemenway Hall have been listed in the Hawai'i Register of Historic Places. Due to their age and significance in the history of the University of Hawai'i at Mānoa Campus, the SHPD has been consulted regarding the Campus Center Expansion and Renovation Process.

In its present configuration Hemenway Hall is a two-story, concrete structure with approximately 42,300 SF of total floor space (plus a 4,000 square foot courtyard area).

Four of the five Engineering Quadrangle buildings exist today. The fifth building was demolished in the early 1970s to make space for the present Campus Center.

Potential Impacts and Mitigation Measures

Since Hemenway Hall is considered historic, the visual aspects and the external design of building need to be maintained. The proposed project will only impact Hemenway Hall Theater (a 1970s addition to the original structure). The Theater is entirely inside the

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

building and modification will occur primarily in the interior space. The addition of exterior doors and windows may be required. These modifications will be designed to look similar to the rest of the building to maintain the overall appearance of this historic building. Negotiations with SHPD regarding the modification of Hemenway Hall are underway.

The Engineering Quadrangle is also considered historic.

Engineering Quadrangle Alternative A: In this alternative all four remaining buildings would be demolished. The Campus Center Board and UHM Administration invited Historic Hawai'i Foundation (HHF) and State Historic Preservation Division (SHPD), to discuss the needs for the Recreation Center. Both HHF and SHPD expressed concerns regarding the potential impact the location of the Recreation Center would have on these buildings. Some of the student community also expressed concern regarding the lack of a preservation plan for this alternative.

Engineering Quadrangle Alternative B: In this alternative, the original Engineering Materials Testing Laboratory and one of the four Engineering Quadrangle buildings built between 1915 and 1928 will be preserved in place. Today those buildings are known as Buildings 6, and 31-D. During the plan design process, the University of Hawai'i and consulted with SHPD regarding the four remaining Engineering Quadrangle buildings to determine the best course of action regarding the Campus Center Renovation and Expansion project. SHPD has indicated that the division would support this alternative.

Engineering Quadrangle Alternative C, Preferred Alternative: In this alternative, two of the four Engineering Quadrangle buildings built between 1915 and 1928 will be preserved in place. Today those buildings are known as Buildings 31-C and 31-D. During the plan design process the University of Hawai'i, Office of Capitol Improvements met with SHPD and HHF to determine the best course of action regarding the four remaining Engineering Quadrangle buildings and the Campus Center Renovation and Expansion project. This alternative meets the Universities programmatic needs by improving the relationship of the new building to the Campus Center plaza to the south, while improving the historic context of the remaining Engineering Quadrangle buildings in relation to the overall campus. Both SHPD and HHF support this alternative.

During discussions with SHPD, the University of Hawai'i proposed a series of 12 mitigation commitments to offset the adverse effect on the historic properties. The mitigation measures will include a Historic American Buildings Survey (HABS) of the Engineering Quadrangle complex, the two buildings scheduled for removal as well as a Historic Building Survey for the entire campus. In addition, SHPD, HHF and other interested parties will be included in the design process to insure the historic quadrangle building are not treated as secondary features, but integrated with the Campus Center. A description of the mitigation measures as well coordination documentation from HHF and SHPD are included in Appendix E.

CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI'I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

4.1.2 Archaeological Resources

The Campus Center Renovation and Expansion project will include the construction of a new Recreation Center addition to the northeast of the existing Campus Center Building. It also includes renovation to the southwest of the existing Campus Center. Both of these areas have been extensively disturbed. In May 2008, Cultural Surveys Hawai'i, Inc. (CSH) completed *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*. The closest historic property documented near the project site is identified as State Inventory of Historic Place (SIHP) No. 50-80-14-4191. According to CSH, this site is a traditional-style, presumably pre-Contact-era burial discovered during construction activities near Keller Hall. According to Figure 43 of the CSH report, SIHP No. 50-80-14-4191 is located mauka of Keller Hall on the McCarthy Mall-side of the building.

Potential Impacts and Mitigation Measures

Hawai'i Revised Statutes Section 6E-8 mandates the review of proposed state projects on historic sites by the SHPD. During the pre-consultation process, the SHPD wrote that its Chapter 6E-8 HRS determination is pending ongoing design development. The University of Hawai'i will continue to coordinate with SHPD during the design of the proposed project. Please note that higher priority will be placed on addressing those areas of design concern raised in the course of the SHPD review, and secondarily, conformity with the "major themes" as discussed in the 2007 LRDP Update.

According to CSH, "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."

The University does not anticipate any adverse impact to archeological resources as a result of construction. Based on the extensive landscaping modifications, grubbing and grading activities, and the lack of any archaeological evidence in the vicinity, it is unlikely that the proposed Campus Center Renovation and Expansion will have an adverse impact on any significant archaeological features. The remaining renovations in Hemenway Hall and Campus Center will occur entirely within the existing building structure and should not impact any archaeological deposits. However, should the inadvertent discovery of significant cultural materials and/or burials occur during construction, all work in the immediate area of the find must cease and the SHPD shall be notified. In addition, a program of precautionary monitoring will be provided to SHPD for construction conducted outside of any existing building's footprint.

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4.1.3 Cultural Resources

The project site involves six buildings, walkways and landscaped areas, and does not appear to provide any resources of use or interest to native Hawaiian cultural practitioners, such as food gathering, shelter, tool or weapon making, kapa-making, traditional medicines, lei making, etc.

Potential Impacts and Mitigation Measures

Due to the extensive excavation activities proposed within the location of new Recreation Center, cultural artifacts or burial sites may be encountered. In accordance with Section 6E-46.6, HRS, and Chapter 13-300, Hawai'i Administrative Rules (HAR), should any significant cultural deposits or human skeletal remains be encountered during project construction, work shall stop in the immediate vicinity, and SHPD shall be contacted.

Based on historical research, it is reasonable to conclude that, pursuant to Act 50, the exercise of Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities within the project parcels will not be affected and there will be no direct adverse effect upon cultural practices or beliefs.

4.2 HAZARDOUS MATERIALS

High levels of Chlordane, a pesticide, are known to exist in the soil on the Mānoa campus. The maximum concentration of chlordane detected in soil on campus was 25 mg/kg. It was found in one area near Hamilton Library. The State of Hawai'i, Department of Health's Environmental Action Level (EAL) for Chlordane in soil is 16mg/kg. The concentrations from samples collected from all other locations surveyed have been below the EAL. Without adequate control, this pesticide may pose a risk to workers and/or the general public during demolition. Additionally, areas that will be graded or left as open ground will require control to minimize exposure.

The Campus Center was constructed around 1973. The buildings in the Engineering Quad were constructed between 1912 and 1928. Hemenway Hall was constructed in 1939. Miller Hall Annex was constructed in 1948. The age of the PEACESAT portable is unknown. Due to the age of these structures, hazardous materials, including, but not limited to asbestos, lead-based paint, polychlorinated biphenyls (PCBs), creosote and arsenic are likely to be found throughout the buildings. Without adequate control, renovation and demolition activities may release these hazardous materials to the environment.

Tenant organizations scheduled for relocation or temporary displacement may utilize or generate hazardous material and or waste in association with their day to day operations. Without adequate control, these materials/wastes may pose a risk to workers and/or the general public.

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Potential Impacts

It is expected that hazardous material will be encountered during construction, demolition and or renovation of buildings within the project area. Hazardous materials are likely to be encountered in soil below ground surface (bgs), within the physical structure of the impacted facilities, and as part of the physical property of individual tenant organizations.

Mitigation Measures

Pesticide Exposure Mitigation:

A base-line soil sampling survey will be conducted in building demolition areas and for any areas that will be graded or left as open ground within 3-5 feet of an existing building's foundation that workers and later students may potentially be exposed to contaminated soil. If Chlordane is detected in during the baseline survey, a chlordane workplan may be required by the Environmental Health and Safety Office, Environmental Compliance Program.

Hazardous Building Material Mitigation:

Since 2002, the guiding principle of the University of Hawai'i is sustainability – living in ways that meet the campus' present needs without limiting the potential of future generations to meet their needs. The UH LRDP 2007 Update has instituted a framework of sustainability guidelines as the basis to develop, evaluate and communicate the integration of sustainability in the development and operation of the UH Mānoa Campus. Prior to demolition, renovation, or removal of a structure within the project area, a survey will be conducted to determine the hazardous building materials present. Based on quantitative data, building materials will be characterized for disposal disposition based on hazard characteristics, and recyclability. A plan for the safe removal of hazardous materials in the building will be developed prior to the removal of existing building materials. Whenever possible, non-hazardous construction debris will be diverted from disposal through re-use within the project and/or recycling.

Hazardous Material/Waste Mitigation:

A hazardous materials inventory and survey will be conducted in all areas occupied by tenant organizations scheduled for displacement or relocation. A plan for the safe relocation of hazardous materials and disposal of hazardous waste will be developed before any demolition, removal or renovation activities occur. Hazardous waste will only be moved to an approved 90-day accumulation point, or a permitted treatment storage or disposal facility (TSDF). It will not be transferred to tenant organizations' new locations.

4.3 ROADWAYS AND TRAFFIC

As part of the University of Hawai'i at Mānoa Long Range Development Plan 2007 Update (LRDP Update) process, Austin, Tsutsumi & Associates, Inc. (ATA) completed a Traffic Impact Analysis report (TIAR) in October 2007. Also in conjunction with the LRDP update, a consultant, Parking Planners, conducted a Parking Supply/Demand Study and Site Alternatives Evaluation. As part of the overall LRDP Update document,

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both reports were accepted by the University of Hawai'i Board of Regents in November 2007. The TIAR included an assessment of traffic from the proposed project. Relative to the TIAR, two proposed parking structures were deemed the only part of the LRDP Update that will significantly alter traffic operations along the roadways within the area. This was attributed to the fact that traffic projections for universities are generally based upon student enrollment, which is not projected to increase.

Streets Surrounding the Mānoa Campus

The roadway network in the vicinity of the campus includes:

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 lanes. South of the H-1 Freeway, the roadway narrows to four lanes with channelization. In addition to UHM, this roadway serves as one of two primary access roads into Mānoa 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.

East-West Road is a two-lane UHM campus road that provides access from Dole Street into the UHM's Central Campus.

Lower Campus Road is a three-lane UHM campus road that provides access from Dole Street into the UHM's Lower Campus (and athletic complex) and connects Lower Campus Road, the H-1 Freeway off-ramp, Varsity Place and Old Wai'alaie Road.

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.

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 (blocked off with bollards) inaccessible to vehicles from University Avenue.

Maile Way is a two-lane, two-way east-west minor collector road that begins at its intersection with O'ahu Avenue, provides vehicular access along the mauka side of the campus from University Avenue through UHM's Central Campus, and terminates at its intersection with East-West Road.

TheBus

TheBus, which is the public transportation service provided by the City and County of Honolulu, provides various bus routes to and from the Mānoa Campus. These routes include:

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Route A – Express bus service connecting the campus with Waipahu, and several points in-between, including Pearl City, Aloha Stadium, Kalihi Transit Center, Liliha, Downtown, and Ala Moana Shopping Center.

Route F2 – Express bus service connecting the campus with Aloha Tower, allowing riders to utilize TheBoat, a ferry service connecting Aloha Tower with Kapolei (Kalaehoa Barbers Point Harbor).

Route 4 – A bus service that connects Nu‘uanu Valley, Downtown, Punchbowl, Makiki, the Mānoa Campus, Kapahulu, Waikīkī and the Honolulu Zoo.

Route 6 – A bus service that connects Nu‘uanu Valley, Downtown, Ward Center, Ala Moana Shopping Center, Mō‘ili‘ili, the Mānoa Campus, and Mānoa.

Route 18 – A bus service that connects the Ala Moana, Makiki, the Mānoa Campus, and Kaimukī.

Route 85A – Express bus service connecting the campus with Kāne‘ohe, and several points in-between, including Makiki, Downtown, and Kamehameha Shopping Center.

While a one-way fare is \$2.00, monthly and annual adult passes offering unlimited rides are available for \$40/month or \$440/year respectively. TheBus offers the U-Pass at \$100 per semester to UHM students.

Effective July 1, 2007, as the result of legislative action, the University has implemented a Pre-Tax Bus Pass option for University employees. This program is authorized under Section 132(f) of the Internal Revenue Code, known as the Transportation Equity Act for the 21st Century. Eligible University employees living and working on the island of O‘ahu will be given the opportunity to purchase monthly bus passes through payroll deduction, on a pre-tax basis, thereby saving on FICA, Federal and State income taxes.

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Honolulu High-Capacity Transit Corridor Project

The City and County of Honolulu is planning for a high-capacity transit corridor project between Kapolei and the University of Hawai'i at Mānoa. The Honolulu High-Capacity Transit Corridor Project (HHCTCP) has evaluated transit alternatives for the 23-mile long corridor between Kapolei and UH Mānoa. On December 22, 2006, the City Council adopted Bill 79 (2006), CD2, FD2 (Ordinance 07-001) which selected the fixed guideway alternative as the Locally Preferred Alternative (LPA). The LPA eventually would include a route between Kapolei and the University of Hawai'i at Mānoa, starting at or near the intersection of Kapolei Parkway and Kalaeloa Boulevard, and would continue to UH Mānoa along Kapi'olani Boulevard. The City and County of Honolulu is undertaking preliminary engineering and, as of this writing, in the process of releasing the draft environmental impact statement for public review.

According to the HHCTCP website (<http://www.honolulutransit.org/overview>), the City and County of Honolulu Department of Transportation Services (DTS) is studying how to improve the ability of people to move in the highly congested east-west corridor between Kapolei and the University of Hawai'i at Mānoa. According to DTS, over sixty percent of O'ahu's population currently lives within the area served by this corridor, and this area is projected to continue to grow faster than the rest of O'ahu.

On-Campus Shuttle

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 provide a mode of transportation throughout the campus during the fall and spring semesters, with various routes offered during the day and evening hours. The daylight hour routes are extensive and some routes extend into Mānoa Valley, providing service to the faculty housing in the Valley and Upper Campus, Wa'ahila Faculty Housing and into Mō'ili'ili. The route that includes Mō'ili'ili serves to supplement TheBus routes that do not quite reach the Mānoa Campus.

The evening hour service serves the student housing overlooking the Makai Campus and is especially important for the security of students, faculty and staff. Modified routes and schedules operate during semester breaks. The on-campus shuttle would provide students with access to the proposed Recreation Center and other facilities that will be housed at the Campus Center as a result of this project.

Carpooling

While carpooling has long been an option for commuters, regardless of the destination, the State also offers an organized carpooling program, called Vanpool Hawai'i. A vanpool is a group of 7 to 15 people who share the commute to and from work in a Vanpool Hawai'i van. The most successful vanpool programs are ones that have commuters who live and work (or study) in the same geographical area and have similar

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work/school schedules. Vanpool riders also have the additional benefit of using HOV and Zipper Lanes (rules recently revised to require three or more passengers per vehicle to utilize Zipper Lanes).

Leeward Oahu Transportation Management Association (LOTMA)

LOTMA, a non-profit organization, serves as a transportation resource center and provides ridesharing information and assistance as a free, public service to the community. LOTMA's programs and services are designed to accommodate the growing travel needs of the region, alleviate traffic congestion, and to improve the overall mobility of Leeward and Central O'ahu's residents, labor force, and the general public. As an advocate for the region's mobility needs, the organization also functions as a vital mechanism to improve communication and cooperation between public and private sectors and facilitate the development and implementation of new and/or improved transportation services

As Hawai'i's first transportation management association, LOTMA represents a unified commitment of eleven public and private landowners and developers to accommodate the increasing mobility needs of 'Ewa and Central O'ahu, alleviate problems of traffic congestion, air pollution and fuel consumption, and improve overall quality of life on O'ahu. LOTMA's mission is to advocate, develop and implement, in cooperation with government and the community, a coherent program aimed at improving mobility in the Leeward and Central regions of O'ahu; and to promote and facilitate the development and use of alternative transportation opportunities that will maximize the use of existing and proposed transportation systems in the Leeward/Central region.

Existing Traffic

The hourly turning movement data utilized in TIAR 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. Based on traffic count data, ATA determined that the peak hours of traffic were from 6:45 AM to 7:45 AM and 4:30 PM to 5:30 PM on weekdays.

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 the TIAR.

According to the TIAR, 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:

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- South King Street;
- Beretania Street; and
- 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 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.

Analysis of Intersections

ATA analyzed several intersections, including, but not limited to the following:

University Avenue/Dole Street - Due to the fact that this intersection serves as a junction point between Mānoa Valley residents accessing the H-1 Freeway and cars accessing the Quarry Parking Lot and Central Campus, congestion occurs at this intersection. 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 1,000 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 Institute, the University Laboratory School, Mānoa Valley, Maile Way, Mō‘ili‘ili, and u-turns towards the south. As these vehicles exit the H-1 Freeway off-ramp, 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-

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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/Metcalf Street - Vehicles generally flow smoothly through this intersection.

University Avenue/Maile Way - Although analysis indicates that this intersection operates at LOS B_d 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 Ka'ala Street, which incidentally provides access to the Mid-Pacific Institute. No channelized lanes are currently provided at this intersection.

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 arounds 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.

Existing Level of Service (LOS) at Representative Intersections

Table 4-1 provides a summary of the existing level of service of the above intersections as observed in the TIAR.

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**Table 4-1
Existing Traffic Level of Service (LOS) at Representative Intersections**

INTERSECTION	LOS – AM	LOS - PM
University Avenue/Dole Street	E	F
University Avenue/Maile Way	B	B
University Avenue/Metcalf Street	A	A
Dole Street/Lower Campus Road	A	F
Dole Street/East-West Road	B	B

The TIAR also notes that currently observed heavy regional traffic at the intersections of South King Street/Beretania Street and University Avenue, Wilder Avenue and Dole Street, Wai‘alae Avenue and St. Louis Heights Drive, and University Avenue and Varsity Place. At the intersection of Dole Street and Lower Campus Road, heavy traffic occurs during the PM Peak hour, with lighter traffic during the AM Peak Hour. Also, the TIAR found the intersections of University Avenue and Maile Way, and Dole Street and East-West Road to operate at acceptable levels.

Potential Impacts and Mitigation Measures

The analysis of traffic impacts must take into account the underlying traffic that would occur in the projected year, without the proposed project. 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 to existing hourly vehicular traffic volumes.

Traffic Projections without the Proposed Project

The State Department of Transportation (SDOT) performs 24-hour traffic counts annually at various locations on O‘ahu. Based on this data, it was possible to estimate the prevailing regional growth along King Street and Wai‘alae 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. Not factored into the projections were the possible impacts of fuel prices and the implementation of the Honolulu High-Capacity Transit Corridor (HHCTC) (rail transit) may have on reducing vehicle trips.

Projected LOS Without the Proposed Project

Table 4-2 provides a summary of the projected traffic level of service in the Year 2017 at representative intersections.

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**Table 4-2
Comparison of Existing and Base Year 2017 LOS at Representative Intersections**

INTERSECTION	EXISTING LOS – AM	EXISTING LOS - PM	YEAR 2017 LOS – AM	YEAR 2017 LOS - PM
University Avenue/Dole Street	E	F	E	F
University Avenue/Maile Way	B	B	B	B
University Avenue/Metcalf Street	A	A	A	A
Dole Street/Lower Campus Road	A	F	A	F
Dole Street/East-West Road	B	B	B	B

Regional Future Traffic and Intersections Requiring Mitigation Measures.

Based on the defacto growth rate, regional traffic will increase along King Street, Wai‘alae 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 - (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 mitigation is proposed.

While mitigation is proposed to address the above intersections with asterisks after them, the remaining intersections will be discussed below.

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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.

Wai'alaie 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.

Specific Mitigation Measures for Future Traffic

As shown in Table 4-2, there is very little difference between existing LOS and the projected LOS. However, ATA recommends a number of mitigation measures (in two phases), as described below.

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 lane storage extending approximately 100 feet east of the University Avenue/Lower Campus Road intersection. This mitigation measure may 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 experience 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-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.

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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 hour periods. It should be noted that at the Dole Street/Lower Campus Road intersection, the lane modification would reduce the number of lanes that drivers need to cross to enter the Lower Campus Road, thereby reducing capacity reductions caused by weaving movements.

ATA recommends that Phases I and II be implemented as a mitigation 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 proposed rail transit system will ultimately reduce future vehicular traffic demand.

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 an 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

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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, ATA recommends 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 mitigation 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, ATA recommends that a traffic signal be installed to facilitate this movement. In conjunction with this, ATA recommends 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 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 St. 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). ATA recommends 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.

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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 1,000 feet or less of each other. Therefore, in order to facilitate flow between these intersections, ATA recommends 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

Projected LOS With Mitigation Measures

Table 4-3 provides a summary of the projected traffic level of service after proposed mitigation measures in the Year 2017 at representative intersections.

**Table 4-3
Comparison of Existing and Year 2017 LOS (With and Without Mitigation Measures) at
Representative Intersections**

INTERSECTION	EXISTING LOS – AM	EXISTING LOS - PM	YEAR 2017 w/o MITIGATION LOS – AM	YEAR 2017 w/o MITIGATION LOS - PM	YEAR 2017 w/ MITIGATION LOS – AM	YEAR 2017 w/ MITIGATION LOS - PM
University Avenue/ Dole Street	E	F	E	F	D	D
University Avenue/ Maile Way	B	B	B	B	C	A
University Avenue/ Metcalf Street	A	A	A	A	A	B
Dole Street/Lower Campus Road	A	F	A	F	A	B
Dole Street/East- West Road	B	B	B	B	B	B

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Traffic Impacts Associated with Implementation of the Proposed Project and the Rest of the Updated LRDP

The University is viewed as a special development area. As such, parking requirements on campus are looked at as a total rather than directly applied to individual buildings. While the LRDP Update 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 implementation of the updated LRDP, including the proposed project, 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. No improvements beyond those recommended in Base Year 2017 Mitigative Measures are recommended. Improvements at the Old Wai‘alae Road Entrance/Exit and at the Varsity Place were investigated by ATA, and are generally not recommended.

No additional onsite parking for the Campus Center Renovation and Expansion will be included as part of the project. Parking associated with the project is accommodated within the overall campus parking system. Currently, there are several parking areas near Varsity Circle and along Campus Road. However, the University intends for the Campus Center Complex (which includes Hemenway Hall) to be part of a larger pedestrian plaza area that eventually will be completely void of vehicular traffic. The overall plan in the LRDP update, and thus affecting the Campus Center Complex is to centralize parking into the existing and proposed new structures while eliminate parking along several roadways within the campus boundaries. This will result in a net gain of onsite parking spaces. In addition, centralizing parking will eliminate the need for travelers to drive from street to street, both on and off campus looking for individual parking stalls.

4.4 NOISE

The Campus Center Renovation and Expansion project will produce increased noise levels both during construction and also during operation of the new Recreation Center. The nearest public school that may be impacted by noise generated as a result of this project is the University Laboratory School (less than 2,000 feet away from the Campus Center Area).

4.4.1 Construction Noise

Potential Impacts and Mitigation Measures

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Construction activities for the Campus Center Renovation and Expansion will inevitably create temporary noise impacts. The building contractor may employ mitigation measures to minimize those temporary noise impacts including the use of mufflers and implementing construction curfew periods. Pursuant to Chapter 11-46, Hawai‘i Administrative Rules, all project activities must comply with all community noise controls. The Mānoa Campus was not constructed all at once, it gradually developed. As each building was constructed, classes in the surrounding buildings presumably experienced the temporary inconvenience of louder construction noise during some classes. It is assumed that most students and instructors adapted to these temporary inconveniences. The closest elementary school is the University Laboratory School but buildings of the UH School of Education and Sinclair Library will effectively attenuate noise from the construction site. Probably more distracting noise sources for the University Laboratory School elementary school students are other students within the School as well as traffic along Metcalf Street and University Avenue.

4.4.2 Operation Noise

The existing noise levels at and immediately adjacent to the proposed site mimic those typical of a campus with relatively longer periods of quiet, with periods of noise when students are changing classes.

Potential Impacts and Mitigation Measures

The Campus Center Renovation and Expansion, Recreation Center addition will increase the noise generated within the general Campus Center Area. Noise will be generated from three different types of source sources. One substantial noise generator is the need for a chilled water system to serve the Recreation Center. The facility will require a 200-ton water-cooled chiller, cooling tower, and pumps located in a new mechanical plant. As a method of reducing noise, the existing Campus Center chiller will be replaced with a larger capacity system housed within the current chiller room. As an added benefit, modifying the existing system will result in improved energy efficiency; and reduced construction and long-term maintenance costs. The second noise-generating source is rotating or reciprocating equipment; and active piping or ducting. To reduce the noise impact, spring support and isolation systems will be utilized. In addition, with the exception of emergency generator equipment, reciprocating equipment will not be utilized in the Recreation Center.

The Recreation Center is being designed with a 900-person capacity. The increase in people both in and around the Campus Center will contribute to the increase in noise. To provide adequate insulation of noise generated within both the Recreation Center and the other renovation sites, acoustical insulation will be utilized in the walls and ceiling spaces to control noise transmission in both the new and renovated spaces. The Campus Center is currently the heart of campus. As such, noise generated by people outside the new or renovated facilities is not expected to significantly increase ambient outdoor noise levels around surrounding buildings.

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The new tenants of the proposed Hemenway Hall Theater renovation are currently located in the Engineering Quadrangle buildings. Once in operation, the Hemenway Hall renovation will generate noise consistent with current operational noise levels of the existing tenants in the Engineering Quadrangle buildings. No mitigation measures are proposed as the noise generated as a result of the renovation represents no substantial change from current noise occurrences and will not impact the University Laboratory School.

4.5 AIR QUALITY

The State's good air quality is largely a function of the predominant tradewinds blowing from the northeast. The typical tradewind pattern blows man-made and volcanic pollutants out from metro Honolulu toward the ocean. However, during non-tradewind periods, both anthropogenic and volcanic pollutants tend to accumulate on island impacting both visibility and air quality (increase in SO_x and particulates). Since 2002, the guiding principle of the University of Hawai'i has been sustainability, with a goal to meet the campus' present needs without limiting the potential of future generations to meet their needs. The UH LRDP 2007 Update has instituted a framework of sustainability guidelines as the basis to develop, evaluate and communicate the integration of sustainability in the development and operation of the UH Mānoa Campus.

4.5.1 Indoor Air Quality

The proposed Recreation Center addition will increase the indoor space available for occupation by approximately 56,000 SF. The addition will include facilities for indoor intramural sports, cardio-vascular exercise, strength training, multi-purpose exercise rooms, indoor jogging, and indoor basketball. These activities will affect the quality of indoor air. The renovation of both the existing Campus Center facilities and Hemenway Hall Theater will require the installation of new materials that may impact indoor air quality within these structures.

Potential Impacts and Mitigation Measures

The Sustainability Guidelines from the LRDP state:

All development should encourage a healthy living environment both indoors and outside. EPA reports that the air in new buildings can be ten times more polluted than outdoor air. Poor indoor air quality is caused partly by the off-gassing of chemicals found in many synthetic building materials. It is also caused by mold and mildew that build up in poorly designed and maintained heating and cooling systems. This problem is minimized with natural ventilation.

In an effort to achieve LEED certification at the silver level, the proposed project will incorporate the following LEED Indoor Quality criteria and strategies

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- Design ventilations systems to meet or exceed the minimum outdoor air ventilation rates as described by Ventilation for Acceptable Indoor Air Quality standards.
- Minimize exposure of building occupants, indoor surfaces and ventilation air distribution systems to Environmental Tobacco Smoke (ETS) by prohibiting smoking in buildings and locating any exterior designated smoking areas at least 25 feet away from entries, outdoor air intakes and operable windows.
- Provide capacity for ventilation system monitoring to help sustain occupant comfort and well-being.
- Use paints, adhesives, carpets, that have low volatile organic compounds (VOCs).
- Use no-added formaldehyde insulation or wood products.

In addition, to ensure optimal energy conservation, the indoor air quality will be monitored and the amount of outside air entering the building will be regulated according to the air quality. During the design process, re-installment of large trees on the upwind (north side) of the Recreation Center will be considered as a means of providing a larger reservoir of cool air, as well as mitigating the “heat-island effect” of a large added structure.

4.5.2 Outdoor Air Quality

Potential Impacts and Mitigation Measures

The University recognizes the potential for impacts to air quality during construction. This could occur from additional traffic generated by construction vehicles, machinery, and dust generated during construction.

An effective dust control plan will be implemented as necessary. All construction activities will comply with the provisions of Title 11, Chapter 59, HAR related to Ambient Air Quality Standards and Section 11-60.1-33, HAR related to Fugitive Dust. Measures to control dust during various phases of construction include:

- Providing an adequate water source at the site prior to start-up construction activities;
- Irrigating the construction site during periods of drought or high winds;
- Landscaping and rapid covering of bare areas, including slopes, starting from the initial grading phase;
- Disturbing only the areas of construction that are in the immediate zone of construction to limit the amount of time that the areas will be subject to erosion;
- Providing adequate dust control measures during weekends, after hours, and before daily start-up of construction activities; and
- Installing silt screening in the areas of disturbance.

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As previously noted, the UH LRDP 2007 Update has instituted a framework of sustainability guidelines as the basis to develop, evaluate and communicate the integration of sustainability in the development and operation of the UH Mānoa Campus.

4.6 VISUAL RESOURCES

The proposed building renovation is located in the middle of the University campus surrounded by buildings similar in height and mass. The City and County of Honolulu’s Primary Urban Center Development Plan does not recognize any view planes encompassing the project site that requires consideration and accommodation.

The 3-story Campus Center is located in the middle of campus surrounded by buildings of mixed height and mass. The existing structures adjacent to the project area are the Andrews Amphitheater, Art Building (3-stories), Administrative Service Buildings 1 and 2 (1-story each), Bachman Annex (1-story), Dean Hall (2-stories), Krauss Annex 1 and 2 (1-story), Kuykendall Hall (4-stories), Miller Hall (3-stories), and Varney Circle. The City and County of Honolulu’s Primary Urban Center Development Plan does not recognize any view planes encompassing the construction site that require consideration and accommodation.

Potential Impacts and Mitigation Measures

The dense nature of the University campus and the proposed addition is expected to be compatible with mass and height of surrounding buildings will not induce adverse impacts to any recognized view planes. From University Avenue (west of the site), the Recreation Center will likely to remain mostly obscured from view due to existing trees along Campus Road as well as by several existing buildings. The new facility will be highly visible from Campus Road and Miller Hall to the north; the remaining Engineering Quadrangle buildings to the south; and the Art building, Building 37, and Kuykendall Hall to the east. The University’s own design review process will help ensure that the proposed renovation and expansion are architecturally compatible with surrounding structures. Because no visually adverse impacts are expected, no additional mitigation measures are proposed.

4.7 SOCIAL & ECONOMIC CHARACTERISTICS

According to the 2000 Census, the population of City and County of Honolulu numbered 876,156 individuals. The most recent American Community Survey conducted for City and County in 2006 by the Census Bureau accounted for 909,863 residents, representing a 4% increase in population. Approximately 19% of the City and County residents have obtained a bachelor’s degree or higher. Approximately 65% of the City and County residents actively participate in the workforce, with the median household income reported at \$51,914 per year.

