DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

PETER B. CARLISLE
MAYOR

LORI M.K. KAHIKINA, P.E.
DIRECTOR

CHRIS TAKASHIGE, P.E.
DEPUTY DIRECTOR

AUG 08 2012

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July 26, 2012

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

Gary Hooser, Director
Office of Environmental Quality Control
Department of Health
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Hooser:

Subject: Draft Environmental Assessment for Honolulu Fire Department Regional Training Center, O'ahu, Hawaii

With this letter, the City and County of Honolulu, Department of Design and Construction hereby transmits the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) for the Honolulu Fire Department Regional Fire Training Center situated at TMK (1)1-1-002:012 on the island of O'ahu for publication in the next available edition of the Environmental Notice.

Enclosed is a completed OEQC Publication Form, two copies of the DEA-AFONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions, please contact Mr. Terry L. Hildebrand, Planner, at 768-8401.

Very truly yours,

Chris Takashige

for Lori M.K. Kahikina, P.E.
Director

LMKK:li

Enclosures

c: Honolulu Fire Department (Captain Robert Main)

SECTION 343-5(b), HRS, AGENCY ACTION SECTION 11-200-3(d), HAR, FORM FOR PUBLICATION IN THE PERIODIC BULLETIN OF THE OFFICE OF ENVIRONMENTAL QUALITY CONTROL

A. DATE:	July 27, 2012
B. TITLE OF ACTION:	Honolulu Fire Department Regional Fire Training Center
C. TYPE OF DOCUMENT:	(1) DEA with AFONSI
D. NOTICE OF ACCEPTING AUTHORITY DETERMINATION ATTACHED:	(1) AFONSI
E. PROPOSING AGENCY:	Honolulu Fire Department, 636 South Street Honolulu, HI 96813-5007
CONTACT FOR PROPOSING AGENCY:	Captain Robert Main, (808) 723-7139, rmain@honolulu.gov
CONSULTANT FOR PROPOSING AGENCY:	Group 70 International, Inc., 925 Bethel Street, 5th Floor Honolulu, HI 96813 Christine Mendes Ruotola, (808) 523-5866, cruotola@group70int.com
F. ACCEPTING AUTHORITY:	City and County of Honolulu, Department of Design and Construction, 650 S. King Street, 11th Floor Honolulu, HI 96813
CONTACT FOR ACCEPTING AUTHORITY:	Terry Hildebrand, (808) 768-8401
G. ISLANDS AFFECTED BY THE ACTION:	O'ahu
H. TAX MAP KEY NUMBERS:	(1)1-1-002:012
I. STREET ADDRESSES:	890 Valkenburgh Street, Honolulu, Hawaii 96818
J. NEAREST GEOGRAPHICAL LANDMARKS:	Honolulu International Airport, Navy Marine Golf Course
K. LATITUDINAL/LONGITUDINAL COORDINATES:	21°20'25.17" N / 157°55'54.44" W
L. STATUTORY/ADMINISTRATIVE AUTHORITIES:	Use of county lands/funds – Section 343-5(a)(1), HRS

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Honolulu Fire Department
Regional Fire Training Center

Moanalua, Honolulu, O‘ahu, Hawai‘i

Draft Environmental Assessment

Proposing Agency:
Honolulu Fire Department

Prepared by:

GROUP 70 INTERNATIONAL

Sustainable Development • Architecture • Planning & Environmental Services • Civil Engineering
Interior Design • Technology

August 2012

Honolulu Fire Department
Regional Fire Training Center

Moanalua, Honolulu, O'ahu, Hawai'i

TMK (1) 1-1-002: 12
Honolulu, O'ahu, Hawai'i

Draft Environmental Assessment

This environmental document is prepared in accordance with the requirements of Chapter 343, Hawai'i Revised Statutes and Hawai'i Administrative Rules, Title 11, Department of Health.

Proposing Agency:
Honolulu Fire Department

Prepared by:

GROUP 70 INTERNATIONAL

Sustainable Development • Architecture • Planning & Environmental Services • Civil Engineering
Interior Design • Technology

August 2012

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D Traffic Impact Report
E Archaeological Assessment
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1.0
Introduction

1.0 INTRODUCTION

This Draft Environmental Assessment (EA) has been prepared in accordance with the requirements of Chapter 343, Hawai'i Revised Statutes (HRS) and Hawai'i Administrative Rules (HAR), Title 11, Department of Health, which set forth the requirements for the preparation of environmental assessments.