Honolulu is the State’s center of commerce and industry. In addition, it is the most densely populated urban area both on O’ahu and in the state. According to the American

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Community Survey of 2006, City and County of Honolulu residents are slightly older, more likely to have a college degree and a higher per capita income than residents of Hawai'i's other Counties. The proposed project site is located within the County Administrative District V, which includes Kapahulu, Kaimukī, Pālolo Valley, St. Louis Heights, Mānoa, Mō'ili'ili, McCully, Kaka'ako, Ala Moana and Makiki neighborhoods. These neighborhoods are largely residential with housing types ranging from single-family dwellings, to low, mid- and high-rise multi-family dwellings. Institutional uses are scattered throughout these neighborhoods, with the University of Hawai'i, being the most dominant institutional use in the vicinity. Small commercial nodes service the neighborhoods, predominantly along arterial and collector streets.

Based on usage of services and facilities (food services, meeting rooms, etc.), the Campus Center Complex (comprised of Hemenway Hall and Campus Center buildings) is currently utilized between 8,000 and 10,000 times per day. Daytime usage is currently limited by current hours of operation and the number of facilities available. The Makai Campus intramural program utilization of existing facilities is based on league and recreation play, and varies based on the sport season. During the 2008 fiscal year, there were 21,275 participants utilizing the facilities for pick-up activities, which is equivalent to approximately 58 users per day. League play is conducted during the traditional school year only. During the last academic school year, 2007-2008, 1,931 individuals participated in league play. Each individual used the facilities numerous time during league play, based on the schedule. The Intramural program is currently limited in part due to the shared use of facilities with the Athletics and Kinesiology departments. The Intramural Program does not have access to any facilities during the day.

Potential Impacts and Mitigation Measures

In 2001, KYADG conducted a series of seven focus group sessions to determine what activities and services the campus population would like to have available at the Campus Center that are not currently provided. In addition, an online survey was conducted to determine the essential requirements of the campus center constituency.

The components of the Campus Center Renovation and Expansion project were designed based on usage data, and information generated during surveys and focus group sessions. Components were also chosen based on the University's desire to revitalize the heart of the campus.

The proposed Recreation Center will augment the existing intramural program by providing a daytime and after-hours location for patrons to exercise and recreate. In addition, the new facilities will provide facilities for individuals wishing to participate in open-gym and pick-up games during both day and evening hours. It is estimated that the Campus Center Renovation and Expansion project will increase daytime evening usage of the Campus Center Complex by 10-15% and 100% respectively.

In addition to augmenting the existing Intramural program by providing centralized facilities for pick-up activities during both day and evening hours, the proposed project

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will enhance recreational opportunities at the University of Hawai'i. The Campus Center Renovation and Expansion project will serve to modernize the heart of campus through the consolidation of recreation and leisure activities in a centralized location. As the Mānoa Campus is often criticized as being a “commuter campus,” the proposed project will enhance student “life” and activity around the Campus Center. The proposed project will provide additional eateries, study, meeting and lounge spaces with technology access, as well as the recreation facility designed for a variety of individual and group activities. This will help to modernize the campus, as well as help attract students from Hawai'i, mainland United States and international students that plan to reside in UHM student housing. The University serves as an important economic driver for the local neighborhoods where students, faculty and administration staff utilize retail and commercial services. Because the renovation and expansion project will supplement an existing facility, it is not expected to increase the number of O'ahu's residents. The scope of the construction project will contribute positively to the construction industry and the expanded facilities, including retail shops and recreation center, may contribute more jobs for UH students and/or O'ahu residents.

4.8 INFRASTRUCTURE AND UTILITIES

4.8.1 Potable Water System

The existing Mānoa Campus is served by the City's Board of Water Supply (BWS) system. In October 2007, Austin Tsutsumi & Associates, Inc. (ATA) prepared a report entitled: Utility Systems Report, University of Hawai'i at Mānoa, Long Range Development Plan 2007 Update, (Category I), Mānoa, Honolulu, Hawai'i. ATA reported that 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. Water for the Campus Center area is currently supplied by the existing Board of Water Supply (BWS) 4-inch waterline that runs north-south between the Campus Center and the Engineering Quadrangle.

Potential Impacts and Mitigation:

ATA reported that since the last LRDP, some of the water lines that were inadequate for fire flow have been improved. One of the areas where deficiencies were improved was Hemenway Hall. The Campus Center area continues to have water distribution deficiencies due to fire hydrant spacing not meeting standards, thereby, reducing fire protection coverage. The proposed project will include the installation of the necessary fire hydrants and ensure adequate flow necessary to meet current fire protection requirements. A new 6-inch tap will be made to the existing 8-inch waterline located at the southeast side of the proposed building to service the fire protection system.

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The proposed project will increase water consumption due the addition of 11 showers, 13 sinks, 16 toilets/urinals, and two 60-pound washing machines in the new Recreation Center. During the pre-consultation process, the City and County of Honolulu Board of Water Supply indicated that waterlines in the vicinity of the project site have adequate capacity and adequate pressures to accommodate the Campus Center Renovation and Expansion's domestic and fire protection water demands.

The location of the existing BWS waterline is within the design footprint of the proposed Recreation Center. To ensure future access to this water main, it will be relocated outside of the proposed building footprint to the east.

Domestic water quality will be compromised if controls to prevent backflow and cross-connection to non-potable water supplies are inadequate. The maximum peak flow capacity of the proposed water lines is 160 gallons per minute (gpm). As part of the Campus Center Renovation and Expansion, backflow and cross-connection prevention requirements will be met prior to building occupancy to ensure water quality is not compromised. In addition, a pressure-reducing valve will be provided to reduce the supply pressure upon entrance into the building(s).

The design of the proposed water system modification shall comply with the *Water System Standards*, Board of Water Supply, City & County of Honolulu, dated 2002; the *Uniform Plumbing Code*, 1997 Edition, as copyrighted and published by the International Association of Plumbing and Mechanical Officials Uniform Plumbing Code; Department of Health, Title 11, Chapter 11, Sanitation; and the ADA Compliance Guidebook.

Water Usage

According to The Long Range Development Plan University Of Hawai'i , Mānoa Campus 2007 Update, Draft Environmental Assessment/ Plan Review Use (LRDP 07DEA/PRU),

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

While the Water Management Plan is still in development, it is programmed to be developed as part of 2007 LRDP process. In October 2008, the University of Hawai'i at Mānoa Facilities Management released its *University of Hawai'i at Mānoa Energy Strategy 2008-2015* report (ES08-15). One of the goals of this strategy is water self-sufficiency by 2050. The Campus Center Renovation and Expansion is being designed to meet the water reduction goals of the LRDP and the Energy Strategy 2008-2015.

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Mitigation

Landscape and Irrigation – According to the 2007 Utilities System Report developed by ATA water from the Makai Campus Quarry could provide an onsite source of irrigation water for the Mānoa Campus. Use of this onsite water resource would reduce the University’s overall requirement for potable water from the Board of Water Supply sources. In addition, modifying landscape choices utilizing native and xeric plants can substantially reduce or eliminate irrigation requirements. The irrigation control should also be high-efficiency and/or climate-based. Self-adjusting rain sensors should also be installed.

Low-flow plumbing fixtures – The University is currently undergoing campus-wide renovation project that includes the replace of existing fixtures with low-flow fixtures. In addition, all new buildings should be constructed with low-flow fixtures.

Education – The University currently conducts research, curriculum development and community service projects aimed at water conservation. These will continue through the LRDP.

Monitoring

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.

4.8.2 Wastewater System

The Campus Center, Engineering Quadrangle and Hemenway Hall sanitary sewage system are connected the municipal system via a 60-inch sewer tunnel on Dole Street. The existing sanitary sewer lines on the Mānoa Campus have no known problems.

Potential Impacts and Mitigation Measures

The LRDP 07DEA/PRU states:

...there are three areas with potential capacity problems on or near campus, Dual sewer lines mauka of the Agricultural Engineering Building, Metcalf Street, University Avenue near King Street... the dual 24 inch sewer lines may be near capacity,

The Recreation Center expansion will increase the current effluent as a result of the installation of 11 showers, 13 sinks, 16 toilets/urinals, and two 60-pound washing machines. The fixtures installed will incorporate water conservation devices such as flow restrictors. Wherever possible, installed equipment will incorporate water conservation

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design elements. The sewer system appears to be adequate to accommodate the needs of the renovated building. However, a sewer connection application is required with the Department of Planning and Permitting, Wastewater Branch, to determine adequacy of existing sewer lines. In addition, conservation efforts will reduce sewage effluent from buildings Campus Center Renovation and Addition. Since many of the students who will be users of the proposed facility either reside on campus and/or utilize existing recreational facilities on the Makai Campus, some of the wastewater generated at the proposed Recreation Center is already being collected and treated by the municipal wastewater system.

4.8.3 Drainage System

The proposed Recreation Center Addition site will encompass impervious surface areas associated with the rooftops of the Engineering Quadrangle, sidewalks, and pervious surface areas associated with landscaping, and portable structures. Although Miller Annex and the PEACESAT portables have impervious rooftops, the structure design allows storm water to collect (and infiltrate) under the buildings. There will be a net increase in storm water runoff generated due to an increase in impervious surface area, a result of the removal of Miller Annex, the PEACESAT building, and the landscaping between the Engineering Quadrangle, Miller Annex and PEACESAT buildings.

Potential Impacts and Mitigation Measures

Storm water runoff has the potential to increase the non-point source pollutant load into Mānoa Stream, the Ala Wai Canal/Harbor, and eventually the Pacific Ocean. The Mānoa Stream, the Ala Wai Canal/Harbor have been listed as impaired for the following pollutants by the Hawai'i State Department of Health's, *2006 State of Hawai'i Water Quality Monitoring and Assessment Report*, as approved by US Environmental Protection Agency, Region 9, February 7, 2008.

Table 4-4
Impaired Water Bodies Potentially Impacted by Activities at UH Mānoa Campus

Name of Water Body	Contaminants detected in Water Samples
Mānoa Stream	Nutrients, turbidity, dieldrin, total chlordane
Ala Wai Canal and Harbor	Chlorophyll a, nitrogen, total P, turbidity, fecal coliform, enterococci, metals, suspended solids, organochlorine, pesticides, lead

While Total Maximum Daily Load (TMDL)s have only been established for nutrient loadings (nitrogen 200 ug/L, phosphorus 25 ug/L) for the Ala Wai Canal, no TMDLs have been established for Mānoa Stream. Establishment of TMDLs for the remainder of the pollutants in the Ala Wai and Mānoa Streams has not been scheduled. Additionally, the remaining pollutants have been given a TMDL development priority code of "low."

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While contaminants such as chlordane have been detected in samples from Mānoa Stream, the source is not known, as use was widespread throughout the state.

The *1995 Long Range Utilities Plan Update, Drainage and Sewer Systems*, prepared by Fukunaga and Associates, Inc. dated September 1995 has identified the portion of drainline from Miller Hall to Dole Street as hydraulically inadequate for existing and future conditions.

Storm water runoff generated on the roof of the proposed building will be collected and discharged via a new direct connection to the existing drainline running north-south along the east side of the Engineering Quadrangle. The proposed Recreation Center building footprint encompasses the existing Engineering Quadrangle, PEACESAT portable, Miller Annex and landscaped areas between these buildings. The proposed building will not overly the existing drainline. There will be a net increase in storm water runoff. However, no significant impact to the drainage system is expected due to the increase.

One of the goals of the LRDP is to increase the permeable surface area from 40% to 60% of the campus grounds as well as increasing canopy cover from 20% to 30%. A decrease in the impervious surface area on campus will increase infiltration of rainwater reducing runoff. In general, an increase in canopy cover also increases the infiltration rate. This project has been designed to minimize canopy loss by relocating or preserving in place most of the trees within the proposed Campus Center Renovation and Expansion footprints (see Table 3-1). The additional runoff generated from an increase in impervious surface area created as a result of the proposed project will be channeled to the relief drain.

The proposed project will create an increase in impervious surface area. Whenever feasible, vegetated roof cover, bioswales and permeable walkways with storm water retention capacity in the gravel layers will be implemented to decrease the impervious surface area.

The relief drain is expected to improve drainage from the Campus Center area.

The proposed project will result in the disturbance of over one (1) acre of land area. Therefore, a National Pollutant Discharge Elimination System (NPDES) permit will be required. Best Management Practices (BMP) will be implemented to prevent pollution and protect the environment. Temporary erosion control measures will be installed prior to any demolition and/or construction activities. Structural BMPs to include silt fence at the downstream perimeter of the project site and sediment control filters at drain inlets.

4.8.4 Electrical and Communications Systems

Existing underground electrical lines serve the Campus Center area via the University's primary electrical distribution system. Telecommunication services are provided from the University's fiber network and telephone switch.

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Potential Impacts and Mitigation Measures

Existing underground electrical lines serving the Campus Center area will be extended into the Recreation Center addition, Hemenway Hall renovation and Campus Center renovation. Similarly, telecommunication services will be provided from the University's fiber network and telephone switch.

During the pre-consultation process, HECO was notified, but did not comment on the project.

The proposed project will not have any significant adverse impact on existing electrical and communication systems. As previously noted, since 2002, the guiding principle of the University of Hawai'i is sustainability – living in ways that meet the campus' present needs without limiting the potential of future generations to meet their needs.

In October 2008, University of Hawai'i Facilities Management released the *University of Hawai'i at Mānoa Energy Strategy 2008-2015* report (ES08-15). The goals of the energy strategy include

- 30% energy reduction by 2012
- 50% energy reduction by 2015
- 25% of energy from renewables by 2020
- Energy and Water Self-sufficient by 2050

The UH LRDP 2007 update has instituted a framework of sustainability guidelines as the basis to develop, evaluate and communicate the integration of sustainability in the development and operation of the UH Mānoa Campus. The Sustainability Guidelines from the LRDP state:

ENERGY EFFICIENCY

Energy efficiency is a cornerstone of any sustainable building project. Power generation and use of energy are major contributors to air pollution and utility costs. According to the School of Architecture, UHM consumes approximately 120 million KWhr/year, which equals to about 6,000 KWhr/Student/Year. Improving energy efficiency and using renewable energy sources are effective ways to reduce environmental and economic impacts associated with excessive energy use and fossil fuel energy use. Reduction of energy use also has the benefits of lowering utility expenses.

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Examples of LEED Criteria and Strategies:

- *Design the building envelope, HVAC, lighting and other systems to maximize energy performance. Establish the minimum level of energy efficiency for the proposed building and systems.*
- *Use a computer simulation model to assess energy performance and identify the most cost-effective energy efficiency measures.*
- *Specify new HVAC equipment that uses no CFC refrigerants and conduct an inventory to identify equipment that uses CFC refrigerants and provide a replacement schedule for these refrigerants to reduce ozone depletion.*
- *Assess the project for non-polluting and renewable energy potential including solar, wind, geothermal, low-impact hydro, biomass and bio-gas strategies.*
- *Verify that the building's energy related systems are installed, calibrated and perform according to the project requirements, basis of design and construction documents. Develop a Measurement & Verification Plan to evaluate building and/or energy system performance, such as metering equipment, tracking of performance and monitoring.*
- *Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.*
- *Minimize use of air-conditioning with natural ventilation design...*

The Campus Center Renovation and Expansion is being designed utilizing LEED criteria and strategies to meet the energy efficiency goals of the LRDP and the energy reduction and self-sufficiency goals of the ES08-15. In addition, during the design process, re-installment of large trees on the upwind (north side) of the Recreation Center will be considered as a means of providing a larger reservoir of cool air, as well as mitigating the “heat-island effect” of a large added structure.

4.8.5 Solid Waste

The Campus Center Renovation and Expansion project will likely increase the volume of solid waste generated over that of the current facility.

Potential Impacts and Mitigation Measures

The proposed project will create additional food service facilities, recreation and lounge facilities that will increase the amount of refuse generated. Since 2002, the guiding principle of the University of Hawai'i is sustainability – living in ways that meet the campus' present needs without limiting the potential of future generations to meet their needs. The university has created an atmosphere conducive to recycling through ease of access to recycling collection and education. A goal of the recycling program is the reduction of solid waste generation. This is accomplished through the paper recycling program, annual recycling/landfill diversion goals, equipment transfer/donation program, electronics recycling, and the sustainability award program. The University has been a leader in recycling education and landfill diversion. In addition, the University of Hawai'i at Mānoa has partnered with the City and County of Honolulu's *Recycle Hawai'i* program

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by installing a community recycling bin near Hale Aloha Dormitory. Some of the solid waste currently generated in student housing areas, or at the Makai Campus (or even off-campus) will be generated at the proposed project (once in operation), but no net increase in solid waste generation is expected. Additionally, while the Campus Center Renovation and Expansion project will increase waste from generated in the new Recreation Center facility, the student population is not expected to increase, therefore the quantity of waste generated on campus is not expected to change significantly.

The proposed project will generate solid waste during construction. The contractor will be required to dispose of all waste in compliance with Department of Environmental Management requirements.

The University will incorporate provisions for the expanded facility into the existing solid waste management plan. As previously noted, since 2002, the guiding principle of the University of Hawai'i is sustainability – living in ways that meet the campus' present needs without limiting the potential of future generations to meet their needs. The UH LRDP 2007 update has instituted a framework of sustainability guidelines as the basis to develop, evaluate and communicate the integration of sustainability in the development and operation of the UH Mānoa Campus. The Sustainability Guidelines from the LRDP state:

MATERIALS AND RESOURCES

Facilitate the reduction of waste that is hauled to and disposed of in landfills by making it convenient to recycle. Reduce construction waste by extending the life cycle of existing building stock, which reduces environmental impacts of new buildings as they relate to materials manufacturing and transport. Divert construction, demolition and land-clearing debris from disposal in landfills by redirecting recyclable resources back to the manufacturing process. Responsible construction waste management can lower costs through material efficiencies in design and disposal fees. Use environmentally appropriate materials in design and construction of infrastructure and buildings, and increase demand for building materials and products that are sustainably extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

Examples of LEED Criteria and Strategies:

- *Provide convenient facilities for recycling collection. Proper design of collection areas is critical to making recycling easy, sanitary and useful.*
- *Consider reuse of existing, previously occupied buildings, including structure, envelope and interior non-structure elements.*
- *Adopt a construction waste management plan and recycle and/or salvage at least 50-75% of non-hazardous construction and demolition debris.*
- *Use building materials or products that have been sustainably extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site.*

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- *Use rapidly renewable building materials and products (made from plants that are typically harvested within a ten-year cycle or shorter, such as bamboo, wool or cotton).*
- *Use a minimum of 50% of wood-based materials and products, which are certified in accordance with the Forest Stewardship Council's (FSC) Principles and Criteria, for wood building components*

Solid waste disposal will be in accordance with the guidelines set forth by the county's Department of Environmental Services.

4.9 PUBLIC SERVICES AND FACILITIES

Police Protection

The site is located within Honolulu Police Department District 7.

Fire Protection

The Mānoa Fire Station and McCully Fire Stations are each within a mile of the University of Hawai'i Campus. There are three fire hydrants in the vicinity of the existing Campus Center. The BWS standards established the required fire flow of 2,000 gallons per minute with 20 psi residual pressure.

Health Care Services

On campus, near the guard station on East-West Road, is the University Health Services Mānoa (UHSM). UHSM is a unit within the Office of Student Affairs under the Vice Chancellor for Students. It was established in 1932 and has been at its present location, since 1964. The UHSM is staffed by physicians, nurse clinicians, nurses, and other support staff. A wide range of medical services and programs are offered. These include the General Medical Clinic, the Women's Health Clinic, Sports Medicine, dermatology, pharmacy, clinical laboratory, student training, employment and volunteer opportunities.

Although its primary service population are the students of UH Mānoa, many services are also available to faculty and staff members, and students from other campuses. Its hours are limited to normal business hours. Kapi'olani Medical Center, which includes emergency services, is located at 1319 Punahou Street, is less than a mile from the University of Hawai'i campus.

Recreational Facilities

Recreational facilities near the Campus Center area include on-campus recreational opportunities (primarily located on the Makai Campus) as well as City facilities such as Kānewai Community Park, Mānoa District Park, Mō'ili'ili Park, and Old Stadium Park.

Schools

A number of public and private elementary, middle and high schools are located in the vicinity of the UHM campus including University Laboratory School, Our Redeemer Elementary School, Lutheran High School, Mid-Pacific Institute, Hōkūlani Elementary School and Noelani Elementary School.

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Potential Impacts and Mitigation Measures

The University does not anticipate the proposed project will generate an increased demand on existing public services as the proposed project involves the renovation and expansion of existing buildings. The University has its own campus security system, including security guards.

There will be an occasional and unavoidable demand for fire protection services, but the proposed project will be designed with sprinkler systems that should help to enhance the fire-fighting capabilities of the City and County of Honolulu Fire Department. Civil and appropriate construction plans will be provided to Honolulu Fire Department for review to ensure that all fire, life and safety requirements are satisfied. The addition of new fire hydrants and an expansion of the existing water service to the campus center area will occur as part of this project. The fire hydrant placement and the Fire Department access road requirements should meet the requirements of the Honolulu Fire Department as well as the 2003 International Building Code (IBC) that was adopted by the City and County of Honolulu in 2007. During the pre-consultation process, the Honolulu Fire Department wrote that it “has no objections to the proposed project.”

There will be an occasional and unavoidable demand for medical services, but there appears to be adequate facilities on campus and nearby (including the nearby Fire Stations) to address most emergency health care needs.

The primary objective of this project is the development of a Recreation Center that is co-located with the Campus Center. This will help to reduce the demand for intramural and informal recreational facilities in the Makai Campus and County parks in the surrounding areas. The reduced demand on County parks will have a positive impact on non-students who utilize Kānewai Community Park, Mānoa District Park, Mō‘ili‘ili Park, and Old Stadium Park.

The proposed use is not anticipated to create any additional demand on existing schools.

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UNIVERSITY OF HAWAI'I AT MĀNOA

FINAL ENVIRONMENTAL ASSESSMENT

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CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI‘I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

5.0 LAND USE CONFORMANCE

State and City and County of Honolulu land use plans and policies and required permits and approvals relevant to the Campus Center Renovation and Expansion are described below.

5.1 STATE OF HAWAI‘I

5.1.1 State Land Use Law, Chapter 205, Hawai‘i Revised Statutes

The State Land Use Law (Chapter 205, HRS), establishes the State Land Use Commission (LUC) and authorizes this body to designate all lands in the State into one of four districts: Urban, Rural, Agricultural, or Conservation. These districts are defined and mapped by the State Land Use Commission in order to ensure compatibility with neighboring land uses and protection of public health.

The Campus Center Renovation and Expansion is located within the State Urban District (Figure 12).

5.1.2 Coastal Zone Management Act, Chapter 205A, Hawai‘i Revised Statutes

The Coastal Zone Management Area, as defined in Chapter 205A, HRS, includes all the lands of the State. Therefore, the proposed Campus Center Renovation and Expansion lies within the Coastal Zone Management Area.

The Coastal Zone Management (CZM) Program aims to provide recreational opportunities, protect historic resources, protect scenic and open space resources, protect coastal ecosystems, provide facilities for economic development, reduce hazards, and manage development. Program objectives and applicability to the proposed Campus Center Renovation and Expansion are discussed below:

RECREATIONAL RESOURCES

Objective: Provide coastal recreational opportunities accessible to the public.

Policy A: Improve coordination and funding of coastal recreational planning and management; and

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

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

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- (ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;
- (iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;
- (iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
- (v) Ensuring public recreational uses of County, State, and Federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;
- (vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;
- (vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and
- (viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and County authorities; and crediting such dedication against the requirements of section 46-6.

Discussion: The proposed Campus Center Renovation and Expansion will be located inland, away from the shoreline (approximately 1.7 miles from the nearest coastline); therefore, it is anticipated that there will be no effect on existing coastal or inland recreational resources.

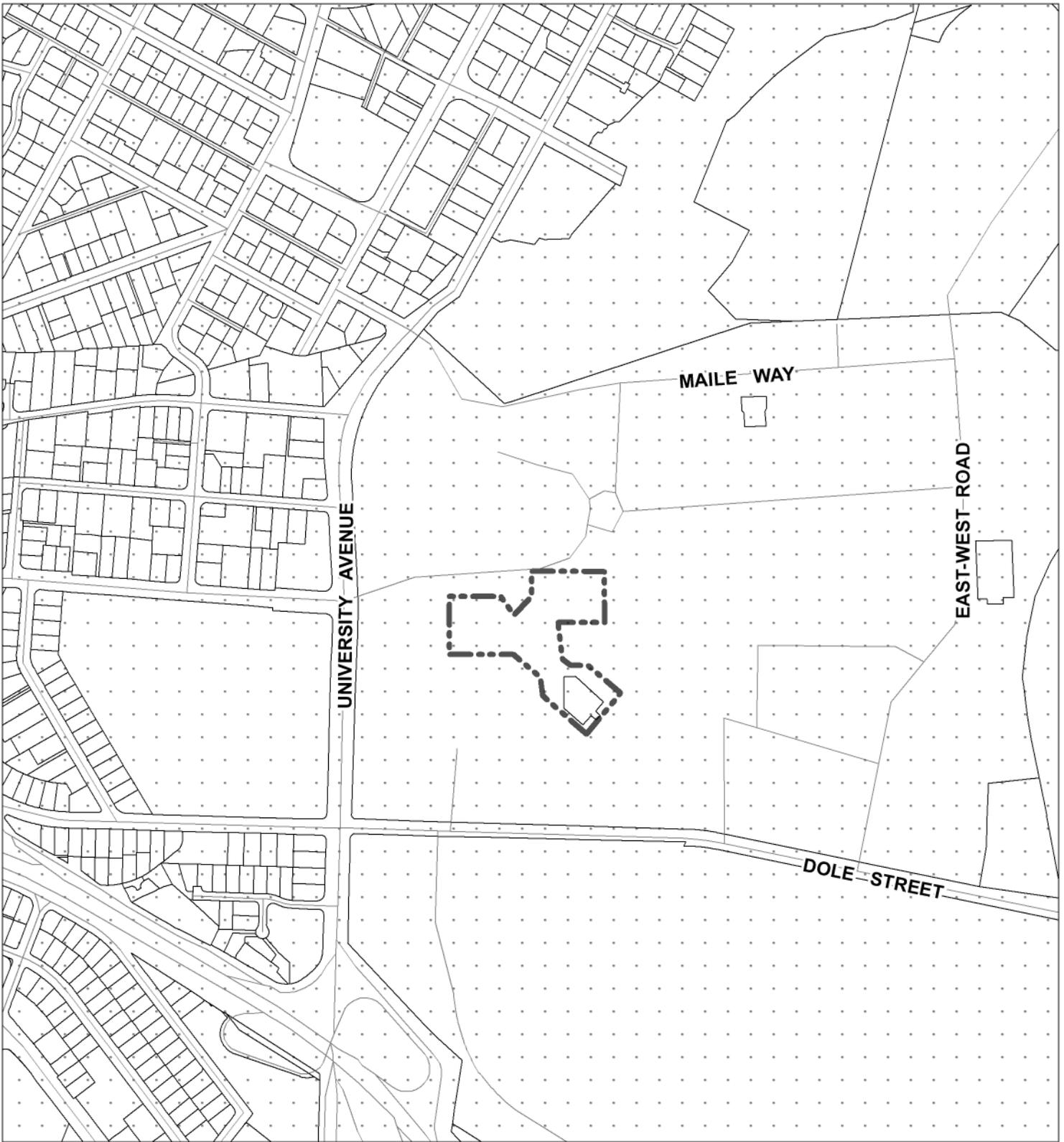
HISTORIC RESOURCES

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

Policy A: Identify and analyze significant archaeological resources;

Policy B: Maximize information retention through preservation of remains and artifacts or salvage operations; and

Policy C: Support State goals for protection, restoration, interpretation, and display of historic resources.



LEGEND

 Project Area

District

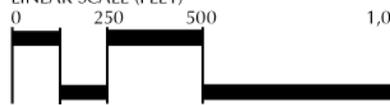
-  Agricultural
-  Conservation
-  Rural
-  Urban

Figure 12

State Land Use Districts

Campus Center Renovation & Expansion
 University of Hawai'i at Mānoa ISLAND OF O'AHU

NORTH 

LINEAR SCALE (FEET)
 0 250 500 1,000 

 PBR HAWAII & ASSOCIATES, INC.

Source: State Land Use Commission (2006)
 Disclaimer: This graphic has been prepared for general planning purposes only.

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Discussion: Due to the extensive disturbance this site has experienced for development and subsequent redevelopment, it is unlikely that subsurface archaeological or cultural resources are present. Should any archaeological or cultural remains be encountered during construction, all work in the immediate vicinity of the find will cease and the State Historic Preservation Division will be contacted for establishment of appropriate mitigation in accordance with Chapter 6E, Hawai‘i Revised Statutes.

While the State Historic Preservation Division (SHPD) does not list the Engineering Quadrangle or Hemenway Hall on the Hawai‘i Register of Historic Places. Both are considered historic, and the visual aspects of the theses facilities will be preserved where possible. The exterior of Hemenway Hall will not be modified. The proposed project alternative was chosen to minimize the impact on the Engineering Quadrangle by reducing the number of buildings slated for demolition from four to two. The historic Engineering Materials Testing Laboratory (building6), the second oldest building on campus will be preserved in place along with one other Engineering Quadrangle facility, Building 31-D.

SCENIC AND OPEN SPACE RESOURCES

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

Policy A: Identify valued scenic resources in the coastal zone management area;

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

Policy C: Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

Policy D: Encourage those developments which are not coastal dependent to locate in inland areas.

Discussion: The proposed Campus Center Renovation and Expansion will be located inland, away from the shoreline. Additionally, Best Management Practices (BMPs) will be employed during construction to reduce erosion of soils and fugitive dust during construction; therefore, it is anticipated that there will be no effect on the quality of the coastal scenic resources.

COASTAL ECOSYSTEMS

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

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

Policy B: Improve the technical basis for natural resource management;

Policy C: Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

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

Policy E: Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Discussion: Best Management Practices (BMPs) will be employed during construction to reduce erosion of soils and fugitive dust during construction. Controlling runoff particularly will ensure that the construction will not increase inputs of sediment into Mānoa Stream. In addition, due to the size of the project (disturbance of over 1 acre), the construction project will operate under a NPDES permit. Since the Campus Center complex and Hemenway Hall are located nearly two miles from the ocean; it is anticipated that over the long term there will be no effect on the quality of the coastal ecosystems.

ECONOMIC USES

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

Policy A: Concentrate coastal dependent development in appropriate areas;

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

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

- (i) Use of presently designated locations is not feasible;
- (ii) Adverse environmental effects are minimized; and

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

Discussion: The Campus Center Renovation and Expansion contributes to Hawai'i's economy through the improvement of a public higher educational facility. The proposed renovation project is not dependant on coastal resources and therefore is located away from the shoreline on the University campus.

COASTAL HAZARDS

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

Policy A: Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and non-point source pollution hazards;

Policy B: Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and non-point source pollution hazards;

Policy C: Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

Policy D: Prevent coastal flooding from inland projects.

Discussion: The proposed Campus Center Renovation and Expansion location nearly two miles inland from the coastline virtually negates any potential detriment to the quality of coastal ecosystems as a result of construction.

MANAGING DEVELOPMENT

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

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

Policy B: Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and

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

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Discussion: Due to the project’s inland location approximately two miles away from the shoreline, it should not be considered a “significant coastal development.” Its benign location relative to the coastline should not require an involved public participation process concerning coastal effects, although this EA provides an opportunity for input.

PUBLIC PARTICIPATION

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

Policy A: Promote public involvement in coastal zone management processes;

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

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

Discussion: The project’s mauka location, and distance from the shoreline provides a difficult segue toward relevant discussions on coastal zone management. This Environmental Assessment provides a means for public input.

BEACH PROTECTION

Objective: Protect beaches for public use and recreation.

Policy A: Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

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

Policy C: Minimize the construction of public erosion-protection structures seaward of the shoreline.

Discussion: The proposed Campus Center Renovation and Expansion will be located nearly two miles from the ocean. Due to the project site’s relatively far distance from the shoreline, no adverse impact to area beaches is anticipated.

MARINE RESOURCES

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Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policy A: Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

Policy B: Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

Policy C: Assert and articulate the interests of the State as a partner with Federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

Policy D: Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

Policy E: Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Discussion: The proposed Campus Center Renovation and Expansion will be located nearly two miles from the ocean. Due to the project site’s relatively far distance from the shoreline, no adverse impact to area marine resources is anticipated.

5.1.3 Hawai‘i State Planning Act, Chapter 226, Hawai‘i Revised Statutes

The Hawai‘i State Plan, Chapter 226 HRS (2007) provides guidelines for the future growth of the State of Hawai‘i. The Hawai‘i State Plan identifies goals, objectives, policies, and priorities for allocating the State’s resources, including public funds, services, human resources, land, energy, and water. The plan was enacted to achieve “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.” Chapter 226 HRS (2007).

Discussion: Planning objectives outlined in Chapter 226 support the proposed Campus Center Renovation and Expansion project. Section 226-20 promotes cooperation among public and private sectors in accommodating the total health needs of individuals throughout the State. Section 226-21 sets forth goals relating to the support of educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups. Section 226-23 sets forth goals relating to both the availability of sufficient resources to provide for recreational needs and adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawai‘i’s people. The renovation and expansion of the University of Hawai‘i’s Campus

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Center, and Hemenway Hall are consistent with the State’s goals to enrich the lifestyles of Hawai‘i people by the advancement of the mental and physical well-being.

5.2 CITY AND COUNTY OF HONOLULU PLANS

5.2.1 O‘ahu General Plan

The O‘ahu General Plan is the policy document for the long-range development of the Island of O‘ahu. The O‘ahu General Plan is a statement of general conditions to be sought in the 20 year planning horizon and policies to help direct attainment of the plan’s objectives.

Specific General Plan goals and policies applicable to the proposed Campus Center Renovation and Expansion project are discussed below.

Health and Education

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

Policies

- (1) *Encourage continuing improvement in the quality of higher education in Hawai‘i.*
- (2) *Encourage the development of diverse opportunities in higher education.*

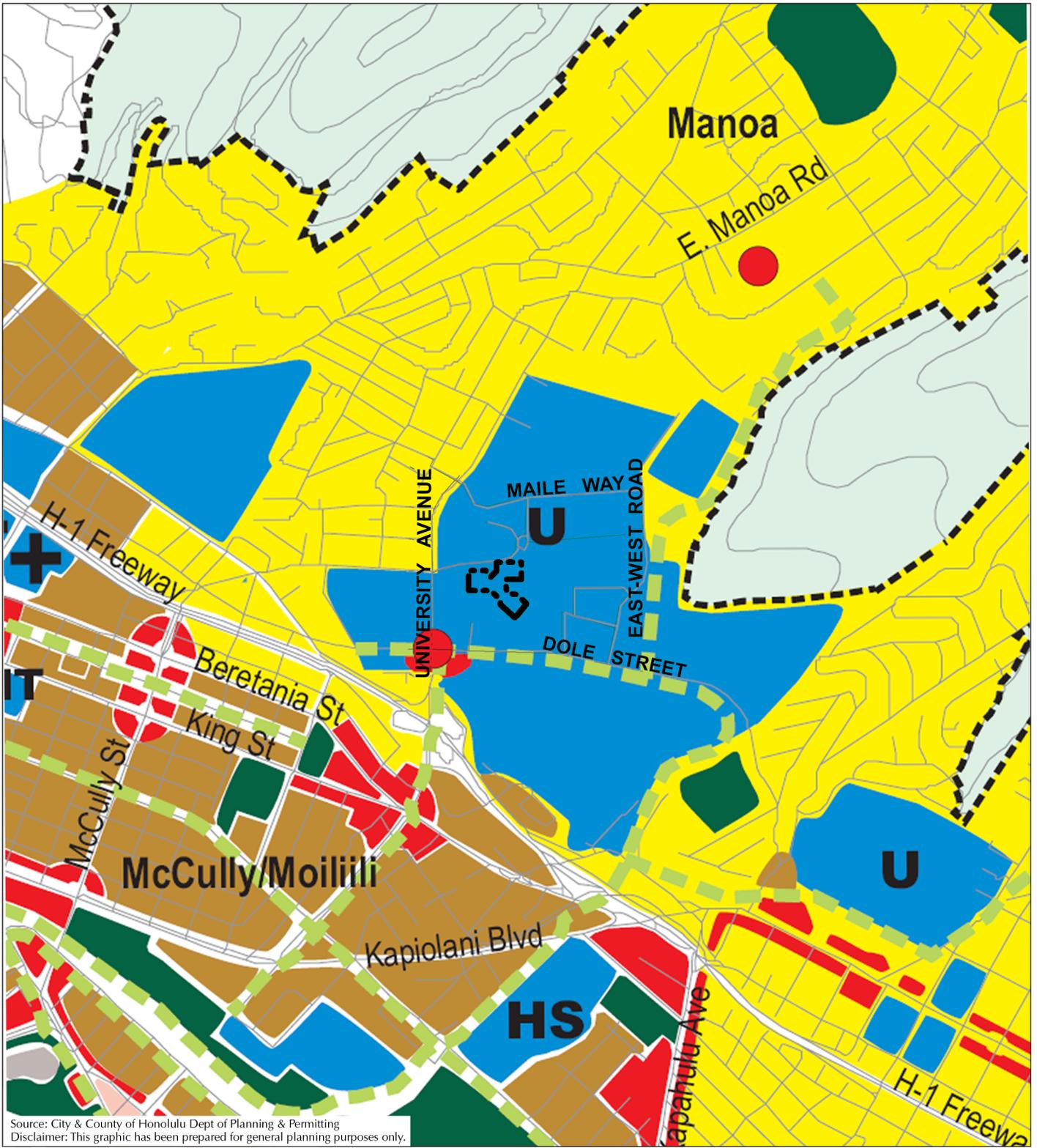
Discussion: The Campus Center Renovation and Expansion supports these policies by renovating and enlarging an established facility for higher education.

5.2.2 Primary Urban Center Development Plan

The City and County of Honolulu has adopted the Primary Urban Center Development Plan as one of eight community-oriented plans to guide public policy, investment and decision making through the 2025 planning horizon. The document contains policies specific to Honolulu’s primary urban center. These policies are then implemented through ordinances such as the Land Use Ordinance (zoning code).

The Primary Urban Center Development Plan includes a policy to, “support the development of a high quality educational system of schools and post-secondary institutions that increase the attractiveness of the Primary Urban Center as a place to live and work...”

Discussion: The expansion and renovation of the Campus Center and Hemenway Hall at the University of Hawai‘i’s main campus in Mānoa contributes to the continuation of a vibrant, campus community in the heart of the city (Figure 13).



LEGEND

-  Project Area
-  Community/Neighborhood Commercial
-  Urban Community Boundary
-  Pedestrian Network
-  Major Parks and Open Space
-  Lower-Density Residential
-  Medium and Higher-Density Residential/Mixed Use
-  District Commercial
-  Resort
-  Institutional
-  Preservation
-  Military
-  College/University
-  Hospital/Medical Center
-  Intermediate School (State)
-  High School (State)

Figure 13

Primary Urban Center Development Plan

Campus Center Renovation & Expansion

University of Hawai'i at Mānoa

ISLAND OF O'AHU



NOT TO SCALE



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5.2.3 Land Use Ordinance

The Land Use Ordinance implements the goals and objectives of the O'ahu General Plan and the Primary Urban Center Development Plan. All lands within the City and County of Honolulu are zoned into specific districts. According to the Department of Planning and Permitting, the project site is zoned Residential (R-5). According to Sec. 21-3.70 of the Land Use Ordinance (LUO):

The purpose of the residential district is to allow for a range of residential densities. The primary use shall be detached residences. Other types of dwellings may also be allowed, including zero lot line, cluster and common wall housing arrangements. Nondwelling uses which support and complement residential neighborhood activities shall also be permitted....The intent of the R-7.5, R-5 and R-3.5 districts is to provide areas for urban residential development.

According to the LUO Master Use Table (Table 21-3), universities and colleges are permitted in all zoning districts regulated by the City and County of Honolulu with Plan Review Use (PRU) approval.

Discussion: The Campus Center Renovation and Expansion is consistent with the purposes of the R-5 land use district in that it is part of a long-established university campus (Figure 14). The University is currently operating under PRU No. 88/PRU-3 (Resolution No. 89-411, CD-2), which was initially approved on December 13, 1989, for the Five-Year Master Plan for the expansion of the University of Hawai'i Mānoa campus." The campus gives the Mānoa and Mō'ili'ili neighborhoods their identity and the proposed renovation and expansion of the heart of campus will serve to contribute to the vitality of these communities.

5.2.4 Long Range Development Plan, University of Hawai'i at Mānoa, 2007 Update

The Long Range Development Plan (LRDP) was initially adopted by the Board of Regents in 1987. The plan, amended and updated four times since 1987, has served as the guiding document for campus redevelopment. The LRDP reverses the existing orientation on campus from vehicles to pedestrians by proposing to remove roads and parking facilities from the heart of the Central Campus to peripheral locations while providing for the addition of approximately 3,000 parking spaces and approximately three million additional square feet of new construction. In addition to the Campus Center Renovation and Expansion Project, the following projects are proposed in the LRDP for development over the next ten years; additional instruction facilities at Henke Hall and the College of Education; additional research space at the Biomedical facility and Mauka Campus, replacement facilities for Klum Gym, Johnson Hall and Hale Noelani; expansion of the Law School Library; additional space at Bilger Hall; new faculty housing; new KHET media facilities; expansion of Kennedy Theatre; renovation of Gartley Hall; additional parking structures; and an addition at the School of Hawaiian Knowledge. The construction of these projects not covered under PRU No. 88/PRU-3 (Resolution No. 89-

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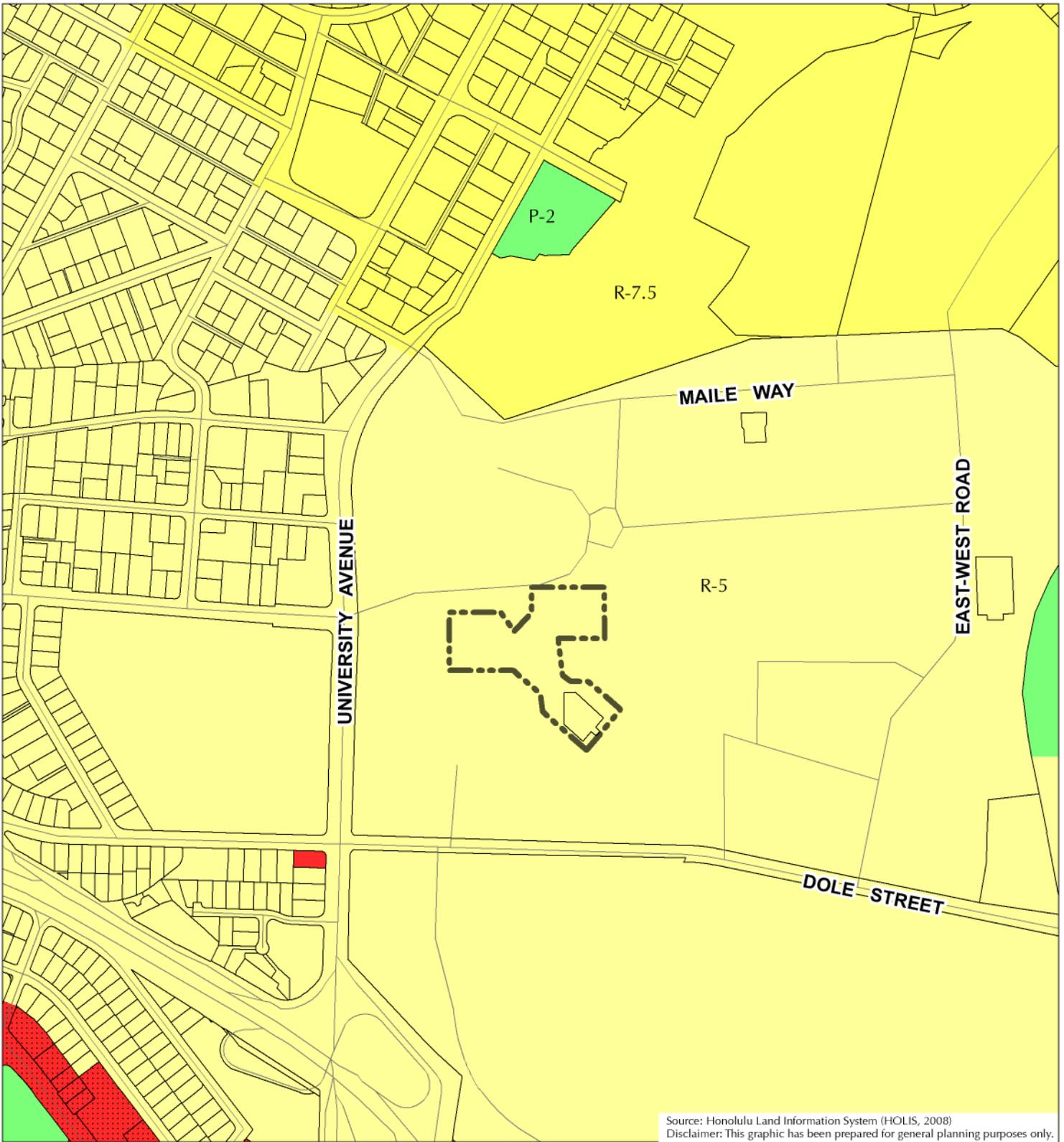
411, CD-2) as well as the Campus Center Renovation and Expansion Project are subject to City Council approval of the new Plan Review Use application as required by the LRDP. Additionally, the University of Hawai'i Office of Capital improvements understands that, pursuant to Land Use Ordinance section 21-2.120-3(b)(2), the Plan Review Use application will only be accepted if the condition of the existing PRU have been fully performed.

5.3 LIST OF REQUIRED PERMITS AND APPROVALS

Required permits and approvals are outlined in Table 5-1, below.

**Table 5-1
Required Permits and Approvals**

AGENCY	PERMIT/APPROVAL
STATE OF HAWAI'I	
Department of Health	<ul style="list-style-type: none">• NPDES
Department of Land and Natural Resources, Historic Preservation Division	<ul style="list-style-type: none">• Section 6E, Hawai'i Revised Statutes (HRS) Review
CITY AND COUNTY OF HONOLULU	
Department of Planning and Permitting	<ul style="list-style-type: none">• Building Permit
Department of Planning and Permitting	<ul style="list-style-type: none">• Plan Review Use permit
Department of Planning and Permitting	<ul style="list-style-type: none">• Grading Permit
Department of Environmental Services	<ul style="list-style-type: none">• Industrial Wastewater Discharge Permit
Department of Environmental Services	<ul style="list-style-type: none">• Air Conditioning/Ventilation Permit
Department of Environmental Services	<ul style="list-style-type: none">• Noise Permit for Construction Activities
Department of Environmental Services	<ul style="list-style-type: none">• Noise Permit for Stationary Sources



LEGEND

 Project Area

Zoning Description

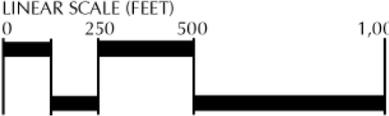
-  B-2 Community Business District
-  BMX-3 Community Business District Mixed Use
-  P-2 General Preservation District
-  R-5 Residential District
-  R-7.5 Residential District

Figure 14

City & County of Honolulu Zoning

Campus Center Renovation & Expansion
 University of Hawai'i at Mānoa ISLAND OF O'AHU

NORTH 

LINEAR SCALE (FEET)
 0 250 500 1,000 

 PBR HAWAII & ASSOCIATES, INC.

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6.0 ALTERNATIVES

In compliance with the provisions of Section 11-200-17(f), HAR relating to Environmental Impact Statements, an environmental assessment must discuss potential alternatives to the proposed action.

The alternatives considered include:

6.1 NO ACTION

The no-action alternative is no change to the existing buildings. Under this alternative, the Campus Center would not be renovated or expanded. The remaining buildings in the Engineering Quadrangle would remain in place, and Hemenway Hall would not be renovated. Students would continue to share recreation facilities with the athletic department that are not centrally located. Due to the lack of centralized facilities, the safety of students and faculty would continue to be at risk during evening hours. In addition, any unfulfilled recreational demands would occur off campus, including at nearby County parks.

6.2 ALTERNATIVES

As noted in Section 4.1.1 of this Environmental Assessment, the primary aspect of the Campus Center Renovation and Expansion project is the development of the Recreation Center. The removal of two of the Engineering Quadrangle buildings, removal or relocation of Miller Annex and PEACESAT, and the renovation of Hemenway Hall are all necessary to facilitate the construction of the Recreation Center in the preferred location, northeast of the existing Campus Center.

It is presumed that the visibility of the facility at the heart of campus will have a positive impact upon student life and reinforce this area as the social center of the University of Hawai'i at Mānoa. Due to the centralized location, the Campus Center Renovation and Expansion is projected to increase student activity and pedestrian traffic in the area. This will benefit the existing Campus Center, Hemenway Hall and other nearby facilities. The hours of operation of the new Recreation Center will expand the availability of late night activities on campus. The existing Campus Center will extend current facility operating hours to enhance student service offerings in the evenings. The preferred alternative will allow a majority of the late night activities to be concentrated in one area.

Since the start of the project, several alternatives were explored and tested for feasibility and are compiled below. The evaluation of alternatives took into consideration the most feasible location of the Recreation Center based on its proximity to the existing Campus Center, impact to buildings listed on the historic registry, and the availability of a space large enough to accommodate the proposed project. These alternatives are described in greater detail below:

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Alternative A. In this alternative, the Recreation Center is not co-located with the Campus Center, but rather at Makai Campus. Locating the Recreation Center at the Makai Campus would provide Athletics and Kinesiology an opportunity to utilize portions of the Recreation Center, since they do not have the funding to build new facilities for their needs. There is limited area to build a Recreation Center on the Makai Campus, as Athletics and Kinesiology also have needs for this limited amount of space for their future expansion needs.

Alternative B. In this alternative, the Recreation Center is constructed along the southwest corner of the Campus Center. Co-location with the existing Campus Center provides visibility of the facility - creating a potentially positive impact upon student life and reinforcing this area as the social center of the University. Placing the Recreation Center on the southwest corner of the Campus Center does not meet the goals of the LRDP. This area is required for a potential classroom or administrative building site. Locating the Recreation Center southwest will also require the demolition of the old post office and two additional buildings. In addition, this area is limited in size and will require a taller facility with a smaller building footprint that is more visible from University Avenue.

Alternative C. Placing the Recreation Center to the south of the Campus Center would encroach on Andrews Amphitheater, which is a registered historic site. However, the visibility of the facility at the heart of campus will have a positive impact upon student life and reinforce this area as the social center of the University similar to that of the preferred alternative.

Alternative D. In this alternative, the Recreation Center is constructed northeast of the Campus Center in the location of the existing Engineering Quadrangle complex, and the Miller Annex, and PEACESAT portables. As noted in Section 4.1.1, the development in the area of the proposed project site has three alternatives:

Engineering Quadrangle Alternative D-1: In this alternative all four remaining buildings would be demolished. Both HHF and SHPD expressed concerns regarding the potential impact the location of the Recreation Center would have on these buildings. Some of the student community also expressed concern regarding the lack of a preservation plan for this alternative.

Engineering Quadrangle Alternative D-2: In this alternative the original Engineering Materials Testing Laboratory and one of the four Engineering Quadrangle buildings built between 1915 and 1928 will be preserved in place. Today those buildings are known as Building 6, and the Ka Leo Building. During the plan design process, the university and its consultant team conferred with SHPD regarding the four remaining Engineering Quadrangle buildings to determine the best course of action regarding the Campus Center Renovation and Expansion project. During these discussions, the University determined that this alternative would place the northern edge of the building too close to Campus Road, and the proposed East-West Mall.

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Engineering Quadrangle Alternative D-3: In this alternative, two of the four Engineering Quadrangle buildings built between 1915 and 1928 will be preserved in place. Today those buildings are known as Buildings 31-C and 31-D. During the plan design process, the University and its consultant team conferred with SHPD and HHF regarding the four remaining buildings in the Engineering Quadrangle complex to determine the best course of action regarding the Campus Center Renovation and Expansion project. This alternative meets the Universities programmatic needs by improving the relationship of the new building to the Campus Center plaza to the south, while improving the historic context of the remaining Engineering Quadrangle buildings in relation to the overall campus.

Of the above alternatives, it was determined that Alternative D-3 would most: 1) consolidate and enhance campus student life and activity in the center of the campus; 2) allow the expansion of future administrative or classroom facilities southwest of the Campus Center; 3) reduce the impact of the Campus Center expansion on Andrews Amphitheater; and 4) provide adequate area for the proposed facility without the need for a taller building. Despite the impact on the remaining buildings in the Engineering Quadrangle complex, SHPD and HHF have indicated that their organizations will support this alternative.

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UNIVERSITY OF HAWAI'I AT MĀNOA

FINAL ENVIRONMENTAL ASSESSMENT

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CAMPUS CENTER RENOVATION AND EXPANSION

UNIVERSITY OF HAWAI‘I AT MĀNOA FINAL ENVIRONMENTAL ASSESSMENT

7.0 FINDINGS, SUPPORTING REASONS, AND ANTICIPATED DETERMINATION

To determine whether the Campus Center Renovation and Expansion may have a significant impact on the physical and human environment, all phases and expected consequences of the proposed project have been evaluated, including potential primary, secondary, short-range, long-range, and cumulative impacts. Based on this evaluation, the Approving Agency (University of Hawai‘i at Mānoa) is expected to issue a Finding of No Significant Impact (FONSI) for the Campus Center Renovation and Expansion project. The supporting rationale for this anticipated finding is presented in this chapter.

7.1 PROBABLE IMPACT, INCLUDING CUMULATIVE IMPACTS

Cumulative impacts are impacts on the environment that result from the action when added to other past, present, and foreseeable future actions by other agencies or persons. As discussed throughout this document, the University has recently completed an update of the Long Range Development Plan (LRDP) to guide campus development in the next five to ten years. Assumed cumulative impacts could be those related to increased traffic and greater demand on water, sanitary sewer and storm drainage capacity. However, the projects outlined in the LRDP are based on current space and activity needs on campus. They are not based on any anticipated increase in enrollment during the five to ten year planning horizon.

One of the major themes in the current LRDP is Environmental Sustainability. The LRDP Design Guidelines emphasize that campus structures further conserve resources through energy efficiency, water conservation, recycling and other environmentally sensible practices. Ostensibly, the design guidelines’ environmental sustainability theme will result in renovations and expansions that make buildings more energy efficient, improve storm water conveyance practices and encourage alternative transportation. In addition, all new buildings will be subject to an Environmental Assessment and the development of the projects will include appropriate mitigation measures to address any impacts.

Based on the fact that the University’s LRDP looks to replace and renovate existing structures using environmentally sensible design and construction, it is assumed that the cumulative impacts will be minimal. UH is committed to reducing its carbon footprint, and has voluntarily begun reporting green house gas emissions. According to the Vice Chancellor for Administration, Finance, and Operations, Kathleen Cutshaw,

By measuring our green house gas emissions it furthers UH’s commitment to energy reduction by giving us the data necessary to take further steps to reduce our energy use by 30% by the year 2012

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Examples of actual project BMP's include:

- *Design the building envelope, HVAC, lighting and other systems to maximize energy performance. Establish the minimum level of energy efficiency for the proposed building and systems.*
- *Use a computer simulation model to assess energy performance and identify the most cost-effective energy efficiency measures.*
- *Specify new HVAC equipment that uses no CFC refrigerants and conduct an inventory to identify equipment that uses CFC refrigerants and provide a replacement schedule for these refrigerants to reduce ozone depletion.*
- *Assess the project for non-polluting and renewable energy potential including solar, wind, geothermal, low-impact hydro, biomass and bio-gas strategies.*
- *Verify that the building's energy related systems are installed, calibrated and perform according to the project requirements, basis of design and construction documents. Develop a Measurement & Verification Plan to evaluate building and/or energy system performance, such as metering equipment, tracking of performance and monitoring.*
- *Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.*
- *Minimize use of air-conditioning with natural ventilation design...*

The Campus Center Renovation and Expansion is being designed utilizing LEED criteria and strategies to meet the energy efficiency goals of the LRDP and the energy reduction and self-sufficiency goals of the ES08-15. In addition, during the design process, re-installment of large trees on the upwind (north side) of the Recreation Center will be considered as a means of providing a larger reservoir of cool air, as well as mitigating the "heat-island effect" of a large added structure.

Social-economic impacts resulting from the proposed projects are anticipated to be beneficial. Construction will generate employment and economic opportunities. Renovation and expansion of the Campus Center Complex, through the Campus Center Renovation and Expansion project, will allow the University of Hawai‘i to continue to provide quality education with improved recreational and social opportunities for the campus population. Overall, the net cumulative impact is expected to have a positive effect on the campus, the Mānoa neighborhood and greater Honolulu.

Several other facilities have recently been proposed for the University of Hawai‘i at Mānoa campus. They include the Performing Arts Facility and the Gartley Hall Renovation. Based on an evaluation of each project's Final Environmental Assessment by the Approving Agency (University of Hawai‘i at Mānoa), a FONSI was issued. The following is a brief summary of each of these projects.

The Performing Arts Facility will be located mauka of Correa Road between the existing Kennedy Theatre, Keller Hall and Physical Science Building. Since 1987, the University has contemplated a parking structure behind Kennedy Theatre and an "addition" to the Kennedy Theatre (University of Hawai‘i Mānoa Long Range Development Plan (December 1987)). The Performing Arts Facility site is approximately 1.6-acres immediately behind

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the existing Kennedy Theatre and currently used as a visitor parking area. The proposed expansion includes additional studio, rehearsal, classroom, shops, performance and theatre spaces. The addition will also partially wrap around the existing theatre. Preliminary plans call for a six-story structure with a basement including approximately 60,000 SF of net program area, and approximately 480 parking stalls. As envisioned in the University's Long Range Development Plan, the new parking structure will be integrated with the expanded theatre facilities. The result will be a larger performing arts center and over three times the current on-site parking capacity.

The renovation of Gartley Hall is in the historic quadrangle of the University of Hawai'i Mānoa Campus and is listed on the Hawai'i Register of Historic Places. Gartley Hall is a historic building which is in need of: environmental remediation, structural modifications, improvements for greater accessibility, as well as greater sustainability features/measures. This project is in the beginning stages of the design process, and construction is not anticipated to begin until March 2010 at the earliest. The proposed renovation of Gartley Hall will not increase the number of students who are currently attending classes within the building, nor increase the number of students attending the University of Hawai'i Mānoa Campus

In addition to these projects, the University of Hawai'i released the LRDP 07DEA/PRU for public comment in September 2008. The LRDP was updated to reflect current and upcoming educational priorities. Future buildings and projects are projected into the plan as well as several new "major themes" through a process of consultation with campus administration, students, faculty and community members. Continuing the theme of previous LRDP's, the LRDP Update reverses the existing orientation on campus from vehicles to pedestrians by proposing to remove roads and parking facilities from the heart of the Central Campus to peripheral locations while providing for the addition of approximately 3,000 parking spaces and approximately three million additional square feet of new construction. The following projects are proposed in the LRDP Update for development over the next ten years; additional instruction facilities at Henke Hall and the College of Education; additional research space at the Biomedical facility and Mauka Campus, replacement facilities for Klum Gym, Johnson Hall and Hale Noelani; expansion of the Law School Library; additional space at Bilger Hall; new faculty housing; new KHET media facilities; additional parking structures; and an addition at the School of Hawaiian Knowledge. The Campus Center Renovation and Expansion, Gartley Hall Renovation, and Performing Arts Facility projects were also included in the LRDP Update.

7.2 SIGNIFICANCE CRITERIA

Based upon the previous information presented in this document the proposed permitting and construction of the Campus Center Renovation and Expansion will likely have no significant environmental impacts. This determination is based upon the Significance Criteria outlined in Chapter 343, HRS, as amended and Title 11 Chapter 200 HAR 1996, discussed below.

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

The site's status as six existing buildings plus prior land disturbance suggests that the site is absent of any resources potentially subject to irrevocable loss as a result of construction. Nearly all of the existing trees and palms that will be impacted by the proposed development will be replanted elsewhere on campus. New trees and landscape materials will be installed around the new facility.

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

The Campus Center Renovation and Expansion will not curtail the range of beneficial uses of the environment as the site is currently developed. The impact on green open space will be mitigated by the increased recreational and social opportunities/benefits provided by the proposed facility.

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

The Environmental Policies enumerated in Chapter 344, HRS, and NEPA promote conservation of natural resources, and an enhanced quality of life for all citizens. The proposed Campus Center Renovation and Expansion will not significantly impact natural resources due to the fact that the site is already developed with six buildings.

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

The Campus Center Renovation and Expansion will positively influence social welfare by enhancing higher education opportunities by improving campus activities and student life, while reducing the demand and competition for recreational facilities at nearby County parks.

(5) *Substantially affects public health;*

The potential impacts related to noise, air or water quality during construction will be addressed through construction management practices in compliance with Federal, State and County requirements. The University's self-imposed mandate in the LRDP to build sustainably will help to ensure that the renovated building will not negatively affect public health during its operation.

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

The University anticipates no increase in student population as a result of the Campus Center Renovation and Expansion. The project is proposed to address needs at the current and planned enrollment levels.

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(7) *Involves a substantial degradation of environmental quality;*

No substantial environmental degradation is anticipated. The University has committed itself to a development theme of environmental sustainability, adopted into the LRDP design standards. The project will need to meet minimum applicable statutes and regulations as well as the more stringent self-imposed sustainability requirements, such as being designed utilizing LEED criteria and strategies to meet the energy efficiency goals of the LRDP and the energy reduction and self-sufficiency goals of the ES08-15.

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

The proposed project will result in the disturbance of over one (1) acre of land area. Therefore, a National Pollutant Discharge Elimination System (NPDES) permit will be required. Best Management Practices (BMP) will be implemented to prevent pollution and protect the environment. Temporary erosion control measures will be installed prior to any demolition and/or construction activities. Structural BMPs to include silt fence at the downstream perimeter of the project site and sediment control filters at drain inlets.

The proposed action will not have any substantial negative secondary impacts on the environment. The Campus Center Renovation and Expansion project is consistent with the University's Long Range Development Plan, a public document developed with input by University stakeholders, including the community. This project will not commit the University or the City and County of Honolulu public facilities to any other larger actions, and will not generate any additional actions having a cumulative effect on the environment.

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

The Campus Center Renovation and Expansion will occupy a site that is already committed to four permanent and two portable structures. The site contains no habitat for rare, threatened or endangered plant or animal species listed on the U.S. Fish and Wildlife Service's website

http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=HI&status=listed.