1.1 PROJECT INFORMATION SUMMARY

Type of Document:	Environmental Assessment
Project Name:	Honolulu Fire Department Regional Fire Training Center
Applicant:	Honolulu Fire Department 636 South Street, Honolulu, Hawai'i 96813-5007 Contact: Captain Robert Main Tel: (808) 723-7139
Planning Consultant:	Group 70 International, Inc. 925 Bethel Street, 5th Floor, Honolulu, Hawai'i 96813 Contact: Christine Mendes Ruotola Tel: (808) 523-5866
Accepting Authority:	City and County of Honolulu Department of Design and Construction 650 S. King Street, 11th Floor, Honolulu, Hawai'i 96813 Contact: Terry Hildebrand Tel: (808) 768-8401
Chapter 343, HRS Trigger:	Use of County Lands
Project Location:	890 Valkenburgh Street Honolulu, O'ahu, Hawai'i, 96818 *(Figure 1-1)*
Tax Map Key:	(1) 1-1-002: 012 *(Figure 1-2)*
Fee Landowner:	City and County of Honolulu Honolulu, Hawai'i 96813
Project Area:	224,770 Square Feet (5.16 acres)
State Land Use District:	Urban *(Figure 1-3)*
City & County of Honolulu Zoning:	F-1 Federal and Military Preservation *(Figure 1-4)*
City & County of Honolulu Development Plan:	Primary Urban District *(Figure 1-5)*
Special Design District:	None

Special Management Area:	Outside Special Management Area *(Figure 1-6)*
Flood Zone:	Flood Insurance Rate Map Zone D *(Figure 1-7)* (An area of undetermined but possible flood hazards)
Anticipated Determination:	Finding of No Significant Impact

1.2 PROJECT SITE

The Honolulu Fire Department's (HFD) Charles H. Thurston Training Center, located on Valkenburgh Street near Honolulu International Airport, serves as the primary venue for the training and education of Honolulu's firefighters. The training facility's 5.16-acre property is owned by the City and County of Honolulu (City), and has been in use since 1987, when it was rented from the U.S. Navy before conveyance to the City in 2005.

The existing training center *(Figure 1-8)* includes classrooms and administrative offices, restrooms, a library, a fitness area with locker and showers, a medical services office, fire training tower, and storage. The property also includes HFD's Mokulele Fire Station.

Surrounding uses include Trinity Missionary Baptist Church, Assets School, and Nimitz Elementary to the west; Air Force family housing and Lynch Park to the southwest; Holy Family Catholic Church and Academy to the south; Fleet Reserve Association Branch 46 to the southeast; and the Navy Exchange, Navy Marine Golf Course, Nimitz Highway and H-1 Freeway to the north.

1.3 OVERVIEW OF THE PROPOSED PROJECT

The mission of the HFD is to respond to fires, emergency medical incidents, hazardous materials incidents, and rescues on land and sea to save lives, property, and the environment. HFD accomplishes this mission by:

- Promoting safety and maintaining a well equipped, highly trained, and motivated force of professional fire fighters and rescue personnel.
- Promoting fire prevention and other public safety education programs.

Supporting the mission, improvements to the training center will enhance the quality of the HFD's training program and will create a modern and well-equipped training environment for new recruits, as well as quality facilities for incumbent fire fighters. With the proposed improvements the facility will become a Regional Fire Training Center, providing critical training to firefighters and other first responders from Hawai'i and locations throughout the Pacific.

The existing training center attempts to focus on both Academic and Tactical firefighter training; however in practice these existing facilities are inadequate to meet the needs of both functions and are handicapping the HFD fire training program. While the existing site is large and level, it can only reasonably support the Academic functions if future development is to take place. The HFD is taking steps to secure reasonable space in the Kalaeloa area for tactical training.

The HFD training center redevelopment is planned to occur in three phases. Phase I will include the construction of a new recruit academy, an 80-stall parking lot, and upgrades to the existing training tower site. Phase II will include the construction of a new incumbent building and 101 parking spaces. Finally, Phase III will include a single-engine company core-concept prototype fire station to replace the existing fire station, and if needed, future expansion of the recruit academy building, with additional parking.

The new buildings will incorporate design strategies to limit the project's environmental footprint and will be designed with a fully integrated approach to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification criteria.

1.4 PURPOSE OF THE ENVIRONMENTAL ASSESSMENT

In accordance with the requirements of Chapter 343, HRS, this Draft EA is being prepared as the proposed project utilizes County lands and County funds.

This Draft EA is presented in eight sections and includes the following: a detailed summary and project description, including a list of necessary approvals; a description of the environmental setting; a section that identifies potential impacts and proposed mitigative measures on identified natural, cultural, and socioeconomic resources as well as existing infrastructure; a description and analysis of alternatives; a discussion of the project's relationship to State and County plans and policies; the anticipated determination and reasons for its believed outcome; a list of references cited or used in developing the Draft EA; and a list of agencies, organizations, and individuals that participated in the pre-consultation phase of the Draft EA.

The Draft EA will be published in the Office of Environmental Quality Control (OEQC) Environmental Notice, which will commence a 30-day public review period. After the conclusion of the 30-day review period of the Draft EA, public comments received will be considered and addressed to the extent feasible within the project scope and evaluation. A Final EA will then be prepared, highlighting key areas of the document that were revised, updated, or modified based upon information received during the public comment period.

A Finding of No Significant Impact (FONSI) is anticipated for this project.

1.5 PERMITS AND APPROVALS REQUIRED

In addition to the acceptance of the Final EA/FONSI by the Department of Design and Construction (DDC), a Waiver Permit will be needed from the Department of Planning and Permitting (DPP) to allow proposed facilities to differ from P-2 development standards. While the property is zoned F-1, upon transfer from the U.S. Navy, development must meet the City's P-2 development standards.

1.5.1 Other Permits Required for Construction

Several other approvals will be required from the City and State to implement the proposed action, to include:

- Building Permits (Buildings, Electrical, Plumbing), and Sidewalk/Driveway Work (DPP)
- Grading, Grubbing, Trenching and Stockpiling Permits (DPP)
- National Pollutant Discharge Elimination System (NPDES) Permit – Construction Storm Water (Hawai'i State Department of Health)

1.6 AGENCIES, ORGANIZATIONS AND INDIVIDUALS CONTACTED IN PRE-CONSULTATION

A list of agencies and other parties that were presented notice of the proposed project or were contacted during the pre-consultation period of the Draft EA is provided in *Section 8.0* of this document. Comments received during this pre-consultation process as well as a listing of those agencies that will be provided an opportunity to review the Draft EA are also provided in *Section 8.0*.