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

Air Quality: No State or Federal air quality standards will be violated during or after the renovation of Campus Center Renovation and Expansion.

Water Quality: No State or Federal water quality standards will be violated during or after the renovation of Campus Center Renovation and Expansion.

Ambient Noise Levels: Construction activities for the development of the property will inevitably create temporary noise impacts. The University's contractors may employ

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mitigation measures to minimize those temporary noise impacts including the use of mufflers and implementing construction curfew periods. Pursuant to Chapter 11-46, Hawai'i Administrative Rules, the project activities will comply with all community noise controls. Operational noise generated will be properly permitted and insulated.

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

The project site does not lie in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, estuary, freshwater or coastal waters. Likewise, the Campus Center Renovation and Expansion is not anticipated to have any impact on any natural hazard conditions and no mitigation measures are planned.

(12) *Substantially affects scenic vistas and view planes identified in County or State plans or studies; or,*

No view planes or scenic vistas identified by the State or County will be impacted by the renovation projects or the Recreation Center Addition.

(13) *Requires substantial energy consumption.*

The proposed project will increase energy consumption, but may direct some energy consumed at other locations (such as student housing areas, the Makai Campus or even off-campus, to the proposed project. As previously mentioned, energy saving design elements will be integrated into the design of the project.

7.3 ANTICIPATED DETERMINATION

On the basis of impacts and mitigation measures examined in this document and analyzed under the above criteria, it is anticipated that the Campus Center Renovation and Expansion will not have a significant effect on the physical or human environments. Pursuant to Chapter 343, HRS, the approving agency, the University of Hawai'i at Mānoa, anticipates a Finding of No Significant Impact (FONSI).

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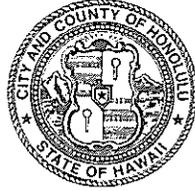
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APPENDIX A
PRE-CONSULTATION LETTERS AND RESPONSES

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulu-pd.org

MUFI HANNEMANN
MAYOR



BOISSE P. CORREA
CHIEF

PAUL D. PUTZULU
KARL A. GODSEY
DEPUTY CHIEFS

OUR REFERENCE BS-KP

October 22, 2008

Ms. Malia M. Cox
PBR Hawaii and Associates, Inc.
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813-3484

Dear Ms. Cox:

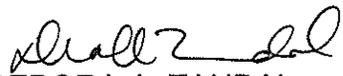
This is in response to your letter of October 16, 2008, requesting comments on the Pre-Consultation, Draft Environmental Assessment, for the proposed Campus Center Renovation and Expansion project at the University of Hawaii at Manoa.

This project should have no significant impact on the facilities or operations of the Honolulu Police Department.

If there are any questions, please call Major Robert Green of District 7 at 529-3362 or Mr. Brandon Stone of the Executive Bureau at 529-3644.

Sincerely,

BOISSE P. CORREA
Chief of Police

By 
DEBORA A. TANDAL
Assistant Chief of Police
Support Services Bureau



PBR HAWAII
& ASSOCIATES, INC.

November 21, 2008

Mr. Boisse P. Correa, Police Chief
Police Department, City and County of Honolulu
801 South Beretania Street
Honolulu, Hawaii 96813

Attn: Ms Debora A. Tandal

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED CAMPUS CENTER RENOVATION AND EXPANSION, UNIVERSITY OF HAWAII AT MĀNOA, HONOLULU, ISLAND OF O'AHU DRAFT ENVIRONMENTAL ASSESSMENT

Dear Ms. Tandal,

Thank you for your letter dated October 22, 2008 (your reference number BS-KP). We acknowledge your assessment that the project should have no significant impact on the facilities or operations of the Honolulu Police Department.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at (808) 521-5631.

Sincerely,

PBR HAWAII
Malia M. Cox

CC: Katherine Kealoha, Office of Environmental Quality Control
Bruce Teramoto, University of Hawaii at Mānoa

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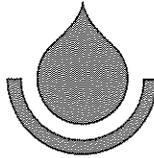
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BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



October 27, 2008

MUFI HANNEMANN, Mayor

RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
ALLY J. PARK
ROBERT K. CUNDIFF
MARC C. TILKER

CRAIG I. NISHIMURA, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio

CLIFFORD P. LUM
Manager and Chief Engineer

DEAN A. NAKANO
Deputy Manager and Chief Engineer

Ms. Malia M. Cox
PBR Hawaii & Associates, Incorporated
1001 Bishop Street, ASB Tower Suite 650
Honolulu, Hawaii 96813-3484

Dear Ms. Cox:

Subject: Your Letter Dated October 20, 2008 on the Environmental Assessment
Pre-Consultation for UH Campus Center Renovations, TMK 2-8-023:003

Thank you for the opportunity to comment on the proposed UH Campus Center Renovations.

The existing water system is presently adequate to accommodate the proposed renovations and expansion. However, please be advised that this information is based upon current data and, therefore, the Board of Water Supply reserves the right to change any position or information stated herein up until the final approval of your building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

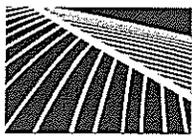
When water is made available, the applicant will be required to pay our Water System Facilities Charges for resource development, transmission and daily storage.

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department. The proposed project is subject to Board of Water Supply cross-connection control and backflow prevention requirements prior to issuance of the Building Permit Application.

If you have any questions, please contact Robert Chun at 748-5443.

Very truly yours,

KEITH S. SHIDA
Program Administrator
Customer Care Division



PBR HAWAII

& ASSOCIATES, INC.

November 21, 2008

PRINCIPALS

THOMAS S. WITTEN, ASLA
President

R. STAN DUNCAN, ASLA
Executive Vice-President

RUSSELL Y. J. CHUNG, FASLA
Executive Vice-President

VINCENT SHIGEKUNI
Vice-President

GRANT T. MURAKAMI, AICP
Principal

Mr. Keith S. Shida, Principal Executive, Customer Care Division
Board of Water Supply,
630 South Beretania Street
Honolulu, Hawaii 96813

Attn: Mr. Robert Chun

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED CAMPUS CENTER RENOVATION AND EXPANSION, UNIVERSITY OF HAWAII AT MĀNOA, HONOLULU, ISLAND OF O'AHU DRAFT ENVIRONMENTAL ASSESSMENT

CHAIRMAN EMERITUS

W. FRANK BRANDT, FASLA
Chairman Emeritus

Dear Mr. Chun,

Thank you for your letter dated October 27, 2008. We offer the following response to your comments.

ASSOCIATES

TOM SCHNELL, AICP
Senior Associate

RAYMOND T. HIGA, ASLA
Senior Associate

KEVIN K. NISHIKAWA, ASLA
Associate

KIMI MIKAMI YUEN, LEED®AP
Associate

SCOTT ALIKA ABRIGO
Associate

SCOTT MURAKAMI, ASLA, LEED®AP
Associate

DACHENG DONG, LEED®AP
Associate

1. We acknowledge your statement that based on current data, the existing water system is adequate to accommodate the proposed development. We acknowledge that the Board of Water Supply (BWS) reserves the right to change its assessment and the final decision on the availability of water will be confirmed when the building permit application is submitted for approval.
2. We acknowledge that UHM will be required to pay the BWS Water System Facilities Charges for resource development, transmission and daily storage.
3. Please be assured that on-site fire protection requirements will be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.
4. We acknowledge that Board of Water Supply Cross-Connection Control and Backflow Prevention requirements will be fulfilled prior to the issuance of the building permit.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at (808) 521-5631.

Sincerely,

PBR HAWAII
Malia M. Cox

CC: Katherine Kealoha, Office of Environmental Quality Control
Bruce Teramoto, University of Hawai'i at Mānoa

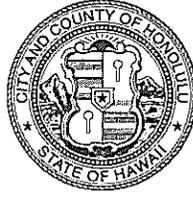
HONOLULU OFFICE
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DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 768-8000 • FAX: (808) 527-6743
INTERNET: www.honolulu.gov • DEPT. WEB SITE: www.honoluluodpp.org



MUFI HANNEMANN
MAYOR

HENRY ENG, FAICP
DIRECTOR

DAVID K. TANOUE
DEPUTY DIRECTOR

2008/ELOG-2583(1k)

October 29, 2008

Ms. Malia M. Cox
PBR Hawaii & Associates, Inc.
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, Hawaii 96813-3484

Dear Ms. Cox:

Subject: Pre-Assessment Consultation
University of Hawaii at Manoa
2444 Dole Street – Manoa
Tax Map Key 2-8-23: 3

This is in response to your October 16, 2008 letter, requesting comments on the proposed Campus Center renovation and addition at the University of Hawaii at Manoa. The project includes the expansion of the Campus Center, including a new recreation facility; the renovation of the Hemenway Hall auditorium; the removal of two (2) of the four (4) buildings in the Engineering Quadrangle; and, the removal or relocation of the PEACESAT and Miller Annex.

The project is proposed under the Long Range Development Plan 2007 Update for the University of Hawaii, Manoa Campus, which will require a new Plan Review Use (PRU) permit. Therefore, the proposed project will be reviewed in conjunction with the new PRU permit application.

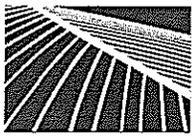
If you have any questions, please contact Lynne Kauer of our staff at 768-8016.

Very truly yours,

A handwritten signature in black ink, appearing to read "H. Eng", is written over a horizontal line.

Henry Eng, FAICP, Director
Department of Planning and Permitting

HE:fm



PBR HAWAII
& ASSOCIATES, INC.

November 21, 2008

PRINCIPALS

THOMAS S. WITTEN, ASLA
President

R. STAN DUNCAN, ASLA
Executive Vice-President

RUSSELL Y. J. CHUNG, FASLA
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VINCENT SHIGEKUNI
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Associate

SCOTT ALIKA ABRIGO
Associate

SCOTT MURAKAMI, ASLA, LEED®AP
Associate

DACHENG DONG, LEED®AP
Associate

Mr. Henry Eng, Director
Department of Planning & Permitting, City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Attn: Lynne Kauer

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED CAMPUS CENTER RENOVATION AND EXPANSION, UNIVERSITY OF HAWAII AT MĀNOA, HONOLULU, ISLAND OF O'AHU DRAFT ENVIRONMENTAL ASSESSMENT

Dear Ms. Kauer,

Thank you for your letter dated October 29, 2008 (your reference number 2008/ELOG-2583(lk)). We offer the following response to your comments.

We acknowledge your assessment that the Campus Center Renovation and Expansion has been proposed under the Long Range Development Plan 2007 Update (LRDP) for the University of Hawai'i Mānoa Campus and that this plan will require a new Plan Review Use (PRU) permit. In September 2008, the University prepared a Draft Environmental Assessment/Plan Review Use for the LRDP. The University has been informed that the proposed project will be reviewed in conjunction with the new PRU permit application

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at (808) 521-5631.

Sincerely,

PBR HAWAII
Malia M. Cox

CC: Katherine Kealoha, Office of Environmental Quality Control
Bruce Teramoto, University of Hawai'i at Mānoa

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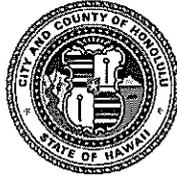
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HONOLULU FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

MUFI HANNEMANN
MAYOR



KENNETH G. SILVA
FIRE CHIEF

ALVIN K. TOMITA
DEPUTY FIRE CHIEF

October 30, 2008

Ms. Malia Cox
PBR Hawaii & Associates, Inc.
American Savings Bank Tower
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Ms. Cox:

Subject: Preconsultation for Draft Environmental Assessment
Proposed Campus Center Renovation and Expansion
University of Hawaii at Manoa
Honolulu, Oahu, Hawaii
Tax Map Key: 2-8-023: 003 (Portion)

In response to your letter of October 16, 2008, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) reviewed the material provided and requires that the following be complied with:

1. Provide 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.)
2. 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

Ms. Malia Cox
Page 2
October 30, 2008

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.)

3. Submit civil drawings to the HFD for review and approval.

Should you have any questions, please call Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 723-7151.

Sincerely,



KENNETH G. SILVA
Fire Chief

KGS/SK:bh



PBR HAWAII & ASSOCIATES, INC.

November 21, 2008

PRINCIPALS

THOMAS S. WITTEN, ASLA
President

R. STAN DUNCAN, ASLA
Executive Vice-President

RUSSELL Y. J. CHUNG, FASLA
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VINCENT SHIGEKUNI
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Tel: (808) 242-2878

Mr. Kenneth G. Silva, Fire Chief
Fire Department, City and County of Honolulu
636 South Street
Honolulu, Hawaii 96813-5007

SUBJECT: PRE-CONSULTATION FOR THE PROPOSED CAMPUS CENTER RENOVATION AND EXPANSION, UNIVERSITY OF HAWAII AT MĀNOA, HONOLULU, ISLAND OF O'AHU DRAFT ENVIRONMENTAL ASSESSMENT

Dear Mr. Silva,

Thank you for your letter dated October 30, 2008. We offer the following response to your comments.

1. Fire apparatus access roads shall be designed and constructed in accordance with the Uniform Fire Code, Section 902.2.1, as amended.
2. Water infrastructure shall be designed and installed in accordance with the Uniform Fire Code, section 903.2, as amended.
3. Civil drawing will be submitted to your department for your review and approval.

Thank you again for your participation in the preparation of the upcoming Environmental Assessment. If you have any questions regarding this project, please do not hesitate to contact me at (808) 521-5631.

Sincerely,

PBR HAWAII
Malia M. Cox

CC: Katherine Kealoha, Office of Environmental Quality Control
Bruce Teramoto, University of Hawai'i at Mānoa



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

December 4, 2008

REPLY TO
ATTENTION OF:

Regulatory Branch

File No. POH-2008-162

Ms. Malia M. Cox
PBR Hawaii & Associates, Inc.
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, Hawaii 96813-3484

Dear Ms. Cox:

This responds to your October 16, 2008 request for pre-consultation comments for proposed renovation and expansion projects at the Campus Center, Hemenway Hall, Engineering Quadrangle, and other various buildings referenced in your letter that are located at the upper campus of the University of Hawaii (UH) at Manoa, Oahu Island, Hawaii, (tax map key (TMK): 128023003 (portion of)). We have reviewed the information you submitted with respect to the Corps' authority to issue Department of the Army (DA) permits pursuant to Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 USC 403) and Section 404 of the Clean Water Act (CWA) (33 USC 13444).

Based on the information you provided and our available sources, we have determined the entire area with TMK 128023003 consists entirely of uplands and is completely absent of waters of the U.S., including adjacent wetlands, subject to Corps jurisdiction. The project as described does not indicate any activities involving the discharge of dredged and/or fill in Waters of the United States; **therefore, a DA permit is not required.**

This approved jurisdictional determination (JD) is valid for a period of five (5) years from the date of this letter, unless new information supporting a revision is provided to us before the expiration date. **Please also note, this approved JD may also be used and referenced for future projects proposed within TMK 128023003 that do not require work in or near vicinity of the Manoa Stream.**

Enclosed is a Notification of Administrative Appeal Options and Process and Request for Appeal form regarding this approved jurisdictional determination (see section labeled "Approved Jurisdictional Determination").

This determination does not relieve you of the responsibility to obtain any other permits, licenses, or approvals that may be required under County, State, or Federal law for your proposed work.

Should you have any questions regarding this approved jurisdictional determination, please contact Ms. Joy Anamizu of my staff at (808) 438-7023 or by e-mail at joy.n.anamizu@usace.army.mil and reference File No. POH-2008-162.

Sincerely,

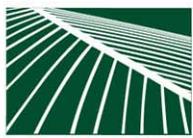
A handwritten signature in black ink, appearing to read "George P. Young". The signature is fluid and cursive, with a large initial "G" and "Y".

George P. Young, P.E.
Chief, Regulatory Branch

Copied Furnished (w/o encls):

Ms. Kathleen Cutshaw, UH-Manoa, Vice Chancellor for Finance, Administration & Operations,
2500 Campus Rd., Hawaii Hall, 307D, Honolulu, HI 96822

Ms. Katherine P. Kealoha, Office of Environmental Quality Control, 235 S. Beretania Street,
Suite 702, Honolulu, HI 96813



PBR HAWAII

& ASSOCIATES, INC.

May 26, 2009

PRINCIPALS

THOMAS S. WITTEN, ASLA
President

R. STAN DUNCAN, ASLA
Executive Vice-President

RUSSELL Y. J. CHUNG, FASLA
Executive Vice-President

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Tel: (808) 242-2878

Mr. George P. Young, P.E.
Chief, Regulatory Branch
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawai'i 96859-5440

SUBJECT: PRE-CONSULTATION COMMENTS TO THE UNIVERSITY OF HAWAI'I AT MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

Dear Mr. Young,

Thank you for your letter dated December 4, 2008.

We acknowledge that based on the information provided, and sources available to the Department of the Army, the entire subject area is absent of waters subject to the Corps jurisdiction. In addition, we concur that the project will not include activities involving the discharge of dredges and/or fill in the Waters of the United States.

We further acknowledge that a Department of the Army (DA) permit is not required, and that this jurisdictional determination (JD) is valid through December 4, 2013 for this and future projects proposed within TMK 128023003 that do not require work in or near the vicinity of Mānoa Stream.

Thank you again for your participation in the Environmental Assessment process. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

Malia M. Cox
Environmental Planner

cc: Ms. Katherine P. Kealoha, Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawai'i at Mānoa
Mr. Bruce Teramoto, University of Hawai'i at Mānoa
Mr. Vinson Hiraoka, KYA Design Group

Job 26\2652.03\Response to ACOE

APPENDIX B
PUBLIC REVIEW LETTERS AND RESPONSES

LINDA LINGLE
GOVERNOR OF HAWAII



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

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

In reply, please refer to:
EPO-08-181

January 6, 2009

Ms. Malia Cox
PBR Hawaii
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Ms. Cox:

SUBJECT: Draft Environmental Assessment for the University of Hawaii at Manoa Campus
Center Renovation and Expansion
Honolulu, Oahu, Hawaii
TMK: (1) 2-8-023: 003 (portion)

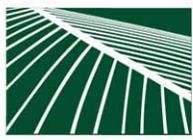
Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have no comments at this time. We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

If there are any questions about these comments please contact Jiakai Liu with the Environmental Planning Office at 586-4346.

Sincerely,

KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO



May 26, 2009

PRINCIPALS

THOMAS S. WITTEN, ASLA
President

R. STAN DUNCAN, ASLA
Executive Vice-President

RUSSELL Y. J. CHUNG, FASLA
Executive Vice-President

VINCENT SHIGEKUNI
Vice-President

GRANT T. MURAKAMI, AICP
Principal

Mr. Kelvin Sunada, Director
 State of Hawai'i
 Department Of Health
 Environmental Planning Office
 PO Box 3378
 Honolulu, Hawai'i 96801

Attn: Mr. Jiakai Liu

CHAIRMAN EMERITUS

W. FRANK BRANDT, FASLA
Chairman Emeritus

**SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE
 UNIVERSITY OF HAWAII AT MĀNOA CAMPUS CENTER
 RENOVATION AND EXPANSION**

ASSOCIATES

TOM SCHNELL, AICP
Senior Associate

RAYMOND T. HIGA, ASLA
Senior Associate

KEVIN K. NISHIKAWA, ASLA
Associate

KIMI MIKAMI YUEN, LEED®AP
Associate

SCOTT ALIKA ABRIGO
Associate

SCOTT MURAKAMI, ASLA, LEED®AP
Associate

DACHENG DONG, LEED®AP
Associate

Dear Mr. Sunada,

Thank you for your letter dated January 6, 2009 (your reference number: EPO-08-181). We acknowledge that the letter was routed throughout the Environmental Health Administration for comment and that the Environmental Planning Office has no comments to offer on the subject matter at this time.

At your request, we have reviewed the standard comments listed on the website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html and provide the following responses.

It is our understanding that following water bodies have been listed as impaired on the Hawai'i State Department of Health's, *2006 State of Hawai'i Water Quality Monitoring and Assessment Report*, as approved by US Environmental Protection Agency, Region 9, February 7, 2008.

Listed Water body	Pollutant
Mānoa Stream	Nutrients, turbidity, dieldrin, total chlordane
Ala Wai Canal and Harbor	chlorophyll a, nitrogen, total P, turbidity, fecal coliform, enterococci, metals, suspended solids, organochlorine, pesticides, lead

While Total Maximum Daily Load (TMDL)s have only been established for nutrient loadings (nitrogen 200 ug/L, phosphorus 25 ug/L) for the Ala Wai Canal, none have been established for Mānoa Stream. Establishment of TMDLs for the remainder of the pollutants in the Ala Wai and Mānoa Stream have not been scheduled. Additionally, the remaining pollutants have been given a TMDL development priority code of "low."

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 Fax: (808) 961-4989

WAILUKU OFFICE
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 Wailuku, Hawai'i 96793-1271
 Tel: (808) 242-2878

Mr. Kelvin Sunada

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAI'I AT
MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

May 26, 2009

Page 2 of 2

As indicated in section 4.8.3 of the Draft Environmental Assessment, every effort will be made to ensure that the proposed project will not impact Mānoa Stream (and then in turn Ala Wai Canal/Harbor, and the Pacific Ocean) through the implementation of best management practices (BMPs) as needed for coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit for Construction. Once operational, runoff generated from the proposed project will be directed to new storm drain connection(s) adjacent to the facility. In addition, as part of the redevelopment of the campus as described in the 2007 Long Range Development Plan, the total permeable surface area will be increased as well as canopy cover. Both an increase in canopy cover and permeability will increase in infiltration rate reducing potential stream loading. This is important especially since chlordane, a listed pollutant of Mānoa Stream has been found in the soil on campus.

The text in section 4.8.3 will be revised to also include the potentially affected waterbodies, pollutant, and established TMDL as indicated above per the recommendation in the standard comments.

Thank you again for your participation in the Environmental Assessment process. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,



Malia M. Cox

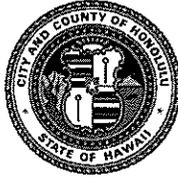
Environmental Planner

cc: Ms. Katherine P. Kealoha, Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawai'i at Mānoa
Mr. Bruce Teramoto, University of Hawai'i at Mānoa
Mr. Vinson Hiraoka, KYA Design Group

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 523-4730 • Internet: www.honolulu.gov

MUFI HANNEMANN
MAYOR



WAYNE Y. YOSHIOKA
DIRECTOR

RICHARD F. TORRES
DEPUTY DIRECTOR

TP12/08-289605R

January 7, 2009

Ms. Malia Cox
PBR Hawaii
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Ms. Cox:

Subject: Campus Center Renovation and Expansion Draft Environmental Assessment

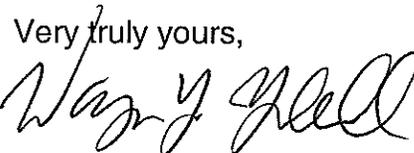
This is in response to your letter of November 25, 2008, requesting our review of the Draft Environmental Assessment (DEA) for the University of Hawaii at Manoa Campus Center Renovation and Expansion Draft Environmental Assessment. We offer the following comments:

1. Our Traffic Engineering Division notes that the project is subject to any applicable conditions of the Plan Review Use for the update to the UH Manoa Long-Range Development Plan.
2. In the DEA you assert that parking supply and demand associated with the project is accommodated within the overall campus parking system. As such, please note and review our department's comments on UH's Long Range Development Plan 2007 Update Draft Environmental Assessment.
3. The Roadways and Traffic section of the Final Environmental Assessment should focus more directly on this project's direct traffic impact. All potential traffic generated by the expansion itself should be assessed and disclosed. The Traffic Impact Analysis Report should be included as an appendix.
4. The DEA mentions that the Campus Center will be a social center on campus. Therefore, an ADA accessible pedestrian connection from the Campus Center to the bus stop on University Avenue at Sinclair Circle should be considered.

Ms. Malia Cox
Page 2
January 7, 2009

5. The developer should consult with our Public Transit Division (PTD) if the construction plans include the use of the parking lots off Sinclair Circle and Dole Street as this could impact our bus operations and service to the campus.

Should you have any questions on the matter, please contact Mr. Brian Suzuki at 768-8349.

Very truly yours,


WAYNE Y. YOSHIOKA
Director

cc: Office of Environmental Quality Control
University of Hawaii at Manoa



PBR HAWAII

& ASSOCIATES, INC.

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May 26, 2009

Mr. Wayne Y. Yoshioka, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawai'i 96813

Attn: Mr. Brian Suzuki

**SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE
UNIVERSITY OF HAWAII AT MĀNOA CAMPUS CENTER
RENOVATION AND EXPANSION**

Dear Mr. Yoshioka,

Thank you for your letter dated January 7, 2009 (your reference number: TP12/08-289605R). We have reviewed your letter and provide the following responses.

1. We acknowledge the Traffic Engineering Division's assessment that the Campus Center Renovation and Expansion project will be subject to new Plan Review Use (PRU) permit conditions. In September 2008, the University prepared a Draft Environmental Assessment/Plan Review Use for the LRDP. The University has been informed that the proposed project will be reviewed in conjunction with the new PRU permit application and will be subject to any applicable conditions.
2. At your request we have reviewed your department's comments to UH's Long Range Development Plan 2007 Update Draft Environmental Assessment.

One of the goals of Campus Center Renovation and Expansion project is the integration of the Recreation Center into the center of campus. The University of Hawai'i has long been considered a "commuter campus." By providing recreational facilities and other student services in a centralized location on-site, students, faculty and staff will not need to utilize public or private transportation to leave campus (or to get to some of the further reaches on campus) for some of their social, recreational

Mr. Wayne Yoshioka

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAII AT
MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

February 10, 2009

Page 2

and exercise needs. This project along with others described in the LRDP 2007 EA are designed to help get Campus Center patrons out of their cars and onto campus for more than just their classes, as well as create more of a sense of “campus life”, and for those students, residing on campus, a more complete, walkable campus.

In addition to providing to providing a centralized location for services that students currently have to drive around town to get to, it will also centralize a number of activities that currently occur elsewhere on campus. By consolidating activities in one location, users of the Campus Center Complex are more likely to choose alternatives to automotive transportation to get from one activity to the next.

As indicated in your comments to the LRDP, one of the issues is the utilization of “free parking” off campus. Parking off campus is viable option for members of the University Community that have to make several trips off campus to conduct their daily business but don’t want to pay for “in and out” privileges. The consolidation of services onsite potentially reduces the need for frequent trips to and from campus.

3. We acknowledge your assessment that the Campus Center Renovation and Expansion Environmental Assessment should focus more directly on this project’s direct traffic impact, and that traffic generated by the expansion itself should be assessed and disclosed and that the Traffic Impact Analysis Report (TIAR) should be included as an appendix.

We respectfully disagree with this assessment. This project must be viewed in the context of the overall University’s impact on traffic. The University’s impact on surrounding public arterials is driven primarily by the location of parking both on and offsite and the student enrollment. Patrons of the expanded and renovated Campus Center will continue to park in existing facilities, or in new facilities when they come online. Because there will be no change in available parking facilities with the development of the Campus Center Renovation and Expansion Project, direction and flow of vehicular traffic will not change. In addition, the development of the Campus Center Renovation and Expansion project will not change the projected enrollment for the University.

The TIAR was included as Appendix B in the Draft Environmental Assessment. It will also be included in Appendix C of the Final Environmental Assessment.

Mr. Wayne Yoshioka

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAI'I AT
MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

February 10, 2009

Page 3

4. We acknowledge your assessment that the Campus Center will be the social center of campus and your recommendation for Americans with Disabilities Act (ADA) accessible pedestrian connections. Thank you for this suggestion. The University strives to ensure accessibility for all patrons and visitors of the University. All aspects of the Campus Center Renovation and Expansion project, including but not limited to walkways and paths connecting the Campus Center complex to surrounding facilities, will be designed to meet the applicable requirements of the ADA and the Architecture Barriers Act. Your suggestion to create an accessible connection from the Campus Center Complex to the bus stop at Sinclair Circle will be forwarded to the University of Hawai'i's Office of Capital improvement.
5. As requested, the University of Hawai'i will consult the Public Transit Division of the Department of Transportation Services if construction plans require the utilization of Sinclair Circle and Dole Street Parking areas.

Thank you again for your participation in the Environmental Assessment process. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,



Malia M. Cox
Environmental Planner

cc: Ms. Katherine P. Kealoha, Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawai'i at Mānoa
Mr. Bruce Teramoto, University of Hawai'i at Mānoa
Mr. Vinson Hiraoka, KYA Design Group

LINDA LINGLE
GOVERNOR OF HAWAII



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



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED

DEC 03 2008

PBR HAWAII

November 28, 2008

University of Hawaii at Manoa
2500 Campus Road, Hawaii Hall 307D
Honolulu, Hawaii 96822

Attention: Mr. Brian Minaai

Gentlemen:

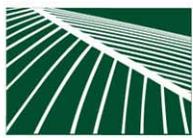
Subject: Campus Center Renovation and Expansion

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charles E. Unoki
for Morris M. Atta
Administrator

Cc: OEQC
PBR Hawaii & Associates, Inc.



PBR HAWAII

& ASSOCIATES, INC.

May 26, 2009

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

Attn: Ms. Charlene Unoki

**SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE
UNIVERSITY OF HAWAII AT MĀNOA CAMPUS CENTER
RENOVATION AND EXPANSION**

Dear Mr. Atta,

Thank you for your letter dated November 28, 2008. We acknowledge that the Department of Land and Natural Resources' has no comments to offer on the subject matter.

Thank you again for your participation in the Environmental Assessment process. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

Malia M. Cox
Environmental Planner

cc: Ms. Katherine P. Kealoha, Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawai'i at Mānoa
Mr. Bruce Teramoto, University of Hawai'i at Mānoa
Mr. Vinson Hiraoka, KYA Design Group

Job 26\2652.03\Response to DLNR

DEPARTMENT OF FACILITY MAINTENANCE
CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768 -3381
Website: www.honolulu.gov

MUFI HANNEMANN
MAYOR



CRAIG I. NISHIMURA, P.E.
DIRECTOR AND CHIEF ENGINEER

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 08-1186

December 26, 2008

Ms. Malia Cox
PBR Hawaii
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Ms. Cox:

Subject: Draft Environmental Assessment (DEA)
Campus Center Renovation and Expansion
University of Hawaii at Manoa

Thank you for the opportunity to review and comment on the DEA dated November 2008 for the proposed renovation and expansion to the Campus Center at the University of Hawaii in Manoa.

We have no comments to offer as the proposed work will be within State property and will have negligible impact on our facilities and operations.

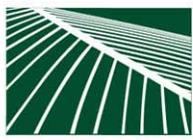
Should you have any questions, please call Charles Pignataro of the Division of Road Maintenance, at 768-3697.

Sincerely,



Craig I. Nishimura, P.E.
Director and Chief Engineer

c: Office of Environmental Quality Control
University of Hawaii at Manoa (Attention: Brian Minaai)



May 26, 2009

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RUSSELL Y. J. CHUNG, FASLA
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VINCENT SHIGEKUNI
Vice-President

GRANT T. MURAKAMI, AICP
Principal

Mr. Craig I. Nishimura, P.E.
Director and Chief Engineer
Department of Facility Maintenance
City and County of Honolulu
1000 Uluohia Street, Suite 215
Kapolei, Hawai'i 96707

Attn: Mr. Charles Pignataro

CHAIRMAN EMERITUS

W. FRANK BRANDT, FASLA
Chairman Emeritus

**SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE
UNIVERSITY OF HAWAII AT MĀNOA CAMPUS CENTER
RENOVATION AND EXPANSION**

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SCOTT MURAKAMI, ASLA, LEED®AP
Associate

DACHENG DONG, LEED®AP
Associate

Dear Mr. Nishimura,

Thank you for your letter dated December 26, 2008 (your reference number: DRM 08-1186). We acknowledge that the Department of Facility Maintenance has no comments to offer as the improvements proposed in the Draft Environmental Assessment are within State property and will have negligible impact on the City and County of Honolulu's facilities and operations.