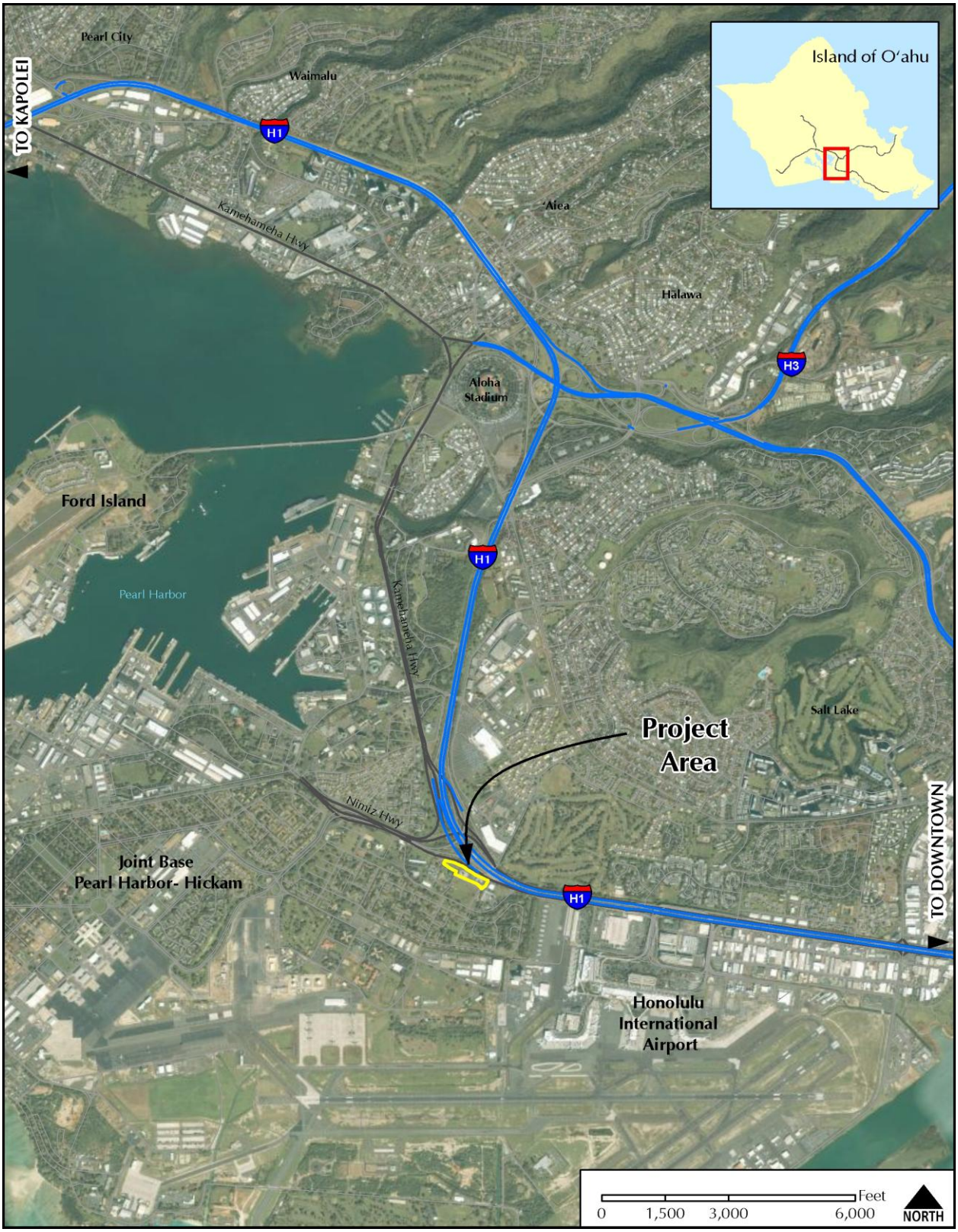


Figure 1-1 Project Location

Figure 1-2 Tax Map Key

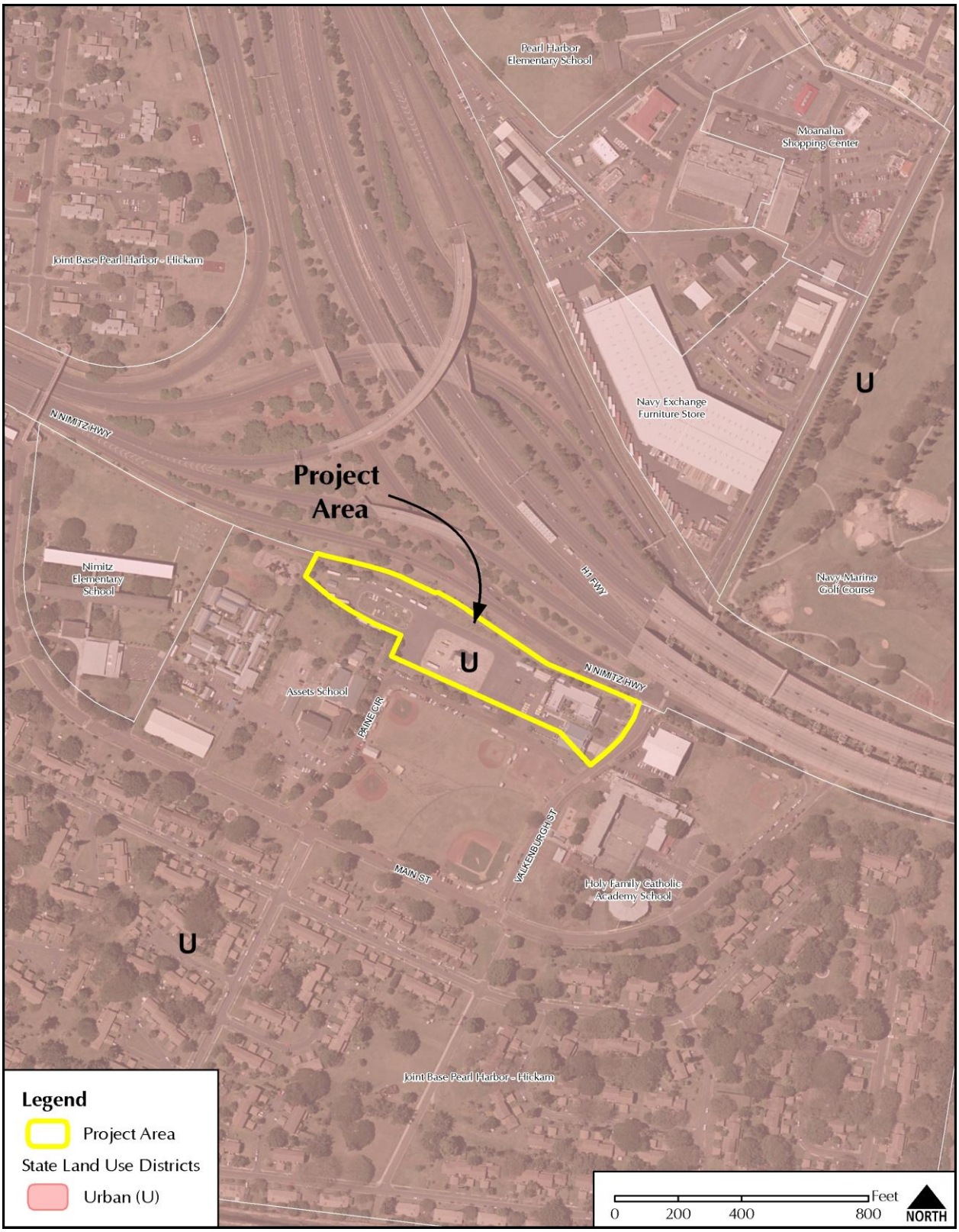