Thank you again for your participation in the Environmental Assessment process. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

Malia M. Cox
Environmental Planner

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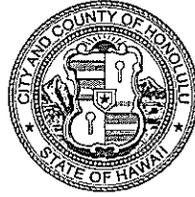
cc: Ms. Katherine P. Kealoha, Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawai'i at Mānoa
Mr. Bruce Teramoto, University of Hawai'i at Mānoa
Mr. Vinson Hiraoka, KYA Design Group

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DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 768-8000 • FAX: (808) 527-6743
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MUFI HANNEMANN
MAYOR

HENRY ENG, FAICP
DIRECTOR

DAVID K. TANOUE
DEPUTY DIRECTOR

2008/ELOG-2882(IK)

December 15, 2008

Ms. Malia M. Cox
PBR Hawaii & Associates, Inc.
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813-3484

Dear Ms. Cox:

Subject: Draft Environmental Assessment
University of Hawaii at Manoa
2444 Dole Street – Manoa
Tax Map Key 2-8-23: 3

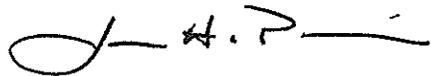
We have reviewed the Draft Environmental Assessment (DEA) for the proposed Campus Center renovation and expansion at the University of Hawaii at Manoa (University) and offer the following comments:

1. The project is proposed under the Long Range Development Plan 2007 Update for the University, which will require a new Plan Review Use (PRU) permit. Therefore, the proposed project will be reviewed in conjunction with the new PRU permit application.
2. The University is currently operating under the PRU No. 88/PRU-3 (Resolution No. 89-411,CD-2), approved on December 13, 1989, for the Five-Year Master Plan for the expansion of the University of Hawaii Manoa 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 by Resolution No. 06-255,CD1).
3. The applicant should clarify that, pursuant to Land Use Ordinance Section 21-2.120-3(b)(2), the new PRU application cannot be accepted for processing if, *"[O]ne or more conditions of the existing PRU which are due to be performed (other than conditions of a continuing nature whose performance is current) have not been fully performed."*

Ms. Malia M. Cox
December 15, 2008
Page 2

If you have any questions, please contact Lynne Kauer of our staff at 768-8016.

Very truly yours,

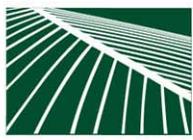


Henry Eng, FAICP, Director
Department of Planning and Permitting

HE:cs

cc: Office of Environmental Quality Control
UH Manoa

g:\landuse\posseworkingdirectory\lkauer\08\lg2882.doc



May 26, 2009

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Mr. Henry Eng, FAICP, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

Attn: Ms. Lynne Kauer

**SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE
UNIVERSITY OF HAWAI'I AT MĀNOA CAMPUS CENTER
RENOVATION AND EXPANSION**

Dear Mr. Eng,

Thank you for your letter dated December 4, 2008 [reference number: 2008/ELOG-2882(lk)]. We have reviewed your letter and provide the following responses.

1. We acknowledge your assessment that the Campus Center Renovation and Expansion has been proposed under the Long Range Development Plan 2007 Update (LRDP) for the University of Hawai'i Mānoa Campus and that this plan will require a new Plan Review Use (PRU) permit. In September 2008, the University prepared a Draft Environmental Assessment/Plan Review Use for the LRDP. The University has been informed that the proposed project will be reviewed in conjunction with the new PRU permit application.
2. We acknowledge that the University is currently operating und the PRU No. 88/PRU-3, approved initially in 1989, and amended through the approval of Resolution No. 92-286, CD-1, FD-1 and 06-255, CD-1. These approved resolutions modified PRU No. PRU No. 88/PRU-3 to allow for the increased seating capacity of the Stan Sheriff Center, and the redevelopment of Frear Residence Hall respectively.
3. Per your request, "The applicant should clarify that, pursuant to Land Use Ordinance Section 21-2.120-3(b)(2), the new PRU application cannot be accepted for processing if [O]ne or more conditions of the existing PRU which are due to be performed (other than conditions of a continuing nature whose performance is current) have not been fully performed," The text of section 5.2.4 of the Draft Environmental Assessment has been modified to include the following text.

Additionally, the University of Hawaii Office of Capital Improvements understands that, pursuant to Land Use Ordinance section 21-2.120-3(b)(2), the Plan Review Use application will only be accepted if the condition of the existing PRU have been fully performed.

Mr. Henry Eng

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAI'I AT
MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

May 26, 2009

Page 2

Thank you again for your participation in the Environmental Assessment process. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

A handwritten signature in black ink, appearing to read "Malia M Cox". The signature is fluid and cursive.

Malia M. Cox
Environmental Planner

cc: Ms. Katherine P. Kealoha, Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawai'i at Mānoa
Mr. Bruce Teramoto, University of Hawai'i at Mānoa
Mr. Vinson Hiraoka, KYA Design Group

FAX TRANSMITTAL SHEET**ENVIRONMENTAL CENTER**

University of Hawaii
2500 Dole Street, Kauss Annex 19, Honolulu, HI 96822
Telephone: (808) 956-7361 Fax: (808) 956-3980

DATE: 1/7/2009

FROM: Peter Rappa
Environmental Review Coordinator

TO: Bruce Teramoto, Office of Capital Improvements (956-3175)
Brian Minaai, Office of Capital Improvements (956-3175)
Malia Cox, PBR (523-1402)
OEQC (586-4186)

SUBJECT: **REVIEW OF DRAFT EA
UHM CAMPUS CENTER RENOVATION AND
EXPANSION
HONOLULU, OAHU**

No. of Pages: including cover sheet: _____



UNIVERSITY
of HAWAII
MĀNOA

January 7, 2009
EA: 00318

Mr. Bruce Teramoto
Office of Capital Improvements
University of Hawaii at Manoa
1960 East-West Road
Biomedical Services Building, B-102
Honolulu, HI 96822

Dear Mr. Teramoto:

Draft Environmental Assessment
University of Hawaii at Manoa
Campus Center Renovation and Expansion
Honolulu, Oahu

The University of Hawaii at Manoa's Campus Center Renovation and Expansion project includes construction at the site of Hemenway Hall, the Campus Center, and the Engineering Quadrangle. The project will also include a new indoor recreational facility that will be integrated with the Campus Center structure as well as renovation of Hemenway Hall's auditorium. Additionally, two portables will be removed or relocated, two of the four buildings comprising the Engineering Quadrangle will be removed, and the remaining two structures (the Ka Leo Building and Building 6) will be preserved in place. Hemenway Hall auditorium will be renovated in order to house operations displaced by construction in and around the Engineering Quadrangle. The University proposes to certify buildings at the Leadership in Energy and Environmental Design (LEED) Silver level.

This review was conducted with the assistance of Ryan Riddle, Environmental Center.

General Comments

This draft environmental assessment (DEA) has three deficiencies. First there are no artist renderings, drawings or simulations of what the new addition and renovations will look like when completed. It is difficult to determine the visual impact on the campus community of this project when there are no visual renderings. The absence of renderings also makes it difficult to conceptualize future viewplanes. One question we have is will the architectural design and theme of the recreational center be consistent with that of the existing Campus Center building?

Second, there are no use figures for the existing structure and no figures on how many students, faculty and staff it will serve once the new construction and renovations are completed. We

January 7, 2009

Page 2

believe an analysis of use should be central to good planning and it must have been done at some time. If the data exists, it should be incorporated in the DEA. If it doesn't exist, it should be collected. At the very least there should be some data presented on the number of people who use the facilities, which parts the use and the variation of use by time of day. We would also like to know how much additional use is estimated to occur once the Campus Center is refurbished.

The Campus Center/Engineering Quadrangle sustains a lot of foot traffic throughout the week. Current pedestrian traffic is jumbled and congested in and around the Quadrangle. How will the project address this congestion? How will foot traffic patterns be altered during and after project completion?

Finally, there are no figures of how much this will cost. The University must have some idea of how much the addition and renovation will cost because they have to budget for it. It shouldn't be difficult to report how much it is estimated to cost.

In addition to our general comments, we also have several specific comments.

Environmental Sustainability (pp. 6-7)

The University's Long Range Development Plan (LRDP) is introduced at the top of page 7 without any explanation of what it is, when it was prepared, or any of the goals, objectives or major themes except for Sustainability. There should be a brief, but fuller introduction of the LRDP than what is presented in this document because it sets the stage for the changes being proposed in this DEA.

Later in this same section on page 7 there is the introduction of an "East-West Mall". How far along Campus Road will the mall run?

Project Implementation (p. 8)

Is there any consideration that the start of the project will coincide with the beginning of the new semester at UHM? This is a time where there is the greatest number of students on campus. We wonder if another starting date may be more advantageous.

Historical Resources (pp. 17-18)

We laud the University for preserving some of the historical buildings on campus. We wish more developers would preserve historical structures.

Hazardous Materials (p. 20)

What is the extent of chlordane within the soil on campus? How and at what point did this contamination occur?

January 7, 2009

Page 3

The last sentence in paragraph three needs revising.

Traffic Impacts Associated with Implementation of the Proposed Project and the Rest of the Updated LRDP (p. 33)

What is the timeframe for the removal of the road fronting Hemenway Hall? How will the lack of roadway impact maintenance and other vehicles servicing the buildings? How will vehicle entry to and circulation within Varney Circle be modified?

Water Usage (p. 39)

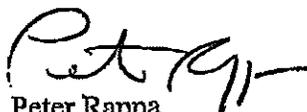
It has been over 5 years since the University of Hawaii has signed a memorandum of understanding with the Honolulu Board of Water Supply to establish a program for reducing water consumption and still there is no Water Management Plan to implement a reduction strategy. Will there ever be an implementation plan. Has the University been able to show that they have made any progress towards reducing their water usage by 10 percent a year?

Drainage System (p. 41)

Has any thought been given to collecting water runoff into cisterns or holding ponds that can be use for irrigation at a later date? This would seem to address two problems at once, both increased runoff due to an increase in the impervious surfaces around the renovated Campus Center and the use of potable water for irrigation.

Thank you for the opportunity to review this Draft EA.

Sincerely,



Peter Rappa
Environmental Review Coordinator

cc: OEQC
Malia Cox, PBR
Brian Minaai, Office of Capital Improvements
James Moncur, WRRC
Ryan Riddle



PBR HAWAII

& ASSOCIATES, INC.

PRINCIPALS

THOMAS S. WITTEN, ASLA
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May 26, 2009

Mr. Peter Rappa, Environmental Review Coordinator
Environmental Center
University of Hawaii
2500 Dole Street, Krauss Annex 19
Honolulu, Hawai'i 96822

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAI'I AT MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

Dear Mr. Rappa,

Thank you for your letter dated January 7, 2009. We offer the following responses to your comments:

General Comments-

View planes and Drawings

We acknowledge your concern that there are no artist renderings drawings or simulations of what the new addition will look like, and if it will be consistent with the existing building and the visual impact on future view planes.

At the release of the DEA, the only renderings available were for Alternative D-1, which would require the demolition of the remaining three buildings in the Engineering Quadrangle and the original Engineering Materials Testing Laboratory, not the preferred Alternative that preserves two of these historic structures. Drawings of the project in the preferred location as specified in Alternative D-3 have subsequently been made available. These drawings will be included in the Final Environmental Assessment.

The design of the Recreation Center, which is part of the greater Campus Center Renovation and Expansion project, will be consistent with the overall Campus Center design and theme once the all renovations are all completed. A majority of the renovations to the existing facilities will occur during phase three of the project as addressed on page 8 of the DEA.

It should be noted that the impact this project would have on scenic vistas and view planes identified by the State and County was addressed on page 65 of the DEA. A building placed at the location of the preferred alternative that is built

Mr. Peter Rappa

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAII AT
MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

May 26, 2009

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of similar character to the surrounding buildings will not impact identified vistas and view planes.

Usage Data

The Campus Center, Engineering Quadrangle, and Hemenway Hall, collectively known as the Campus Center Complex currently houses the following organizations and facilities: Administrative offices, Associated Students of the University of Hawaii, Ballroom facilities, Campus Center Marketing and Graphics Office, Computer Lab and Lounge, Co-curricular Activities, Programs and Services (CAPS), Dining spaces, Food service, Games room, Lounge space, Meeting rooms, Retail spaces, Student organizations offices, Ticket, Information & ID Office, University Bookstore, American Savings+ Bank, Barber Shop, Chartered Student Organization (CSO) offices, Dental Hygiene program clinic, Graduate Student Organization (GSO) offices, Hemenway Theater, KTUH student radio station, Leisure Center, Registered Independent Organizations (RIO) offices, Beau Press, Board of Publications (BOP) offices, Ka Leo O Hawaii, Duplicating Services, Family Resources, Ka Leo O Hawaii printing room, PEACESAT, Student Support Services. The Campus Center and Hemenway Hall will continue to house all of the organizations listed, however several will be relocated within the Campus Center Complex both during and after construction.

Based on usage of services and facilities (food services, meeting rooms, etc.), the Campus Center Complex is currently utilized between 8,000 and 10,000 times per day. Daytime usage is currently limited by current hours of operation and the number of facilities available. The Makai Campus Intramural program utilization of existing facilities is based on league and recreation play, and varies based on the sport season. During the 2008 fiscal year, there was a total of 21,275 participants utilizing the facilities for pick-up activities, or approximately 58 users per day. League play is conducted during the traditional school year only. During the last academic school year, 2007-2008, 1,931 individuals participated in league play. Each individual will use the facilities numerous time during league play, based on the schedule. The Intramural program is currently limited in part due to the shared use of facilities with the Athletics and Kinesiology departments. The Intramural Program does not have access to any facilities during the day. The proposed Recreation Center, phase II of the Campus Center Renovation and Expansion, is designed to augment the existing intramural program by providing a daytime location for patrons to exercise and recreate. In addition, the new facilities will provide facilities for individuals wishing to participate in open-gym and pick-up games during the day and evening hours.

The components of the proposed facility were designed based on usage data, and information collected during surveys and focus group sessions. Components were also chosen based on the University's desire to revitalize the heart of the campus, and to shift UH Mānoa's image away from that of a "commuter campus." It is estimated that the Campus Center Renovation and Expansion will increase daytime usage by 10-15 percent and evening usage by 100 percent.

Mr. Peter Rappa

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAII AT
MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

May 26, 2009

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Per your request, current and future usage data will be incorporated into the Final EA.

Pedestrian Traffic

Vehicular roads crossing between buildings currently impact foot traffic throughout the campus. Near the proposed project, pedestrians are forced into small sidewalks to avoid cars on Campus Road, Varney Circle, and roadways connecting the parking areas South of Miller Hall and adjacent to Andrews Amphitheater. The proposed project will include the development of walkways in the immediate vicinity of the project area. The walkways will be designed not only to meet Americans with Disabilities Act (ADA) requirements and Architectural Barriers Act (ABA), but also to facilitate movement of people throughout the campus center in both an aesthetic and efficient manner.

During construction, safety of the public is the foremost concern. Traffic, (both pedestrian and vehicles) will be routed around the construction zone. Signs and fences will be erected to ensure the safety of the public and to notify persons utilizing the area of alternative pedestrian pathways. Dust control, construction barriers, noise control, and other restrictions during school hours will be described and addressed in the construction documents.

Foot traffic in the vicinity of Miller Annex and PEACESAT buildings and the Engineering Quadrangle Complex, will be impacted. This is the site of the future Recreation Center, and pedestrian traffic will be prohibited during construction. Pedestrian traffic will also be limited in areas utilized for staging of equipment and/or materials as required by construction plans. These plans have not yet been developed but may include areas located to the west of the existing Campus Center Building and to the East of and South of Hemenway Hall. Every effort will be made to ensure the Monkeypod plaza between Campus Center and the Ka Leo Building are available for use during construction activities.

At build out, the preferred Alternative D-3 will be designed to integrate the new building into the Campus Center Complex without impacting the future East-West Plaza or the existing Monkeypod plaza between Campus Center and the Ka Leo Building. Wide paths conducive to high foot traffic are envisioned for the renovation and expansion project. The remainder of the Engineering Quadrangle will be within the proposed facilities footprint; therefore, the only foot traffic will be within the confines of the new structure.

Project Cost

According to the Campus Center Board, the remaining two phases of the project will cost approximately 45.3 million dollars of which \$21.5 million has been appropriated by the 2008 Legislature for phase II. A breakdown of costs, as well as funding source information can be found at the Campus Center Board's Campus Center Renovation and Expansion Project website at: <http://www.hawaii.edu/campuscenter/renovation/index.html>

Mr. Peter Rappa

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAII AT
MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

May 26, 2009

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Environmental Sustainability-

Introduction of the Long Range Development Plan (LRDP)

As noted, the University's LRDP was introduced without any explanation. This was an oversight. Thank you for the suggestion. A more detailed description will be included in the Environmental Sustainability section of the Final EA.

The East-West Mall

Incorporation of pedestrian malls and plazas has been included in Long Range Development Plans (LRDP) for the Mānoa campus since the 1987 LRDP. As early as 1987, the LRDP proposed to reverse the existing orientation on campus from vehicles to pedestrians through the development of malls, paths and plazas. As proposed in the current LRDP 2007 Update, the East-West Mall would run from University Avenue to Varney Plaza (currently Varney Circle). While the development of the mall and plaza will enhance the accessibility and aesthetics of the proposed project, they are separate projects. The impacts associated with the malls and plazas are at a minimum covered under the LRDP EA, but not the Campus Center Renovation and Expansion EA. Information regarding these and other projects proposed in the LRDP have been provided to inform the public of the future development plans that are being contemplated by the University, and how they might impact the proposed actions at the Campus Center, Hemenway Hall and the Engineering Quadrangle.

Project Implementation-

The University of Hawai'i at Mānoa's Office of Capital Improvements has been informed that the start of project construction should not coincide with the start of a new school semester, spring or fall.

Historical Resources-

Thank you for your acknowledgment of UH Mānoa's efforts to modernize the campus while preserving the history of the University through appropriate site selection and design.

Hazardous Materials-

Chlordane

Historically, Chlordane, a pesticide, was utilized throughout campus as to provide structures with protection from insects. According to University's Environmental Health and Safety Office (EHSO), Environmental Compliance Program Officer, the widespread use of chlordane occurred on campus until its use was banned by the State of Hawaii. Typically, chlordane was only applied within a few feet of a buildings foundation. To provide adequate protection to workers and the public, the EHSO will require a baseline soil survey be conducted for any soil disturbance within 5 feet of a building's foundation. While the State of Hawai'i, Department of Health's Environmental Action Level (EAL) for Chlordane is 16mg/kg, the

Mr. Peter Rappa

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAII AT
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May 26, 2009

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EHSO may require a Chlordane Work Plan if chlordane is detected at any concentration in any of the samples collected. To date, the maximum concentration of chlordane detected on campus was 25 mg/kg. It was found in one area near Hamilton Library. The concentrations from samples collected from all other locations surveyed have been below the EAL.

The Final EA will be modified to include information regarding the potential for a Chlordane Work Plan to be developed if it is detected during preliminary soil sampling.

Clarification of last sentence in Paragraph 3

The words "a risk" were inadvertently omitted from the sentence. The sentence will be revised in the Final EA as follows: *Without adequate control, these materials/wastes may pose a risk to workers and/or the general public.*

Traffic Impacts Associated with Implementation of the Proposed Project and the Rest of the Updated LRDP-

The removal of the roadway fronting Hemenway Hall may impact servicing and maintenance needs of the buildings along Campus Center Drive. According to the University's Office of Capital Improvements, the closing of the road is not designed to eliminate access to the areas by service carts or emergency vehicles.

As indicated in the LRDP, the pedestrian mall/plaza development will also include the conversion of Varney Circle to Varney Plaza. As such, this area would end vehicular circulation within Varney Circle.

None of the impacts associated with the proposed plaza, mall and pathway development have been addressed in the Campus Center Renovation and Expansion. Their description was included within this assessment primarily to inform the public of other projects proposed within the vicinity of the Campus Center Renovation and Expansion project. Your comments regarding traffic ramifications associated with projects within the scope of the LRDP will be forwarded onto the University.

Water usage

According to the LRDP 2007 Update, as indicated on page 40 of the DEA, the Memorandum of Understanding (MOU) between the Board of Water Supply (BWS) and the University included the goal of reducing water consumption. A water management plan has been programmed for development as part of the LRDP 2007 process.

The University is taking action to reduce water consumption. This includes installation of low-flow plumbing fixtures as older fixtures need to be replaced. The University has also been installing separate water meters for landscape irrigation and buildings, to document the

Mr. Peter Rappa

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAI'I AT
MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

May 26, 2009

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amount of water not being discharged into the wastewater system. This reduces the University's sewer fees, but will also help establish a baseline of water usage from which reductions in water use can be tracked. Based on report released by the University's Facilities Management Department in October 2008, as described on page 41 of The DEA, a strategy has been designed to facilitate the long-term goal of complete self-sufficiency from the BWS by 2050.

Drainage System

We acknowledge your suggestion to utilize water runoff retention receptacles for future irrigation needs. The proposal of such methods to reduce storm water runoff and irrigation needs was included in the Draft EA on page 42.

Thank you again for your participation in the Environmental Assessment process. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,



Malia M. Cox

Environmental Planner

cc: Ms. Katherine P. Kealoha, Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawai'i at Mānoa
Mr. Bruce Teramoto, University of Hawai'i at Mānoa
Mr. Vinson Hiraoka, KYA Design Group

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



December 22, 2008

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CLIFFORD P. LUM
Manager and Chief Engineer

DEAN A. NAKANO
Deputy Manager and Chief Engineer

Ms. Malia Cox
PBR Hawaii & Associates, Inc.
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Ms. Cox:

Subject: Your Letter Dated November 25, 2008 on the Draft Environmental Assessment for Campus Center Renovation and Expansion, TMK: 2-8-23:3

Thank you for the opportunity to comment on the proposed Campus Center Renovation and Expansion.

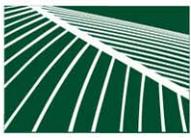
The comments in our letter date October 27, 2008, which is included in the document, are still applicable.

If you have any questions, please contact Robert Chun at 748-5443.

Very truly yours,

for 
KEITH S. SHIDA
Program Administrator
Customer Care Division

cc: Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawaii at Manoa



PBR HAWAII

& ASSOCIATES, INC.

May 26, 2009

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Mr. Keith S. Shida, Program Administrator
Customer Care Division
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawai'i 96813

Attn: Mr. Robert Chun

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAI'I AT MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

Dear Mr. Shida,

Thank you for your letter dated December 22, 2008. We acknowledge that the Board of Water Supply comments provided in a letter dated October 27, 2008, on the pre-consultation for the Draft Environmental Assessment, are still applicable.

Thank you again for your participation in the Environmental Assessment process. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

Malia M. Cox
Environmental Planner

cc: Ms. Katherine P. Kealoha, Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawai'i at Mānoa
Mr. Bruce Teramoto, University of Hawai'i at Mānoa
Mr. Vinson Hiraoka, KYA Design Group

Job 26\2652.03\Response to BWS

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CITY AND COUNTY OF HONOLULU

836 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd



MUFI HANNEMANN
MAYOR

KENNETH G SILVA
FIRE CHIEF

ALVIN K TOMITA
DEPUTY FIRE CHIEF

December 12, 2008

Ms. Malia Cox
PBR Hawaii & Associates, Inc.
American Savings Bank Tower
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Ms. Cox:

Subject: Draft Environmental Assessment (DEA)
Campus Center Renovation and Expansion
University of Hawaii at Manoa
Honolulu, Oahu, Hawaii
Tax Map Key: 2-8-023: 003 (Portion)

In response to your letter of November 25, 2008, regarding the above-mentioned project, the Honolulu Fire Department reviewed the materials provided and has no additional comments. Please refer to our comments dated October 30, 2008, which are included in the DEA.

Should you have any questions, please call Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 723-7151.

Sincerely,

KENNETH G. SILVA
Fire Chief

KGS/KB:bh

cc: Office of Environmental Quality Control
Brian Minaai, University of Hawaii at Manoa



PBR HAWAII

& ASSOCIATES, INC.

May 26, 2009

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Mr. Kenneth G. Silva, Fire Chief
Honolulu Fire Department
City and County of Honolulu
636 South Street
Honolulu, Hawai'i 96813-5007

Attn: Battalion Chief Socrates Bratakos

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAII AT MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

Dear Chief Silva,

Thank you for your letter dated December 22, 2008. We acknowledge that the Honolulu Fire Department has no additional comments to offer on the subject matter.

Thank you again for your participation in the Environmental Assessment process. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

Malia M. Cox
Environmental Planner

cc: Ms. Katherine P. Kealoha, Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawai'i at Mānoa
Mr. Bruce Teramoto, University of Hawai'i at Mānoa
Mr. Vinson Hiraoka, KYA Design Group

Job 26\2652.03\Response to HFD

**DEPARTMENT OF DESIGN AND CONSTRUCTION
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MUFI HANNEMANN
MAYOR



EUGENE C. LEE, P.E.
DIRECTOR
RUSSELL H. TAKARA, P.E.
DEPUTY DIRECTOR

December 22, 2008

Ms. Malia Cox
PBR Hawaii & Associates, Inc.
ASB Tower, Suite 650
1001 Bishop Street
Honolulu, Hawaii 96813-3484

Dear Ms. Cox:

Subject: Draft Environmental Assessment
Campus Center Renovation and Expansion

Thank you for giving us the opportunity to review the above Draft Environmental Assessment.

The Department of Design and Construction does not have any comments to offer at this time.

Very truly yours,

A handwritten signature in black ink, appearing to read "Eugene C. Lee".

For Eugene C. Lee, P.E.
Director

ECL:lt (289128)



PBR HAWAII

& ASSOCIATES, INC.

May 26, 2009

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Mr. Eugene C. Lee, P.E., Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawai'i 96813

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE UNIVERSITY OF HAWAII AT MĀNOA CAMPUS CENTER RENOVATION AND EXPANSION

Dear Mr. Lee,

Thank you for your letter dated December 12, 2008. We acknowledge that the Department of Design and Construction does not have any comments to offer on the subject matter at this time.

Thank you again for your participation in the Environmental Assessment process. If you have any questions regarding this project, please do not hesitate to contact me at 521-5631.

Sincerely,

Malia M. Cox
Environmental Planner

cc: Ms. Katherine P. Kealoha, Office of Environmental Quality Control
Mr. Brian Minaai, University of Hawai'i at Mānoa
Mr. Bruce Teramoto, University of Hawai'i at Mānoa
Mr. Vinson Hiraoka, KYA Design Group

Job 26\2652.03\Response to DDC

APPENDIX C
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



Austin, Tsutsumi & Associates, Inc.
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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

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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”.

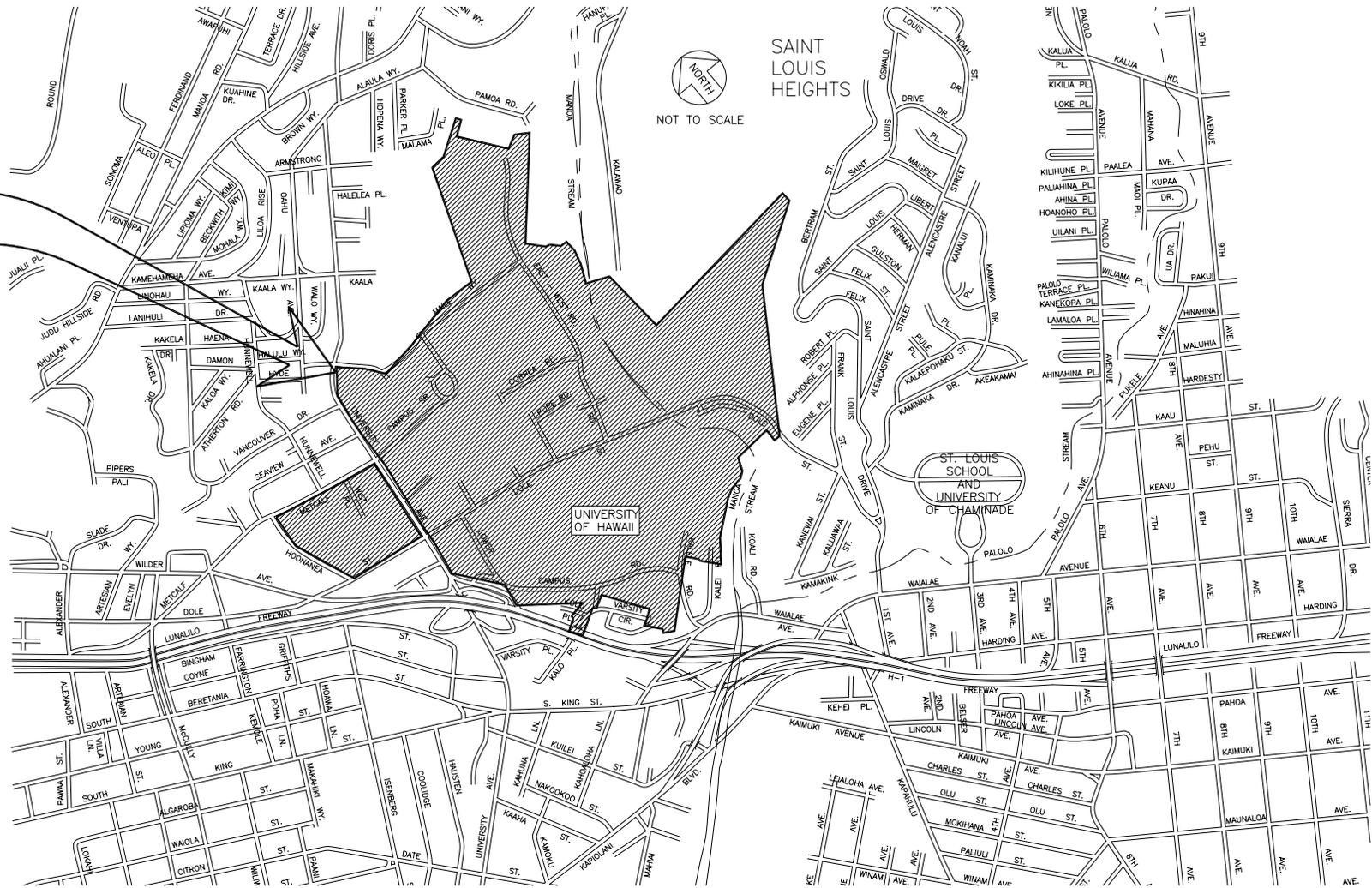
A. Background

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.

PROJECT
LOCATION



SAINT
LOUIS
HEIGHTS



NOT TO SCALE

UNIVERSITY
OF HAWAII

ST. LOUIS
SCHOOL
AND
UNIVERSITY
OF CHAMINADE

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

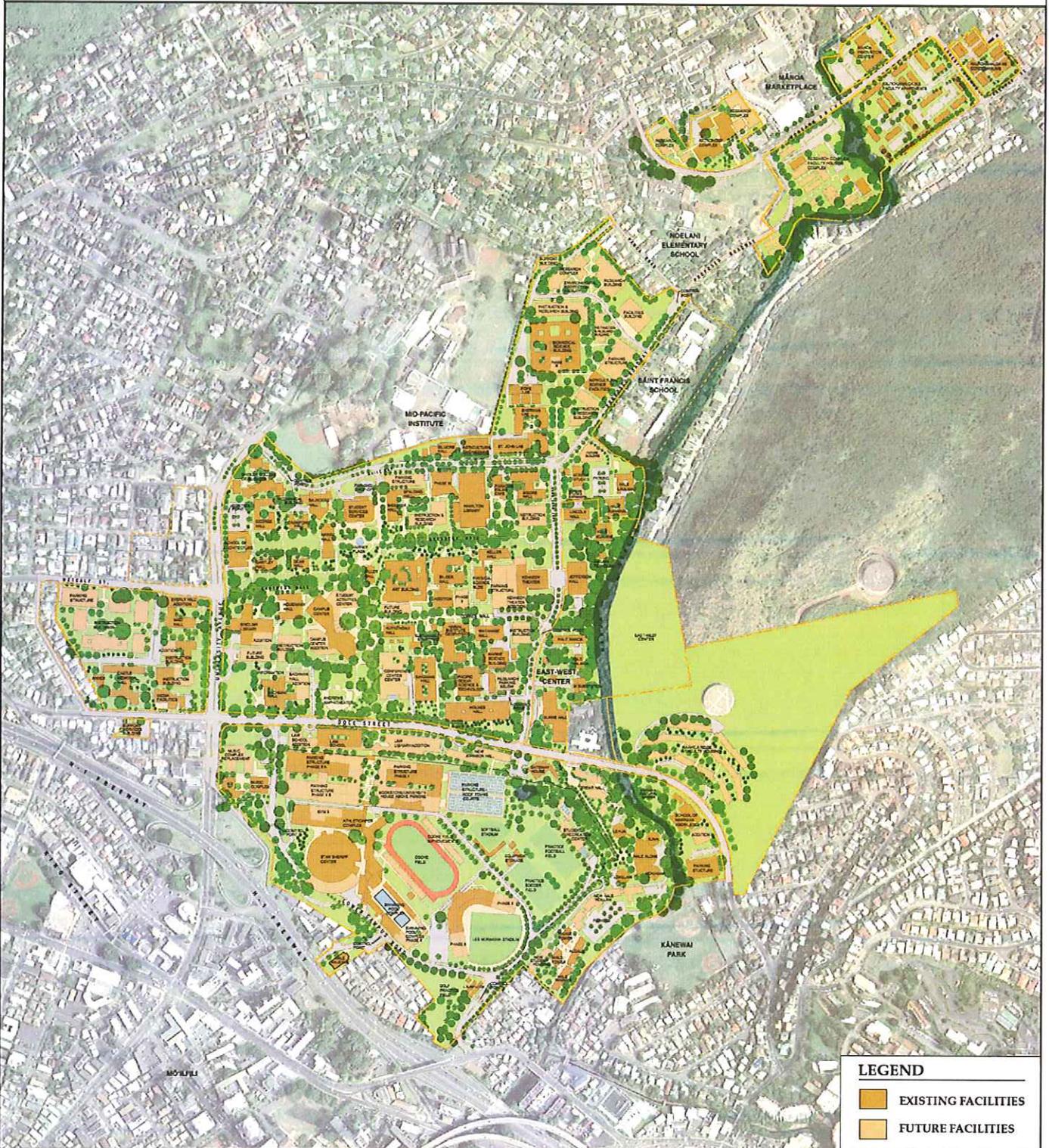
This study will address the following:

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.



LEGEND

- EXISTING FACILITIES
- FUTURE FACILITIES

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FIGURE
2

SITE PLAN

- **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 Pamoia 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, Pamoia 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.

Metcalfe 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 road 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.

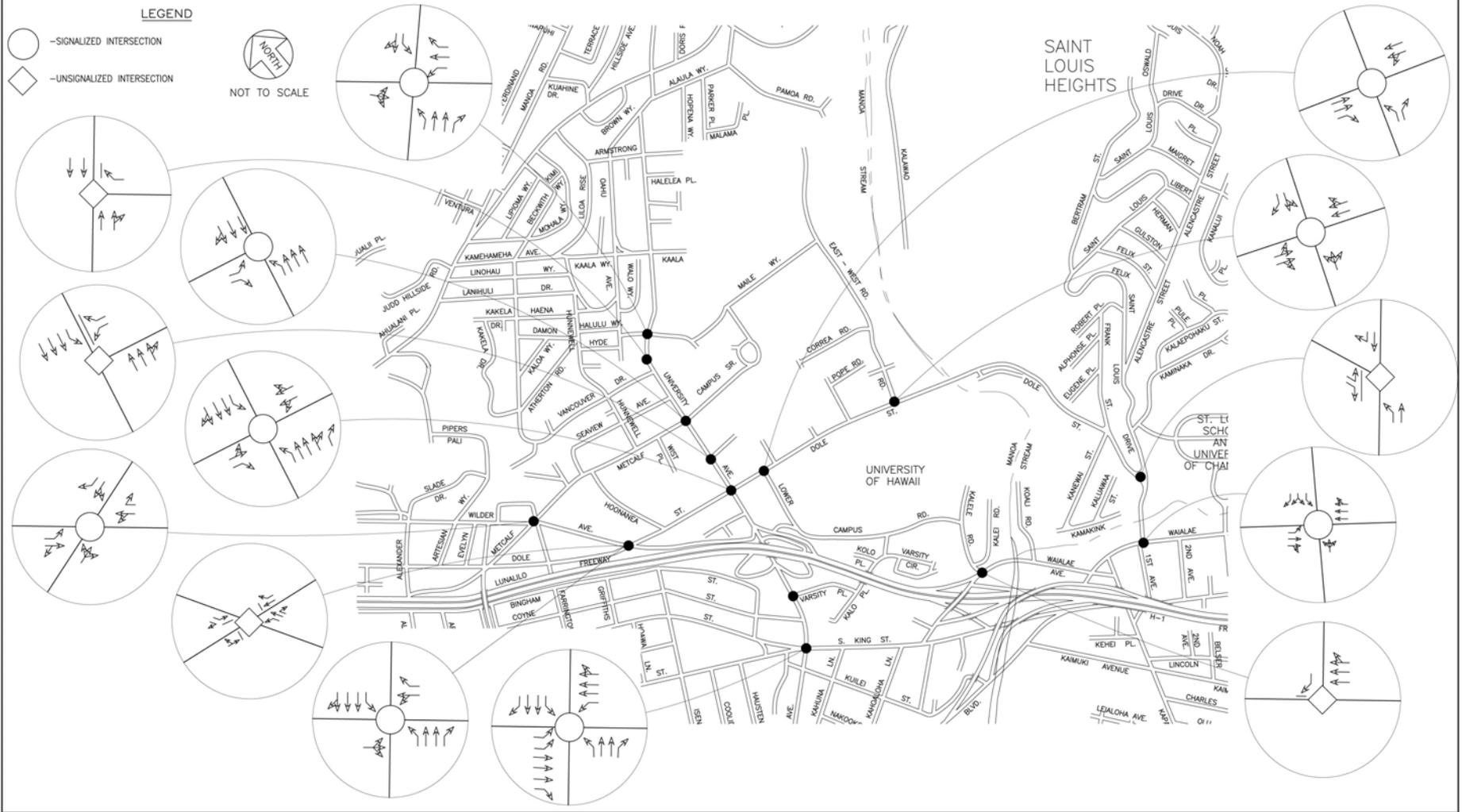
C. Existing Traffic Volumes

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/Metcalfe Street (signalized)
- University Avenue/School of Architecture entrance/exit (unsignalized)
- University Avenue/Maile Way (signalized)

- Wilder Street/Dole Street (unsignalized)
- Wilder Street/Metcalfe 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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EXISTING LANE CONFIGURATION

FIGURE
3

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 Waiialae 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 channeled 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.

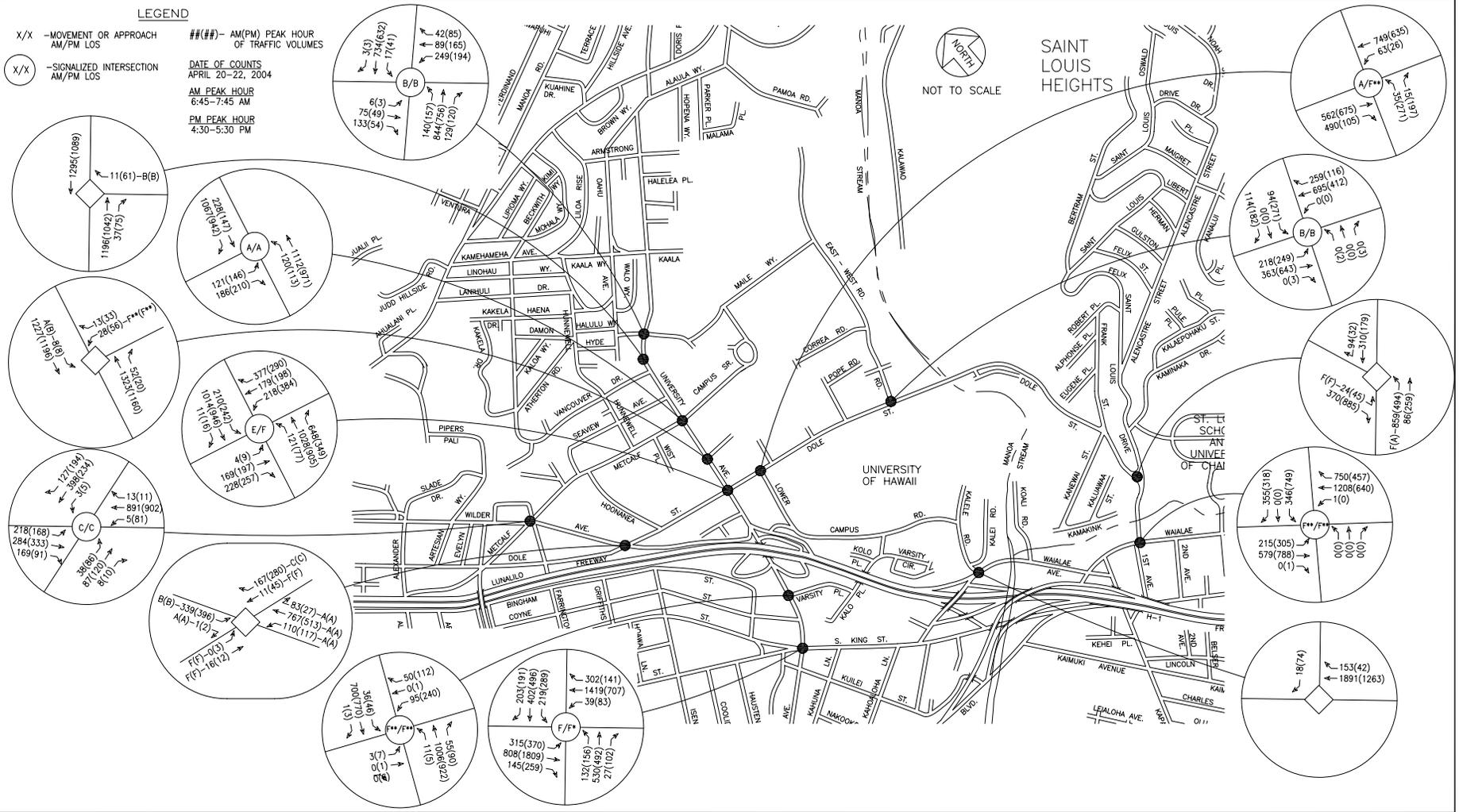
University Avenue/Varsity Place

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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EXISTING TRAFFIC VOLUMES AND LEVEL OF SERVICE

FIGURE 4

TABLE 1		
Existing Level of Service Summary		
Intersection	Existing	
	AM	PM
	LOS	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	PM
	LOS	LOS
<u>University Avenue/Metcalf Street</u>		
EB LT	C	B
EB RT	C	B
NB LT	A	B
NB TH	A	A
SB TH/RT	A	A
OVERALL	A	A
<u>University Avenue/School of Architecture</u>		
WB RT	B	B
<u>University Avenue/Maile Way</u>		
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
<u>Dole Street/Wilder Street</u>		
EB LT/TH	F	F
WB TH	F	F
WB RT	C	C
NB LT/TH	A	A
SB LT	B	B
<u>Wilder Street/Metcalf Street</u>		
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
<u>Dole Street/Lower Campus Road</u>		
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	PM
	LOS	LOS
<u>Dole Street/East-West Road</u>		
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
<u>Dole Street/Saint Louis Heights Drive</u>		
NB LT	F	A
SEB LT	F	F
<u>Waiālae/Saint Louis Heights Drive</u>		
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.

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 experience 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-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

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

LEGEND

- X/X - MOVEMENT OR APPROACH AM/PM LOS
- ##(###) - AM(PM) PEAK HOUR OF TRAFFIC VOLUMES
- X/X - SIGNALIZED INTERSECTION AM/PM LOS

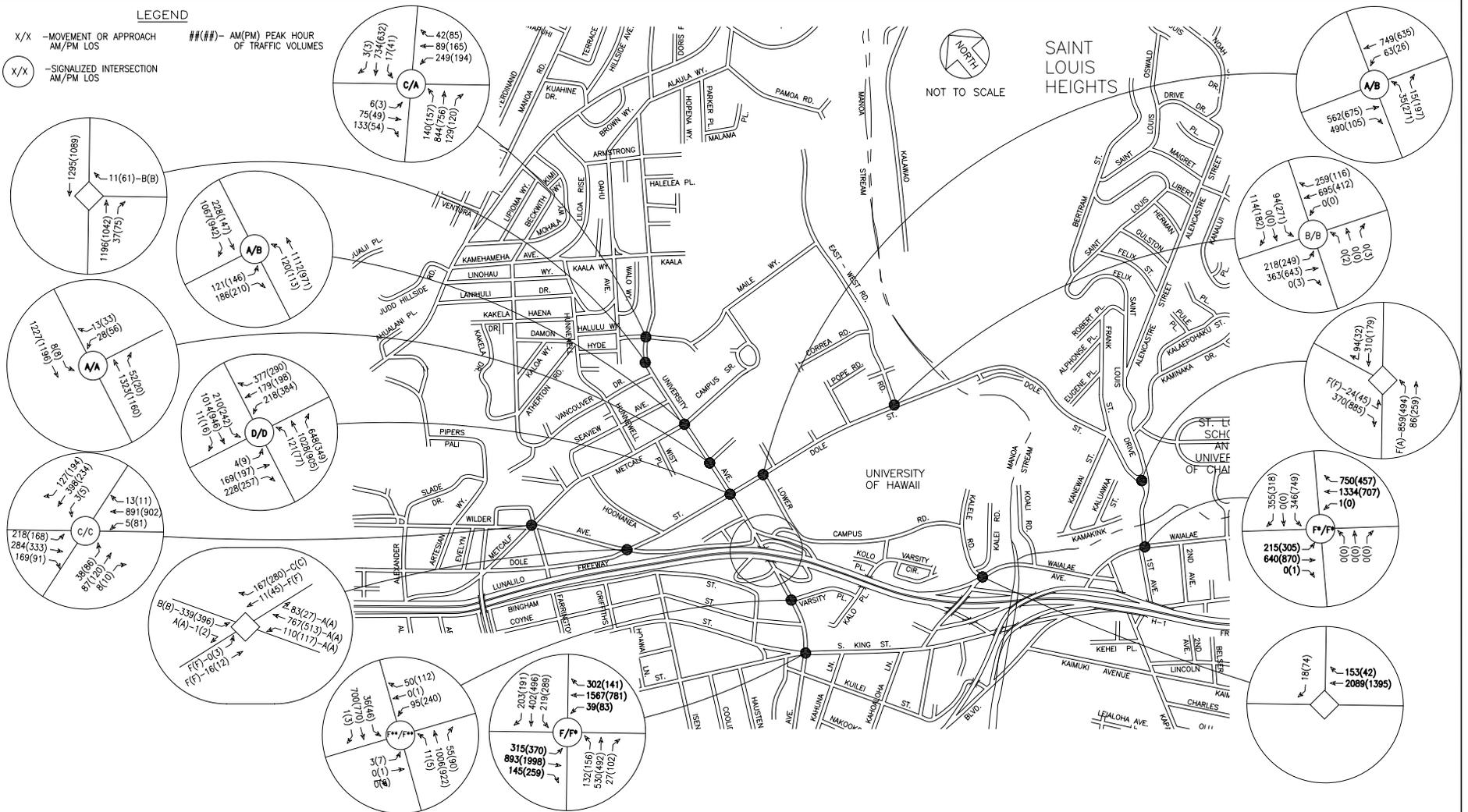


TABLE 2
Base Year 2017 Level of Service Summary

Intersection	Existing		Base 2017 (Timings Optimized)		Base 2017 with Mitigation	
	AM	PM	AM	PM	AM	PM
	LOS	LOS	LOS	LOS	LOS	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		Base 2017 (Timings Optimized)		Base 2017 with Mitigation	
	AM	PM	AM	PM	AM	PM
	LOS	LOS	LOS	LOS	LOS	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
<i>OVERALL</i>	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
<i>OVERALL</i>	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		
Wildier 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		
<i>OVERALL</i>	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
<i>OVERALL</i>	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		Base 2017 (Timings Optimized)		Base 2017 with Mitigation			
	AM	PM	AM	PM	AM	PM		
	LOS	LOS	LOS	LOS	LOS	LOS		
<u>Dole Street/East-West Road</u>								
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				
<i>OVERALL</i>	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>				
<u>Dole Street/Saint Louis Heights Drive</u>								
NB LT	F	A	C	A				
SEB LT	F	F	F	F				
<u>Waiialae/Saint Louis Heights Drive</u>								
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				
<i>OVERALL</i>	<i>E</i>	<i>C</i>	<i>f**</i>	<i>f**</i>				

* 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.

LEGEND

- X/X - MOVEMENT OR APPROACH AM/PM LOS
- ##(##) - AM(PM) PEAK HOUR OF TRAFFIC VOLUMES
- X/X - SIGNALIZED INTERSECTION AM/PM LOS

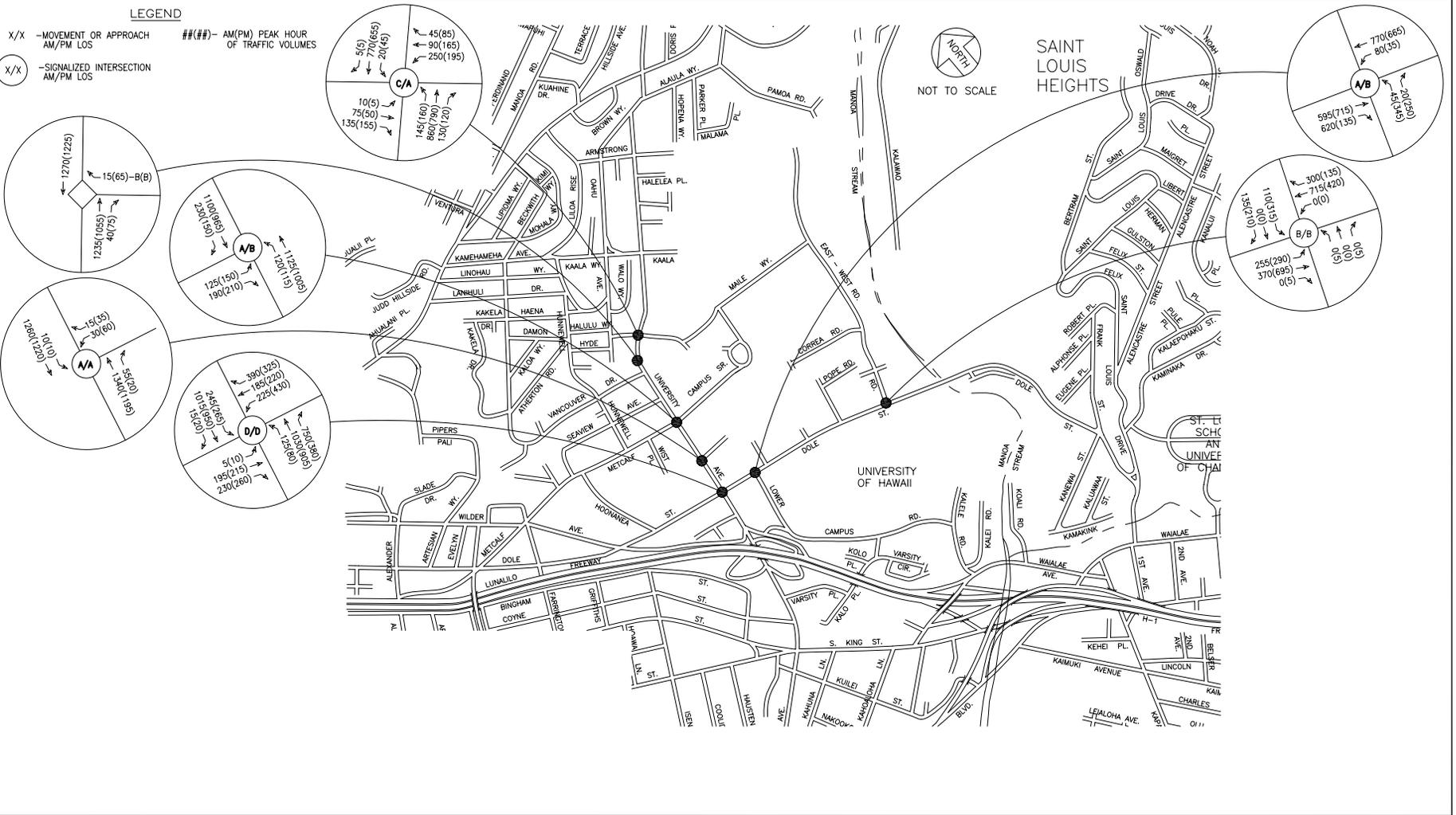


TABLE 3
Year 2017 with LRDP Update (Category 1 - 5-10 Years)

Intersection	Base 2017 (Timings Optimized)		Base 2017 with Mitigation		2017 with LRDP Update	
	AM	PM	AM	PM	AM	PM
	LOS	LOS	LOS	LOS	LOS	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)		Base 2017 with Mitigation		2017 with LRDP Update	
	AM	PM	AM	PM	AM	PM
	LOS	LOS	LOS	LOS	LOS	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
<i>OVERALL</i>	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
<i>OVERALL</i>	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				
<i>OVERALL</i>	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
<i>OVERALL</i>	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)		Base 2017 with Mitigation		2017 with LRDP Update	
	AM	PM	AM	PM	AM	PM
	LOS	LOS	LOS	LOS	LOS	LOS
<u>Dole Street/East-West Road</u>						
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
<i>OVERALL</i>	<i>B</i>	<i>B</i>			<i>B</i>	<i>C</i>
<u>Dole Street/Saint Louis Heights Drive</u>						
NB LT	C	A				
SEB LT	F	F				
<u>Waiialae/Saint Louis Heights Drive</u>						
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				
<i>OVERALL</i>	<i>f**</i>	<i>f**</i>				

* 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 Waiialae 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.
- Waiialae 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 experience 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-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

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

- 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 Waiialae 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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APPENDIX D
PARKING SUPPLY/DEMAND STUDY AND
SITE ALTERNATIVES EVALUATION

**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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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.



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.



Supply & Demand Analysis ■

Total Parking Supply

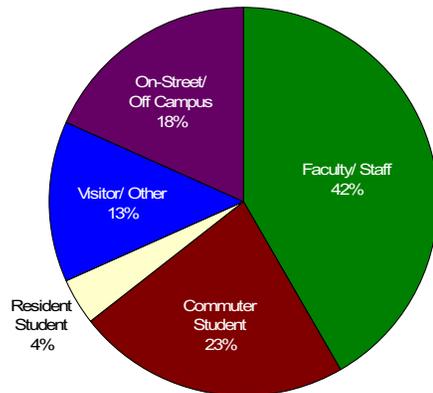
Table 2a below summarizes the current parking supply with regard to user group.

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**



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%



Supply & Demand Analysis ■

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

- 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

- 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.



Supply & Demand Analysis ■

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:

- 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.
- 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.
- 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.



Supply & Demand Analysis ■

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:

- 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.
- 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-classified 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%.



Supply & Demand Analysis ■

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		



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	
5 Parking Structure at Kennedy Theatre	-121
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 - Wa'iahila 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.



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.



Supply & Demand Analysis ■

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 Analysis ■

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.



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) Design - Aesthetically unobtrusive/ integration with	10%
D: 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 rankings 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	
	5%	5%	10%	20%	10%	30%	5%	15%	Points	Rank
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.



Site Alternatives Analysis ■

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).



Site Alternatives Analysis ■

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.



University of Hawai'i at Mānoa
Parking Supply/Demand Alternative Analysis

Appendix ■

Table 1a: Site Count Data Collection - Central Campus

Central Campus	Stalls	% over sell	Student Permits	Employee Permits	Daily Permits	Wednesday, September 12 (# empty spaces)				Thursday, September 13 (# empty spaces)			
						8am - 10am	10am - 12pm	12pm - 2pm	2pm - 4pm	8am - 10am	10am - 12pm	12pm - 2pm	2pm - 4pm
						Current	0	0	0	0	0	0	0
COMMUNITY COLLEGE (A)	22	0	30	0	4	3	5	7	0	4	3	6	6
PUBLIC TELEVISION (B)	15	0	21	0	4	1	5	5	4	3	9	9	
COLLEGE OF ED (C,D,E & F)	95	0	130	0	33	22	7	1	12	0	4	4	
ZONE 1 PARKING STRUCTURE	0	0	0	0	0	0	0	0	0	0	0	0	
Zone 1	132	137%	0	181	0	41	26	17	13	16	7	19	
					% utilization:	66%	80%	87%	90%	88%	95%	86%	
ARCHITECTURE BUILDING	146	0	152	10	69	43	38	32	73	52	43	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	10	
HEMINGWAY HALL (B)	13	0	15	0	9	6	3	4	8	2	6	6	
CAMPUS CENTER (C)	6	0	7	0	2	0	0	0	6	1	0	0	
CIRCLE TO SINCLAIR (D)	37	0	43	0	9	1	3	1	8	0	2	2	
VARSNEY CIRCLE (E)	23	0	0	23	-	-	-	-	-	-	-	-	
MID-PAC (Zone 16 on the map)	19	0	22	0	12	2	1	0	12	7	3	3	
MAILLE 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	1	
CRAWFORD HALL & SAUNDERS HALL	0	0	0	0	0	0	0	0	0	0	0	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	2	
MAILLE WAY	94	0	99	0	16	2	10	10	18	2	10	10	
SHERMAN LAB (under construction)	10	0	10	0	-	-	-	-	-	-	-	-	
ST. JOHN LAB	0	0	0	0	-	-	-	-	-	-	-	-	
HAMILTON LIBRARY	0	0	0	0	-	-	-	-	-	-	-	-	
ZONE 4 PARKING STRUCTURE	0	0	0	0	0	0	0	0	0	0	0	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	37	
FACILITIES MANAGEMENT (G)	60	0	69	5	5	3	5	14	6	2	11	11	
CREDIT UNION VISITOR	10	0	10	0	-	-	-	-	-	-	-	-	
ZONE 5 PARKING STRUCTURE	0	0	0	0	0	0	0	0	0	0	0	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	1	
KOREAN STUDIES (D, F & G)	156	0	175	10	51	12	6	19	53	16	16	16	
LINCOLN HALL	7	0	8	0	0	0	0	0	0	0	0	0	
KENNEDY Theatre VISITOR	7	0	7	0	-	-	-	-	-	-	-	-	
JEFFERSON HALL VISITOR	12	0	0	12	-	-	-	-	-	-	-	-	
PARADISE PALMS CAFE	0	0	0	0	-	-	-	-	-	-	-	-	
HALE LAULIMA	0	0	0	0	-	-	-	-	-	-	-	-	
Zone 6	227	120%	0	238	29	51	13	7	23	53	16	17	
					% utilization:	74%	93%	96%	88%	75%	92%	91%	
TRANS SVCS-INSIDE	39	0	51	0	3	4	9	21	13	7	19	19	
TRANS SVCS-OUTSIDE	12	0	16	0	0	0	0	6	1	0	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	1	
BURNS-IRAMOND HEAD (RESERVED)	20	0	20	0	-	-	-	-	-	-	-	-	
M SUBSTATION	0	0	0	0	-	-	-	-	-	-	-	-	
JEFFERSON HALL (C)	8	0	8	0	5	5	3	5	5	5	5	5	
HALE MANOA (B)	17	0	17	0	8	0	6	4	7	6	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	0	3	1	0	0	0	
Zone 10	64	100%	0	64	0	0	3	1	0	0	0	0	
					% utilization:	100%	100%	93%	98%	100%	100%	100%	
POST	56	0	50	0	7	2	3	3	6	0	7	7	
PACIFIC OCEAN SCIENCE	0	0	0	0	-	-	-	-	-	-	-	-	
MARINE SCIENCE & WATANABE HALL	0	0	0	0	-	-	-	-	-	-	-	-	
Zone 11	56	90%	0	50	0	7	2	3	3	6	0	7	
					% utilization:	88%	96%	95%	95%	89%	100%	88%	

Central Campus	Stalls Current	% over sell	Student Permits	Employee Permits	Daily Permits	Wednesday, September 12 (# empty spaces)					Thursday, September 13 (# empty spaces)				
						8am - 10am	10am - 12pm	12pm - 2pm	2pm - 4pm	8am - 10am	10am - 12pm	12pm - 2pm	2pm - 4pm		
						% utilization:									
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			
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	14	0	-	-	-	-	-	-	-				
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			
BACHMAN VISITOR	35	0	0	35	0	5	6	11	12	12	6				
ZONE 14 PARKING STRUCTURE	0	0	0	0	0	0	0	0	0	0	0	0			
Zone 14	35	100%	0	0	35	0	5	6	11	12	12	6			
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			
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			
CENTRAL SUBTOTAL	1,991	0	2,111	220	519	230	209	296	536	244	277				

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-classified 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 location.
- All visitor spaces are included in our inventory assessment. However, the utilization calculations were omitted.
- Space counts and utilization figures for Kennedy Theatre and Bachman Hall were included because these lots have always been dedicated for visitors and thus the data collected was representative of typical use.
2 Zone 4: 99 Employee permits for "Male Way" results from the (31) spaces counted from zone 3 multiplied by the corresponding 115% oversell factor.

Lower Campus	Stalls Current	% over sell	Student Permits	Employee Permits	Daily Permits	Wednesday, September 12 (# empty spaces)					Thursday, September 13 (# empty spaces)				
						8am - 10am	10am - 12pm	12pm - 2pm	2pm - 4pm	8am - 10am	10am - 12pm	12pm - 2pm	2pm - 4pm		
						% utilization:									
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			
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			
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			
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		0	0	0	0	0	0	0	0	0	0			
Zone 20	2939	140%	2160	1200	539	558	11	167	-	711	98	155			
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			
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			
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			
LOWER CAMPUS SUBTOTAL	3,509	2,426	1,378	665	673	120	358	(see note 1)	849	232	295				

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 TIME	Tickets Sold					Spaces Available		
	LC1	LC2	LC3	WAI	Total	Phase I	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 TIME	Tickets Sold					Spaces Available		
	LC1	LC2	LC3	WAI	Total	Phase I	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
				% utilization:	72%	88%	89%	84%	71%	87%	83%
LOWER CAMPUS SUBTOTAL	3,509	2,426	1,378	665	673	120	358	(see note 1)	849	232	295
				% utilization:	81%	97%	90%	(see note 1)	76%	93%	92%
TOTAL CAMPUS	5,500	2,426	3,489	885	1,192	350	567	(see note 1)	1,385	476	572
				% utilization:	78%	93%	89%	(see note 1)	74%	91%	89%

Notes:

1 Space counts were conducted by ULI 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%
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			Resident Students			Commuter Students			Visitors		
		Presence Factor	Driving Ratio	Parking Demand	Presence Factor	Driving Ratio	Parking Demand	Presence Factor	Driving Ratio	Parking Demand	Presence Factor	Driving Ratio	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 HAWAII
FALL 1996 TO FALL 2006**

FALL SEMESTER	TOTAL		UH AT MĀNOA		UH AT HILO		UH WEST O'AHU		UH COMMUNITY COLLEGES															
	No.	Pct	No.	Pct	No.	Pct	No.	Pct	SUBTOTAL		HAWAII		HONOLULU		KAPI'OLANI		KAUA'I		LEEWARD		MAUI		WINDWARD	
		Chg				Chg			Chg		No.	Chg	No.	Chg	No.	Chg	No.	Chg	No.	Chg	No.	Chg	No.	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 O'ahu.

Note: Data include special students (concurrents, early admits and auditors) for all years shown.

SOURCE: University of Hawai'i, Institutional Research Office; September 2006.

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
221000001	OFF VP AC AF			MANOA CAMPUS			1	1.00											1	1.00
221001001	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
221003001	OFF VP AC AF	UNIV OF HAWAII PRESS		MANOA CAMPUS	25	25.00	4	4.00	1	1.00									30	30.00
221004001	OFF VP AC AF	CENTER ON AGING		MANOA CAMPUS			1	1.00											1	1.00
221006001	OFF VP AC AF	MILITARY SCIENCE		MANOA CAMPUS			1	1.00									20	0.00	21	1.00
221007001	OFF VP AC AF	AEROSPACE STUDIES		MANOA CAMPUS			1	1.00									15	0.00	16	1.00
221008001	OFF VP AC AF	OFF FAC DEV & AC SUP		MANOA CAMPUS	7	7.00	2	2.00			3	2.93							12	11.93
221009001	OFF VP AC AF	FACULTY SENATE		MANOA CAMPUS			2	2.00											2	2.00
221101001	C ARTS & HUM	A&H DEANS OFF		MANOA CAMPUS	4	4.00	1	1.00	2	2.00	2	1.00							9	8.00
221111001	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
221112001	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
221113001	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
221114001	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
221115001	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
221116001	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
221117001	C ARTS & HUM	RELIGION DEPT		MANOA CAMPUS			1	1.00			7	7.00	6	2.50	2	0.43			16	10.93
221118001	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
221230001	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
221231001	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
221233001	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
221234001	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
221235001	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
221236001	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
221237001	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
221238001	C OF L L L	LINGUISTICS DEPT		MANOA CAMPUS			2	2.00			14	13.00	31	8.00			12	0.00	59	23.00
221239001	C OF L L L	INTERPRT & TRANS STU		MANOA CAMPUS							3	2.50					1	0.00	4	2.50
221340001	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
221341001	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
221342001	C OF NAT SCI	BOTANY DEPT		MANOA CAMPUS	2	2.00					20	19.75	25	12.50			15	0.00	62	34.25
221343001	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		
221346001	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
221347001	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
221349001	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
221351001	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
221352001	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
221353001	C OF NAT SCI	EECB		MANOA CAMPUS	1	0.75											6	0.00	7	0.75
221354001	C OF NAT SCI	MARINE OPTION PROG		MANOA CAMPUS	2	1.50													2	1.50
221355001	C OF NAT SCI	LYON ARBORETUM		MANOA CAMPUS			1	1.00											1	1.00
221460001	C OF SOC SCI	SOC SCI DEANS OFF		MANOA CAMPUS	7	7.00	2	3.00	2	2.00									11	12.00
221461001	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
221462001	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
221463001	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
221464001	C OF SOC SCI	ETHNIC STUDIES PROG		MANOA CAMPUS							10	10.00	1	0.50	1	0.88			12	11.38
221465001	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
221466001	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
221468001	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
221469001	C OF SOC SCI	POP STUDIES PROG		MANOA CAMPUS													1	0.00	1	0.00
221470001	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
221471001	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
221472001	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
221473001	C OF SOC SCI	WOMENS STUDIES PROG		MANOA CAMPUS			1	1.00			5	5.00	2	1.00	2	0.43			10	7.43
221474001	C OF SOC SCI	PUBLIC ADMIN		MANOA CAMPUS							6	6.00	1	0.50	1	0.21			8	6.71
221475001	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
221583001	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
221583021	CL A&S DEANS	A&S ACADEMIC AFF	LIBERAL STU	MANOA CAMPUS			1	0.50			4	3.96							5	4.46
221583031	CL A&S DEANS	A&S ACADEMIC AFF	HONORS PROG	MANOA CAMPUS			1	1.00			2	1.71							3	2.71
221587001	CL A&S DEANS	A&S STUDENT SERV		MANOA CAMPUS							1	1.00							1	1.00
221587011	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

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	12.84	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 PEOPLESFT
 o:\ssa\datawhse\hdct-qtr uhm307.xls

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	HDCT
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							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
 o:\ssa\datawhse\hdct-qtr uhm307.xls

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 REGISTRATION STATUS	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
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.

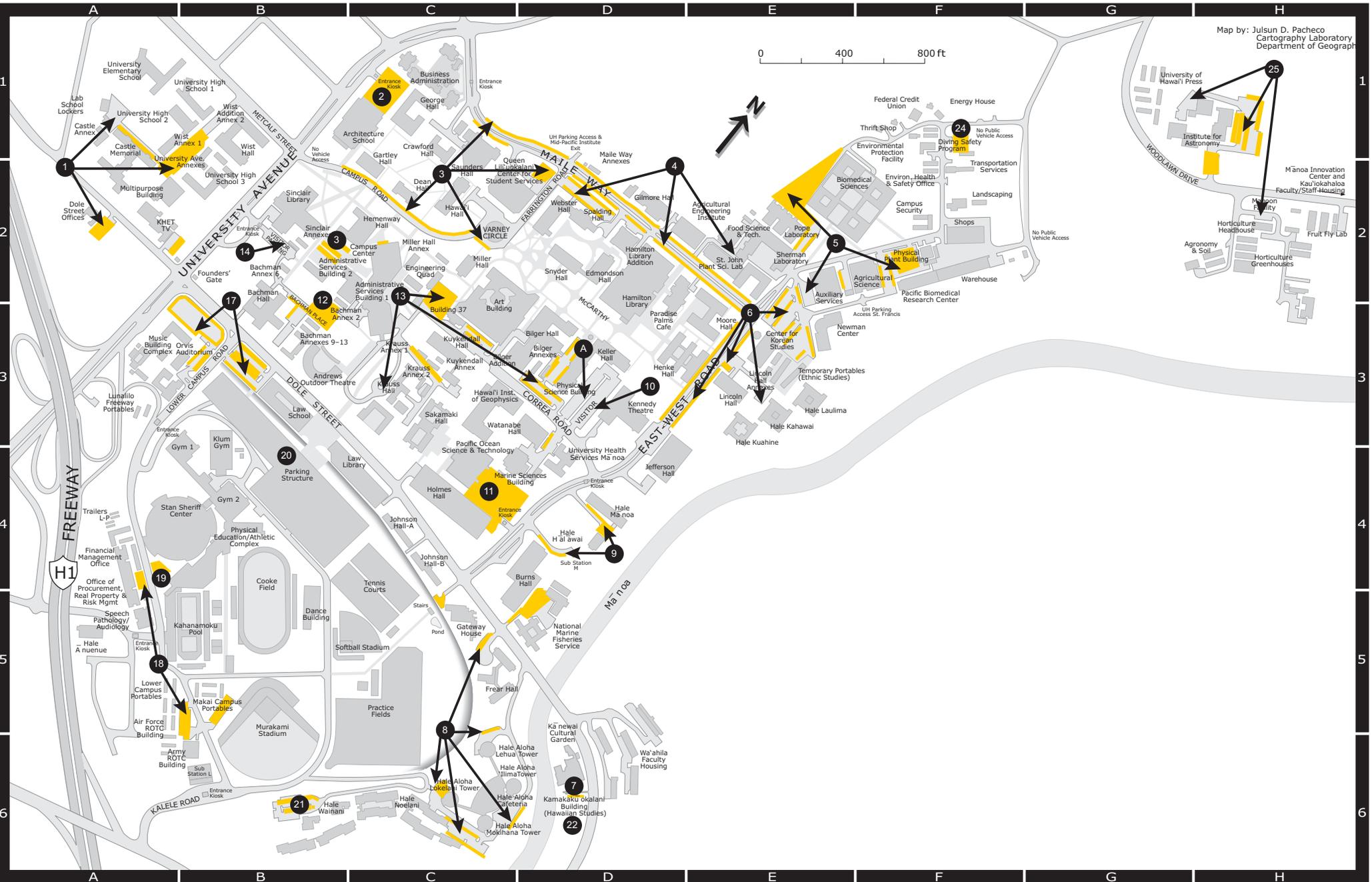
3/ Includes records with invalid data on education level.

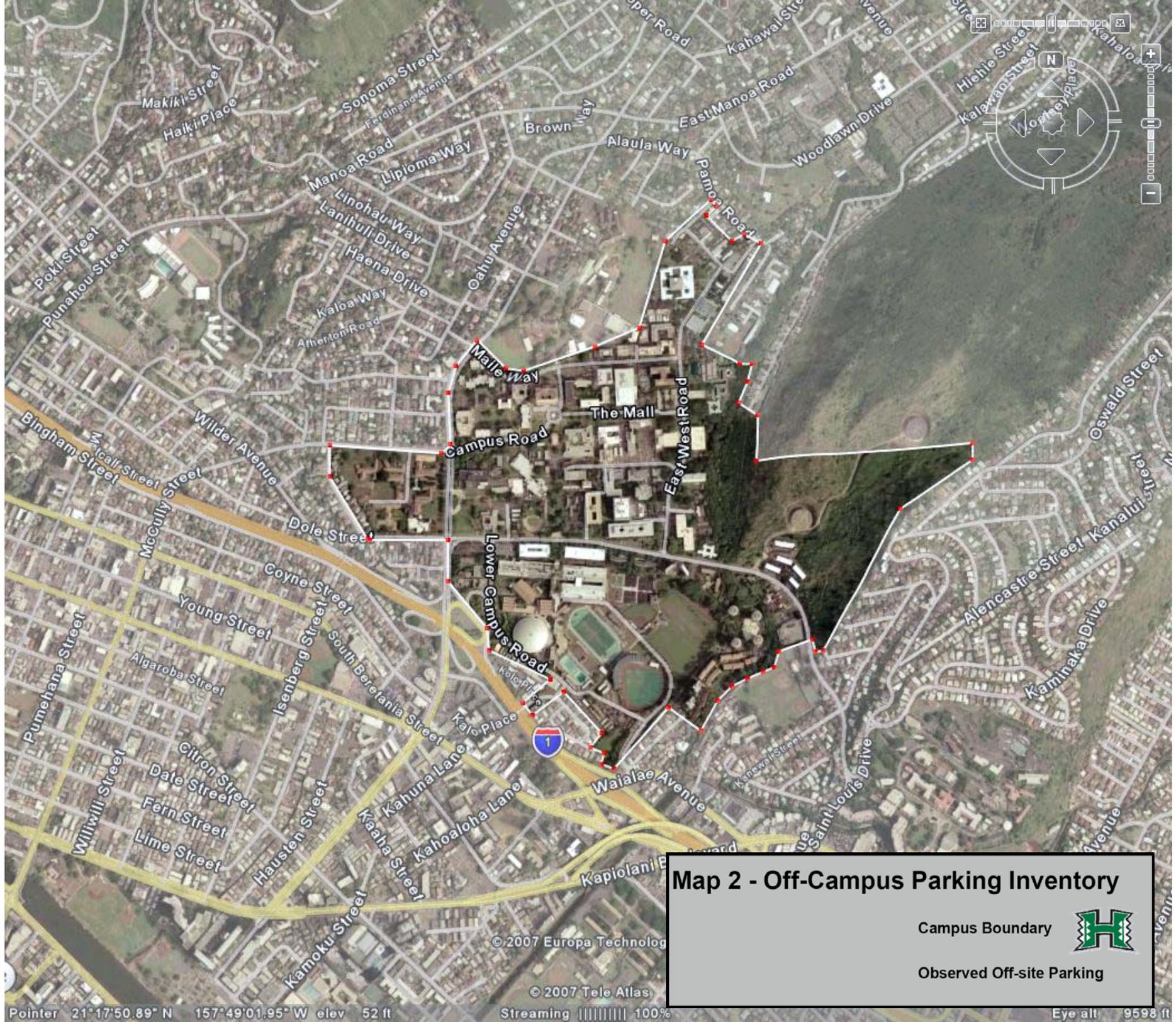
4/ Students whose home-campus, as defined in Banner / ODS, is not the campus at which they are registered for classes.

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 Geograph

0 400 800 ft





Map 2 - Off-Campus Parking Inventory

- Campus Boundary 
- Observed Off-site Parking

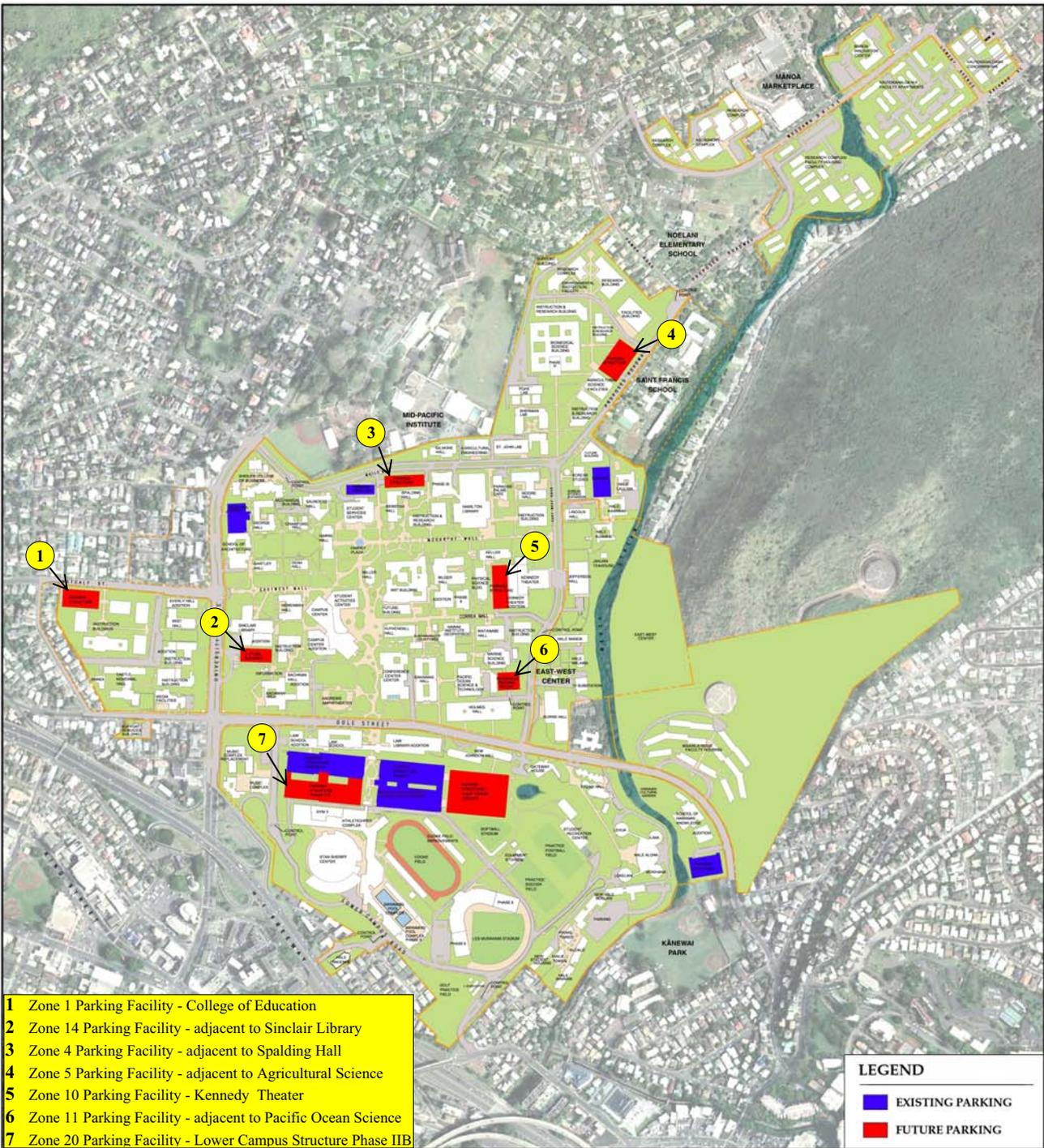


Future Campus Area Per LRDP

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 HAWAII, MĀNOA
2007 UPDATE**

LEGEND

- EXISTING PARKING
- FUTURE PARKING

DRAFT

GROUP 70
INTERNATIONAL

0' 200' 400' 800'

NORTH

APPENDIX E
HISTORIC PRESERVATION COORDINATION



April 24, 2009

Dr. Puaalaokalani Aiu
Administrator
State of Hawai'i, Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Boulevard., Room 555
Kapolei, Hawai'i 96707

Attention: Susan Tasaki

Dear Dr. Aiu:

**SUBJECT: Chapter 6E-8, HRS Review
Campus Center Renovation and Expansion, Phase II
University of Hawai'i at Mānoa
TMK: (1) 2-8-023:003
Honolulu, O'ahu, Hawai'i**

In our letter to you dated March 9, 2009, the University requested the State Historic Preservation Division's concurrence to proceed with the above project. The project requires the demolition of two of the four existing Engineering Quadrangle buildings. The University acknowledged that this would constitute an adverse effect on the historic properties, and proposed 12 specific mitigation commitments.

Since March 9, the University's architectural consultants have modified the proposed plans. We believe the revised plans better address the programmatic needs of the project, by improving the relationship of the new building to the Campus Center plaza to the south, while improving the historic context of the two remaining Engineering Quadrangle buildings in relation to the overall campus.

The original plan referenced in our March 9 letter retained Building 6 and the Ka Leo Building, which formed a small courtyard next to Campus Center. The revised plan preserves Building 31-C and the Ka Leo Building, which align in the north-south direction, and form a historic edge along the planned Legacy Path pedestrian mall. This edge, combined with Miller Hall to the north, forms a strong historic context for Legacy Path, and will be experienced by many students that use this heavily traveled route.

For reference, the following are the mitigation measures proposed by the University in the March 9 letter:

1. Complete a historic building survey of the UH Mānoa Campus (the UHM Campus Heritage Report). The survey is funded through a Getty Foundation grant, and will be posted on a Website available to the public. The University will inform the State Historic Preservation Division (SHPD) and any interested parties, such as the Historic Hawai'i Foundation (HHF), when the posting is available.
2. Review the completed Campus Heritage Report with SHPD and determine which buildings are historically significant and should be protected.
3. In the next UH Mānoa Long Range Development Plan (LRDP) Update, include the above historic structures in order to facilitate consideration of historic preservation issues early during the planning and design of future projects. Although the next LRDP Update is not scheduled until 2012, this procedure can be implemented as soon as the list of historically significant structures is agreed on.
4. Update the State Historic Register to include the buildings evaluated as significant.
5. Develop historic preservation design standards for UH Mānoa Campus. This mitigation commitment is in lieu of the proposal that the University provide historic preservation training to its staff. These standards and guidelines will be distributed to Facilities and Planning staff, and the University believes this will be more effective than a training program in the long term. However, the University would like to continue discussions for a joint seminar or training session.
6. HABS Photographic and Historic Documentation of the two buildings being demolished and the overall Engineering Quadrangle.
7. Provide an educational wall display in one of the remaining Engineering Quadrangle buildings. The display could use the HABS documentation, or could provide information on the development of the project and historic preservation issues, perhaps using drawings from the project design.
8. To the extent feasible, use the Secretary of Interior Standards for Rehabilitation when working on the historic portions of the building.
9. Conduct a design charrette early in the process to include SHPD and other interested parties, including HHF.
10. Design guidelines can be developed from this charrette to specifically address the connection of historic structures to new structures to ensure that the Engineering Quadrangle buildings are not treated as secondary features. Guidelines should address issues such as massing, building orientation, materials, architectural details, fenestration, entries and active use.

11. Request design reviews by SHPD at 10%, 35%, 65% and 100% design stages. SHPD may solicit comments from other interested parties.
12. Salvage parts of the two buildings being demolished for replacement of parts as needed in the buildings that will remain.

The University would like to amend its previous request by proposing to retain Buildings 31-C and the Ka Leo Building as discussed in our meeting with Susan Tasaki, and Kiersten Faulkner of Historic Hawai'i Foundation, April 13, 2009. The University requests your concurrence that the project will have an "effect with agreed upon mitigation commitments" with the completion of the above mitigation measures.

Attached for reference is a copy of the letter from the University to SHPD dated March 9, 2009, the existing site plan showing the affected historic buildings, the minutes of our meeting with SHPD and HHF dated April 13, 2009, and drawings of the Revised Scheme dated March 30, 2009.

Thank you for your consideration. We would also like to thank Susan Tasaki for attending numerous meetings to work cooperatively with the University and the consultants to achieve this solution. Please feel free to call Bruce Teramoto of our office at 956-4800 should you, or your staff have any questions.

Sincerely,



Brian Minaai
Associate Vice President
for Capital Improvements

Attachment

- c: Kathleen Cutshaw – Vice Chancellor for Administration, Finance and Operations,
University of Hawai'i at Mānoa
Eric Crispin – Assistant Vice Chancellor for Financial and Physical Management,
University of Hawai'i at Mānoa
Sarah Yap – Campus Center, University of Hawai'i at Mānoa
Gary Nakatsuka – Ushijima Architects, Inc.
Tonia Moy – Fung Associates, Inc.
Kiersten Faulkner – Historic Hawai'i Foundation
Bruce Teramoto



March 9, 2009

Dr. Puaalaokalani Aiu
Administrator
State of Hawai'i, Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Boulevard, Room 555
Kapolei, Hawai'i 96707

Attention: Susan Tasaki

Dear Dr. Aiu:

**SUBJECT: Chapter 6E-8, HRS Review
Campus Center Renovation and Expansion, Phase II
University of Hawai'i at Mānoa
TMK: (1) 2-8-023:003
Honolulu, O'ahu, Hawai'i**

Our historic preservation consultant, Fung Associates, Inc., has consulted with Susan Tasaki of your office and Kiersten Faulkner from Historic Hawai'i Foundation (HHF) for a preliminary assessment of the project. Please refer to the attached meeting minutes dated December 4, 2008. The following is a description of the project, and proposed mitigation for the demolition of two existing Engineering Quadrangle buildings.

I. GENERAL INFORMATION

- A. Organization:
University of Hawai'i at Mānoa, Office of Capital Improvements
1960 East-West Road, Biomedical Sciences B-102
Honolulu, Hawai'i 96822
- B. Contact: Bruce Teramoto
Phone: 956-4800, Email: brucet@hawaii.edu
- C. Additional contact: Tonia Moy, Fung Associates, Inc.
Phone: 941-3000, Email: tonia@funghawaii.com
- D. Project Name and Street Address:
Campus Center Renovation & Expansion, Phase II
University of Hawai'i at Mānoa
2465 Campus Road
Honolulu, Hawai'i 96822
- E. Area of Potential Effect: Included in the area of potential effect is the area surrounding the Engineering Quadrangle. See attached map.

- F. **Project Description:** This project will expand Campus Center with a new Recreation Center, approximately 56,000 square feet, including an indoor gym, an indoor jogging track, a fitness center, a strength training room, and multi-purpose exercise rooms. It will be designed as a “state of the art” facility and will be certified as a LEED Silver project. The project proposes to demolish two of the four remaining buildings of the Engineering Quadrangle.
- G. **Project alternatives:** The following alternatives were considered.

1. **Preserving all four Engineering Quadrangle buildings and constructing the Recreation Center at another location.**

There is very limited area to build a Recreation Center on the Lower Campus, as the Athletics and Kinesiology Departments also require space for expansion.

Placing the Recreation Center on the southwest (Makai-Ewa) corner of the Campus Center is problematic because the UH Mānoa Long Range Development Plan (LRDP) designates this area for a non-Campus Center related facility, such as a classroom or administrative building. This area is also limited in size and would require the demolition of two existing buildings, including the old post office building (designed by architect Alfred Preis).

Placing the Recreation Center to the south of the Campus Center would encroach on Andrews Amphitheater, which is a Registered Historic Site. The northwest side would encroach on Hemenway Hall, a Historic Property (designed by architect Claude Stiehl).

The Engineering Quadrangle site was chosen in support of concepts set forth in the LRDP, which proposes the development of a Campus Center Plaza fronting the east side of Campus Center, at the intersection of Correa Road and the Legacy Path. It is envisioned that Campus Center Plaza, due to its location, will be a significant entry to Campus Center and would accommodate large gatherings for functions held there.

2. **Moving the Engineering Quadrangle buildings.** This alternative would allow the buildings to remain intact. However, it would adversely impact the historic district and cause the buildings to lose their historic context. Also, since these buildings are concrete structures they would cost millions of dollars to move, and their structural stability could not be ensured in a new location.

3. **Remove two of the Engineering Quadrangle buildings, and retain two buildings.** This alternative would demolish two of the existing buildings to create sufficient space for the new Recreation Center. The oldest of the remaining buildings, Building 6, and the Ka Leo building would remain, forming a smaller courtyard around the existing Campus Center plaza.

H. Consulting Parties: HHF, Campus Center Board.

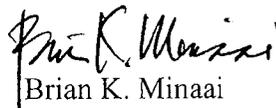
II. IDENTIFICATION OF HISTORIC PLACES

- A. Through consensus, it is agreed that the Engineering Quadrangle is eligible for listing on the Hawaii and National Registers of Historic Places.
- B. The University offers the following mitigation measures:
 1. Complete a historic building survey of the UH Mānoa Campus. The survey is funded through a Getty Foundation grant, and will be posted on a Website available to the public. The University will inform the State Historic Preservation Division (SHPD) and any interested parties when the Website is available.
 2. Review the completed Historic Building Survey with SHPD and determine which buildings are historically significant and should be protected.
 3. In the next LRDP Update, include the above historic structures in order to facilitate consideration of historic preservation issues early during the planning and design of future projects. Although the next LRDP Update is not scheduled until 2012, this procedure can be implemented as soon as the list of historically significant structures is agreed on.
 4. Update the State Historic Register to include the buildings evaluated as significant.
 5. Develop historic preservation design standards for UH Mānoa Campus. This mitigation commitment is in lieu of the proposal that the University provide historic preservation training to its staff. These standards and guidelines will be distributed to Facilities and Planning staff, and the University believes this will be more effective than a training program in the long term. However, the University would like to continue discussions for a joint seminar or training session.
 6. Historic American Buildings Survey (HABS) Photographic and Historic Documentation of the two buildings being demolished and the overall Engineering Quadrangle.
 7. Provide an educational wall display in one of the remaining Engineering Quadrangle buildings. The display could use the HABS documentation, or could provide information on the development of

- the project and historic preservation issues, perhaps using drawings from the project design.
8. To the extent feasible, use the Secretary of Interior Standards for Rehabilitation when working on the historic portions of the building.
 9. Conduct a design charrette early in the process to include SHPD and other interested parties, including HHF.
 10. Design guidelines can be developed from this charrette to specifically address the connection of historic structures to new structures to ensure that the Engineering Quadrangle buildings are not treated as secondary features. Guidelines should address issues such as massing, building orientation, materials, architectural details, fenestration, entries and active use.
 11. Request design reviews by SHPD at 10%, 35%, 65% and 100% design stages. SHPD may solicit comments from other interested parties.
 12. Salvage parts of the two buildings being demolished for replacement of parts as needed in the buildings that will remain.

We acknowledge that SHPD considers the demolition of two of the four remaining buildings in the Engineering Quadrangle to be an adverse effect. Accordingly, we request your concurrence that the project will have an “effect with agreed upon mitigation commitments” with the completion of the above mitigation. Thank you for your consideration. Please feel free to call Bruce Teramoto of our office at 956-4800 should you, or your staff have any questions.

Sincerely,



Brian K. Minaai
Associate Vice President
for Capital Improvements

Attachment

- c: Kathleen Cutshaw – Vice Chancellor for Administration, Finance and Operations,
University of Hawai‘i at Mānoa
Carl Furutani – Campus Center, University of Hawai‘i at Mānoa
Tonia Moy – Fung Associates, Inc.
Kiersten Faulkner – Historic Hawai‘i Foundation
Bruce Teramoto



FUNG ASSOCIATES INC.

architecture ■ preservation ■ planning ■ interiors

MEETING MINUTES

UHM CAMPUS CENTER RENOVATION AND EXPANSION

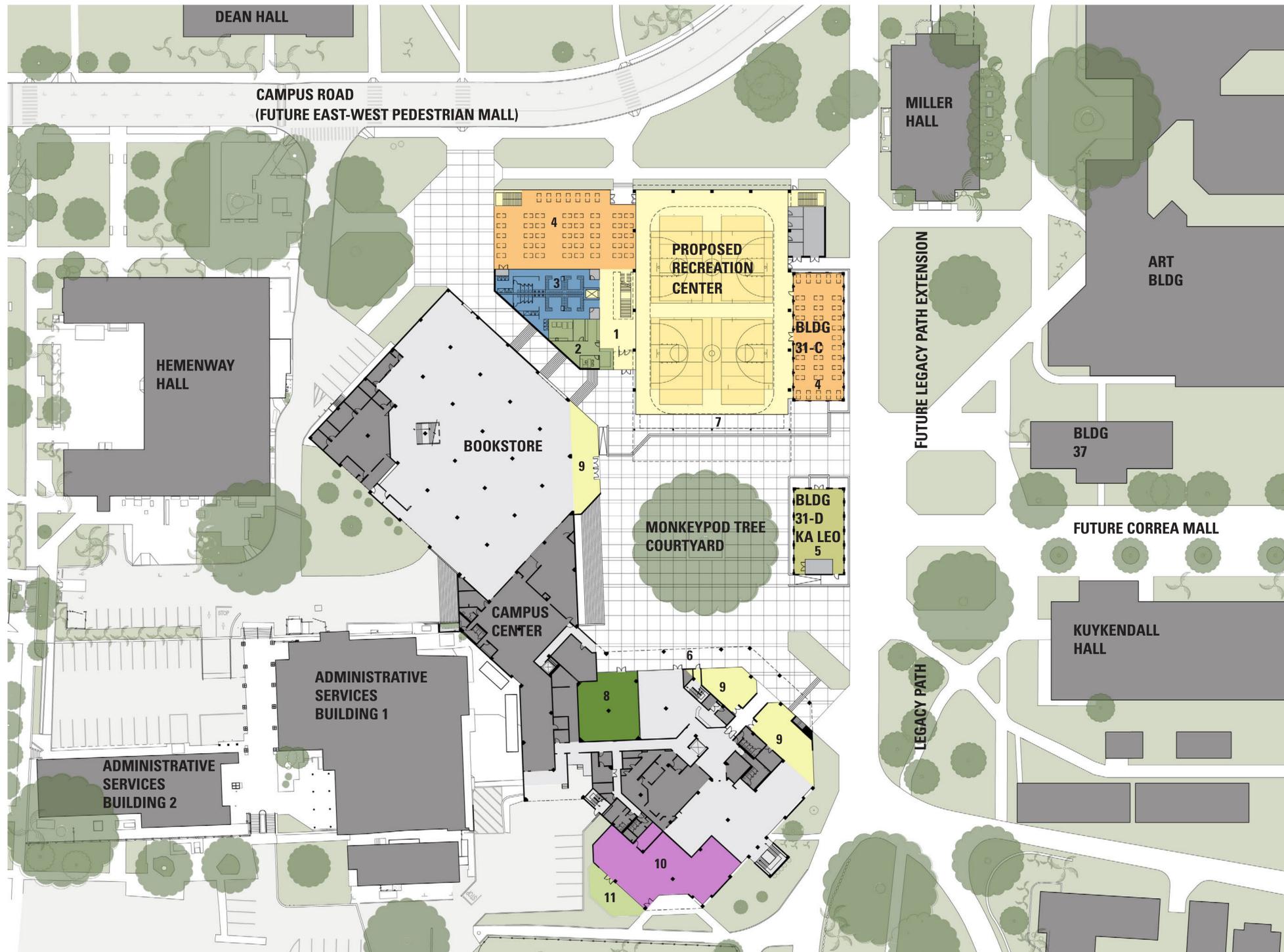
April 13, 2009

- I. Present:
 - a. Susan Tasaki (SHPD)
 - b. Kiersten Faulkner (HHF)
 - c. Bruce Teramoto (UH System)
 - d. Eric Crispin (UHM)
 - e. Gary Nakatsuka (UAI)
 - f. Tonia Moy (FAI)

- II. Project update
 - a. SHPD letter – sent letter to SHPD regarding the formal initiation of historic preservation consultation, no reply due to ongoing consultation which included this meeting
 - b. PDR notes 2 Buildings will be kept to keep the small courtyard
 - c. Current project designers recommend that the two buildings along "Legacy Path" be kept instead of the two identified in the PDR
 - d. Justification discussed includes resolving numerous programmatic issues and the relationship of the buildings to the overall campus vs. the relationship of the buildings to a courtyard
 - e. Design team examined keeping three buildings as was requested by Kiersten at the charrette held March 10, 2009
 - f. Kiersten thanked the design team for exploring the various design solutions and understood the constraints of the site and the program
 - g. SHPD and HHF concurred that the University may move forward with the "Revised Scheme" as shown in the presentation packet which indicates the Duplication and Ka Leo Buildings incorporated into the design and the demolition of the Publication Building
 - h. This will allow for better integration of the buildings into the project and into the overall campus
 - i. It was concurred that demolition of two of the four buildings is an adverse effect and determination for this project will be "effect with agreed upon mitigation measures."
 - j. Design issues
 - i. The design should be developed to specifically address the connection of the historic and new to ensure that the Engineering Quad buildings are not treated as a secondary feature and that the integration of the historic buildings be taken into account as the design proceeds
 - ii. As noted in the mitigation measures, the preservation partners will be a part of the design review

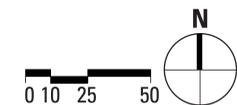
- III. Next steps
 - a. Mitigation measures to be reviewed prior to concurrence of the project, however, these minutes shall serve as an informal concurrence to the project as shown in the "Revised Scheme"
 - b. The University to update formal consultation letter

-- end of notes --



- LEGEND**
- 1 ENTRY LOBBY
 - 2 CHECK-IN
 - 3 LOCKER ROOMS
 - 4 FITNESS
 - 5 MULTI-PURPOSE ROOM
 - 6 COVERED WALKWAY
 - 7 LANAI
 - 8 LEISURE CENTER
 - 9 CAMPUS CENTER ADDITION
 - 10 SATELLITE CHILD CARE CENTER
 - 11 OUTDOOR PLAY AREA

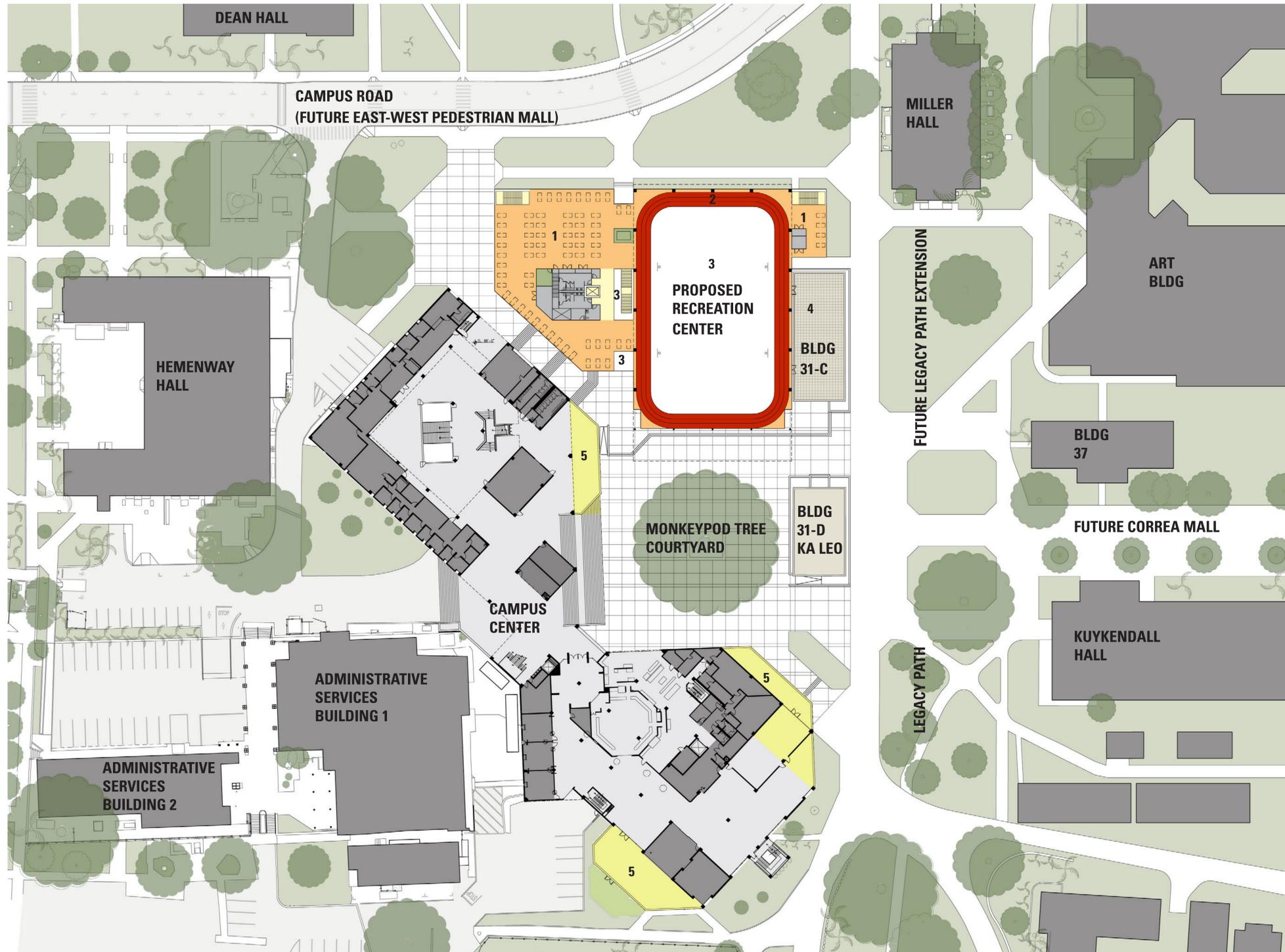
SITE & BUILDING CONCEPT-LEVEL ONE- REVISED SCHEME



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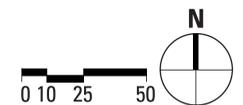
CAMPUS CENTER RENOVATION + EXPANSION

Ushijima Architects
Yost Grube Hall Architecture
March 30, 2009



- LEGEND**
- 1 FITNESS
 - 2 JOGGING TRACK
 - 3 OPEN TO BELOW
 - 4 ROOF TERRACE/OUTDOOR FITNESS
 - 5 OVERLOOK TERRACE

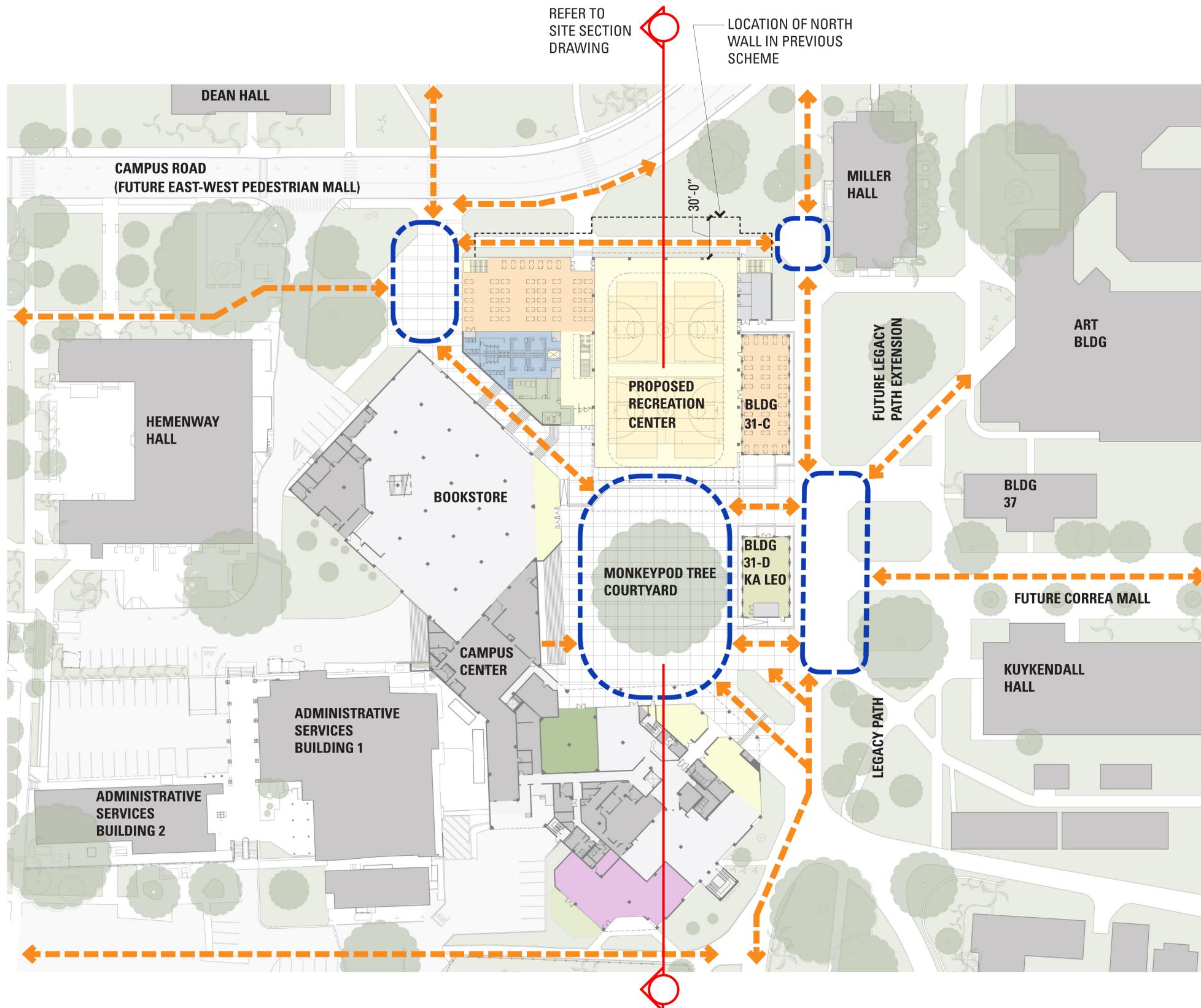
SITE & BUILDING CONCEPT-LEVEL TWO- REVISED SCHEME



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CAMPUS CENTER RENOVATION + EXPANSION

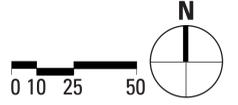
Ushijima Architects
Yost Grube Hall Architecture
March 30, 2009



REFER TO
SITE SECTION
DRAWING

LOCATION OF NORTH
WALL IN PREVIOUS
SCHEME

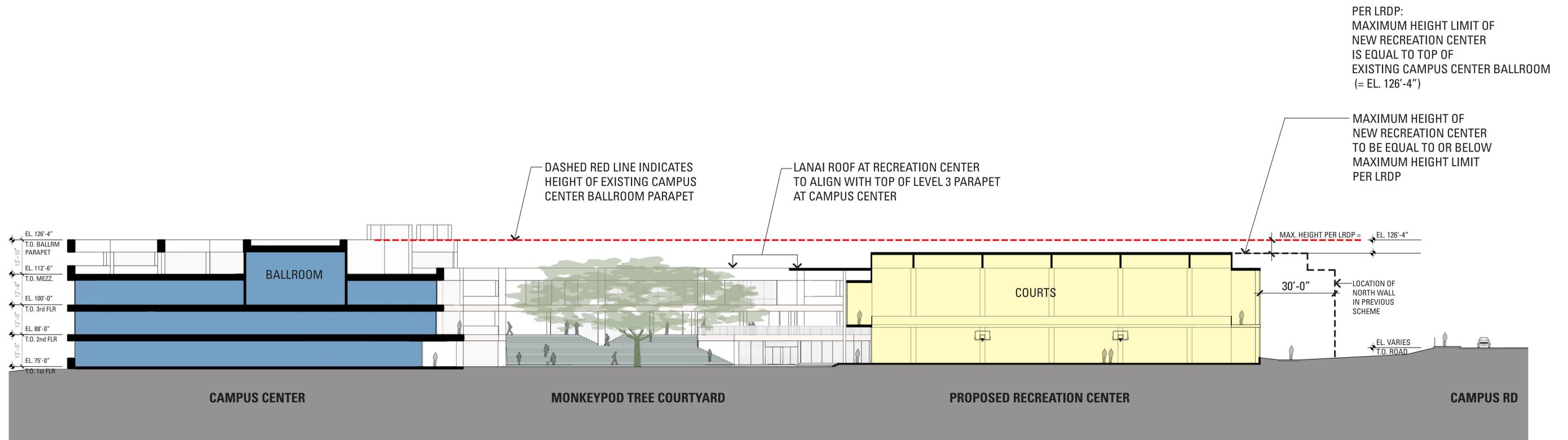
SITE CIRCULATION AND CAMPUS CONNECTIONS- REVISED SCHEME



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CAMPUS CENTER RENOVATION + EXPANSION

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March 30, 2009



SITE SECTION- REVISED SCHEME



CAMPUS CENTER RENOVATION + EXPANSION

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 Yost Grube Hall Architecture
 March 30, 2009



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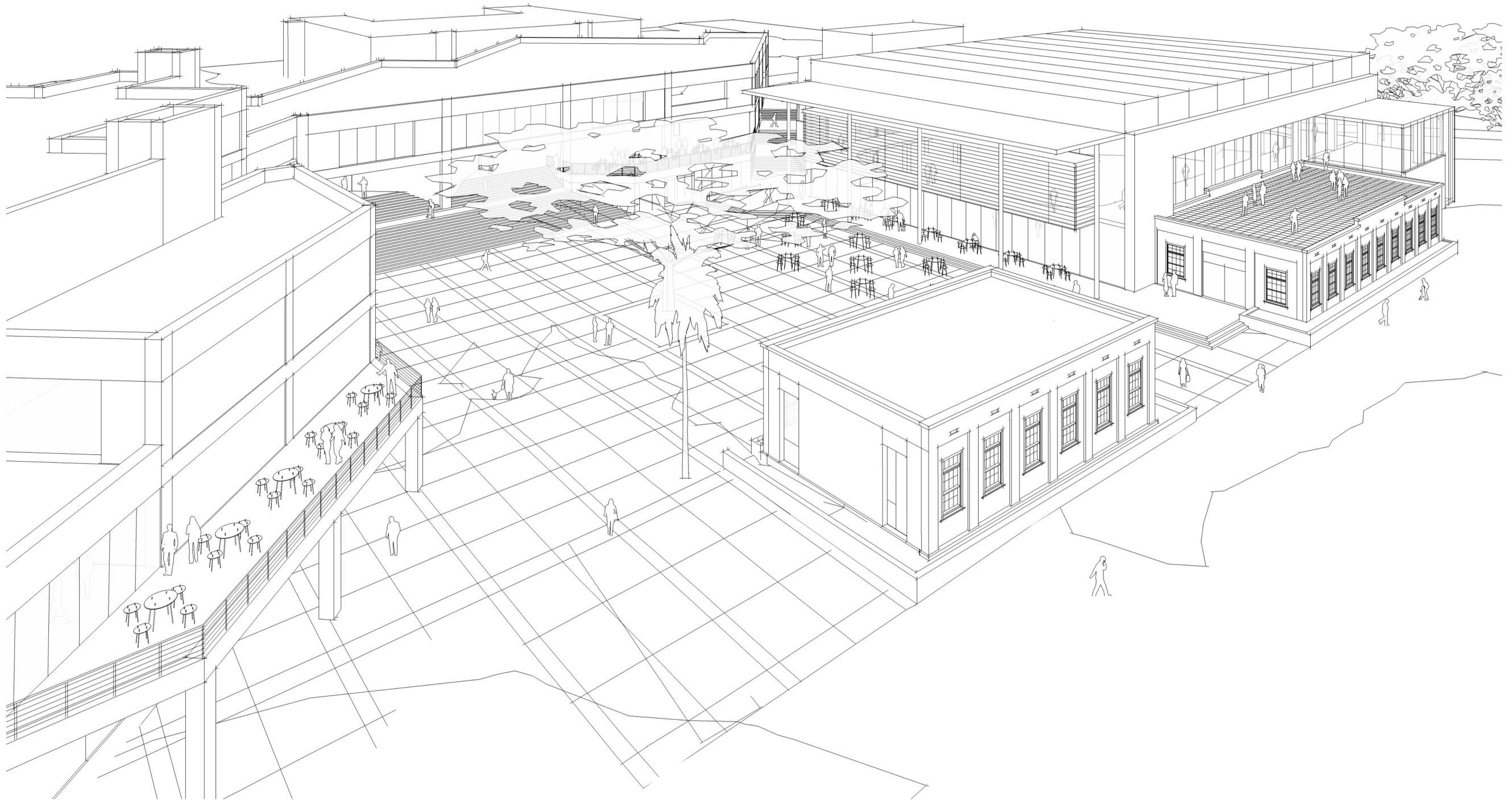
VIEW LOOKING NORTHWEST FROM LEGACY PATH - REVISED SCHEME



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CAMPUS CENTER RENOVATION + EXPANSION

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March 30, 2009



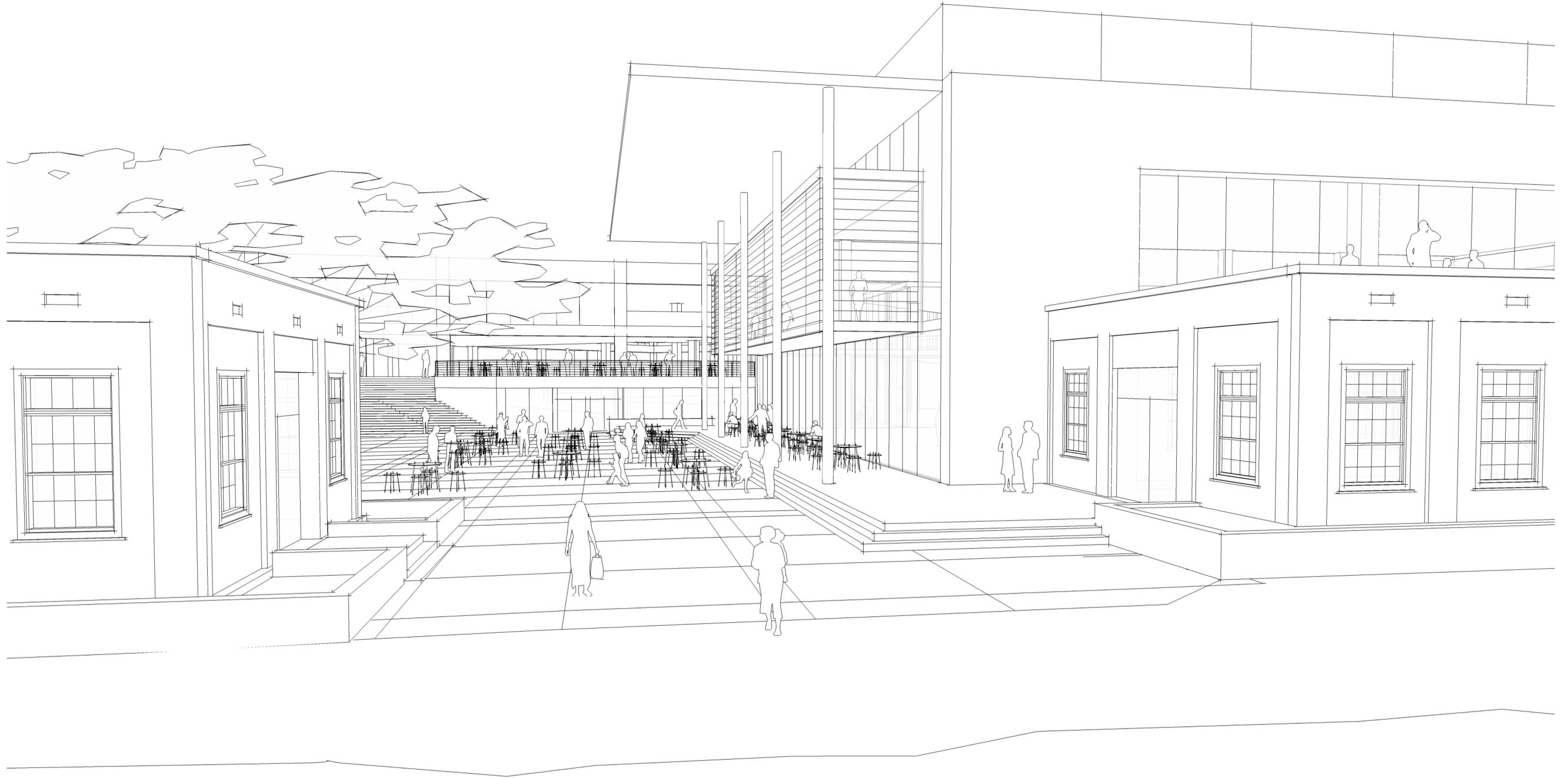
AERIAL VIEW - REVISED SCHEME

CAMPUS CENTER RENOVATION + EXPANSION

Ushijima Architects
Yost Grube Hall Architecture
March 30, 2009



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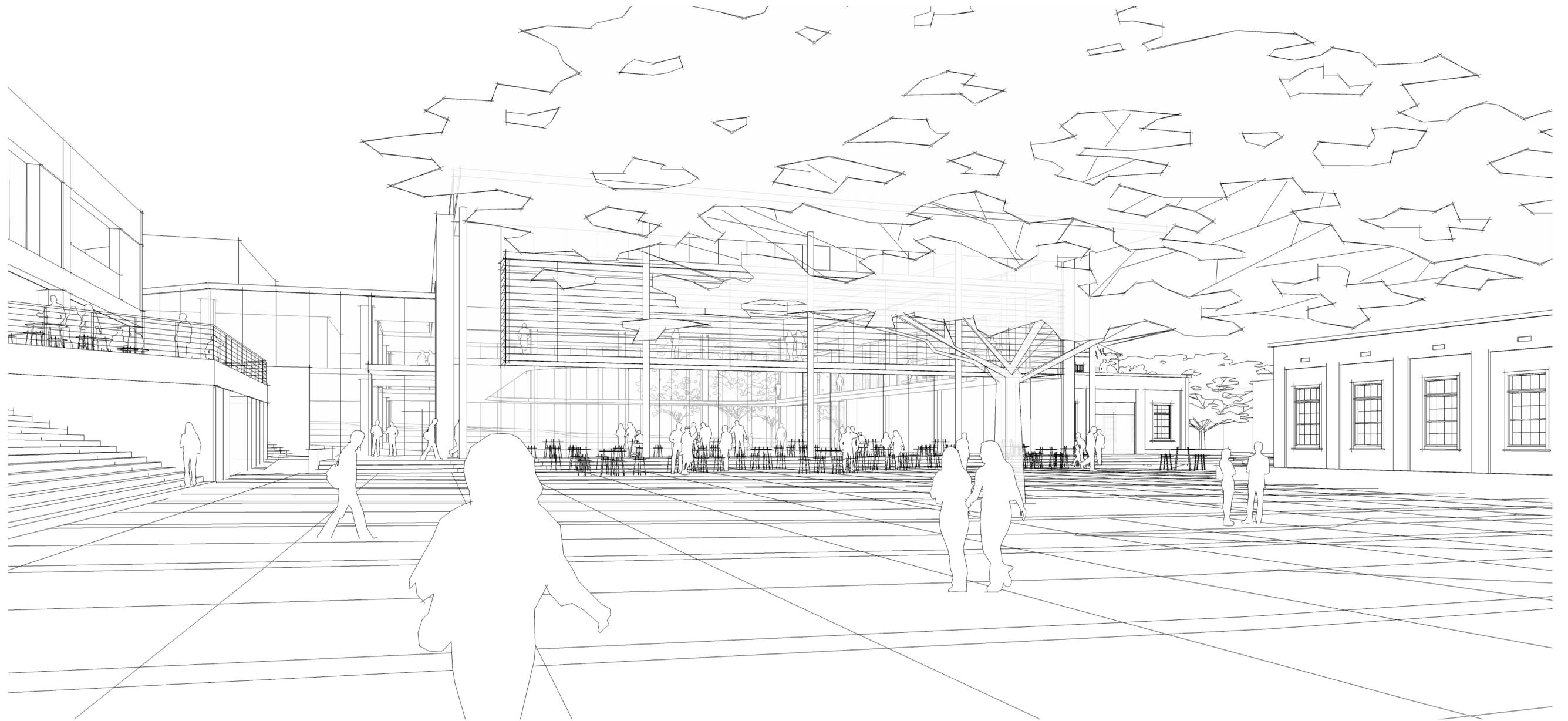
PLAZA VIEW 1- REVISED SCHEME

CAMPUS CENTER RENOVATION + EXPANSION

Ushijima Architects
Yost Grube Hall Architecture
March 30, 2009



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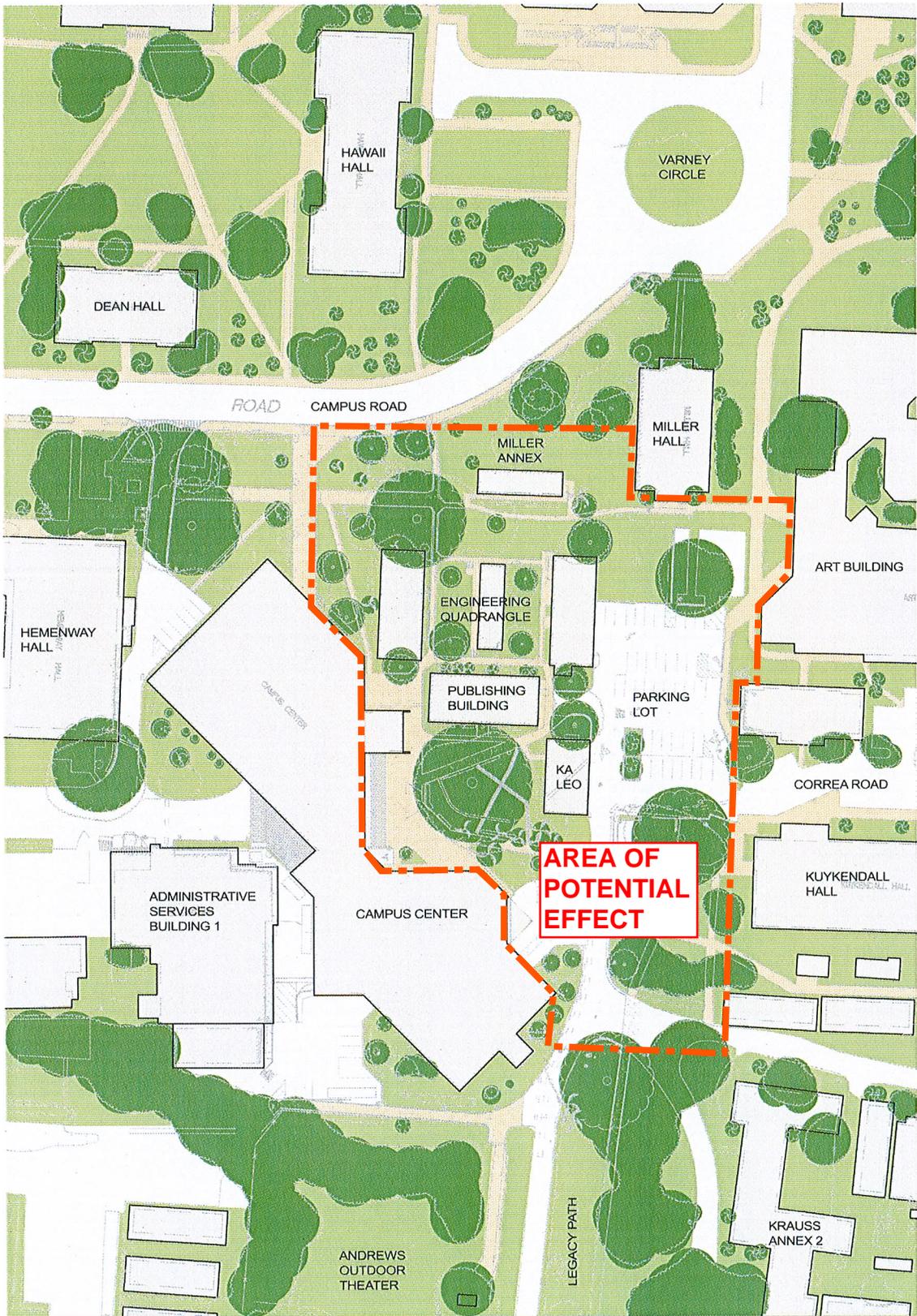
PLAZA VIEW 2- REVISED SCHEME



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CAMPUS CENTER RENOVATION + EXPANSION

Ushijima Architects
Yost Grube Hall Architecture
March 30, 2009



PLAN - EXISTING

SCALE: 1"=80'-0"



E

PROJECT:
CAMPUS CENTER RENOVATION AND ADDITION
 PROJECT DEVELOPMENT REPORT
 University of Hawaii at Manoa

Project No.: UHM 06-223A | KYA 26064-01 | Printed: May 2008

kya design group

*fostering relationships
 that enhance creative solutions*

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