Figure 1-3 State Land Use Classification Map

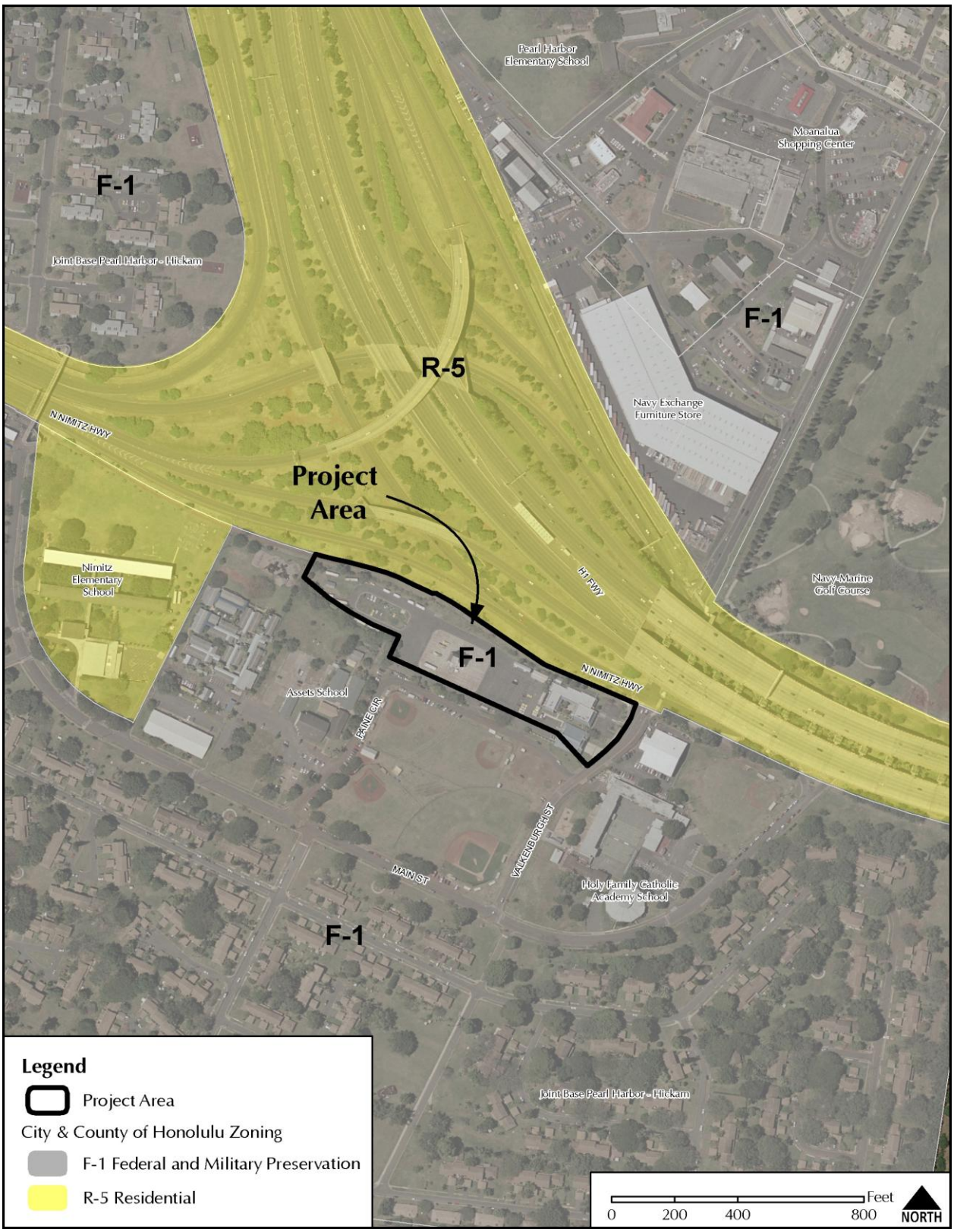


Figure 1-4 City and County of Honolulu Zoning Map

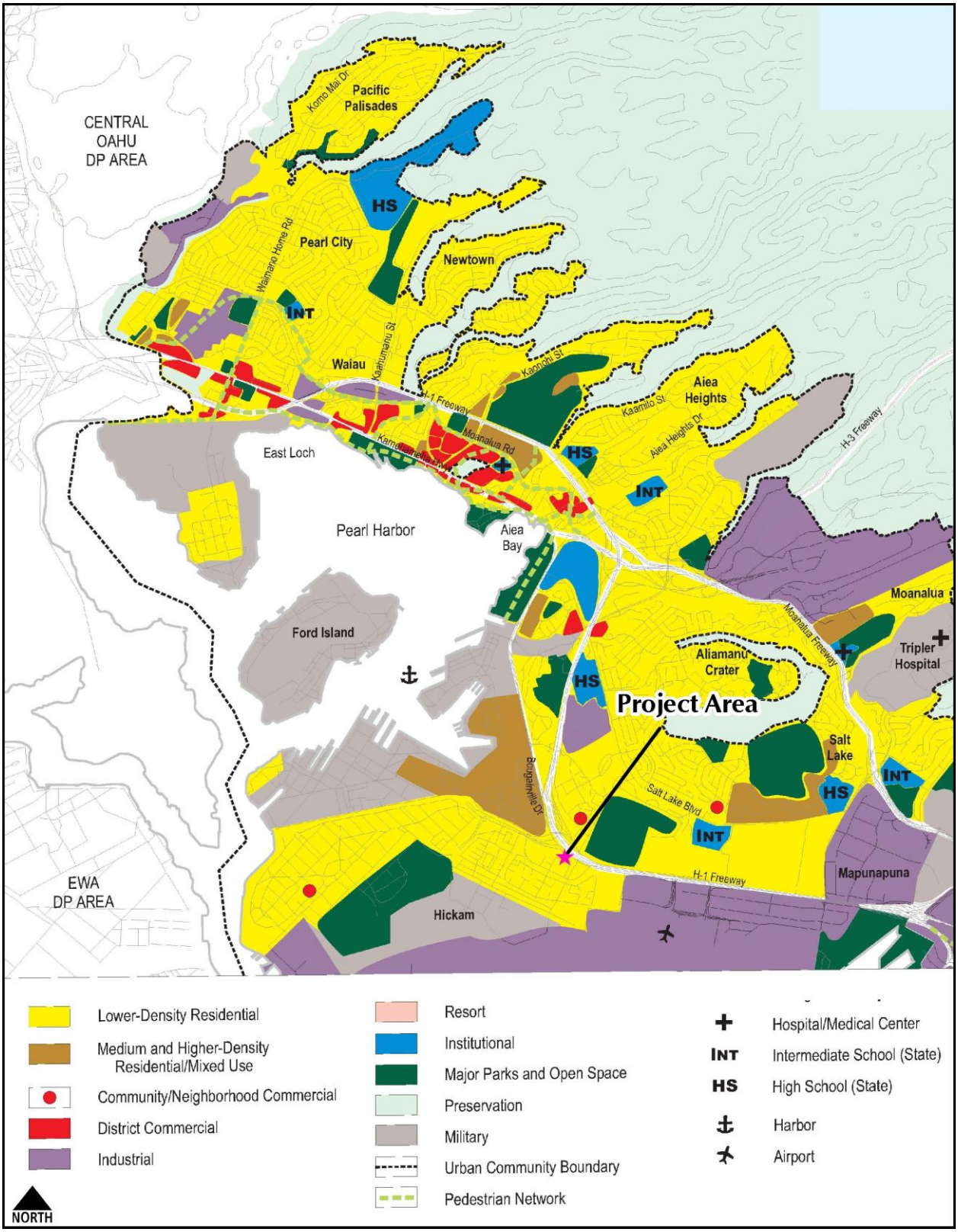


Figure 1-5 City and County of Honolulu Primary Urban Center Development Plan

Figure 1-6 City and County of Honolulu Special Management Area Map

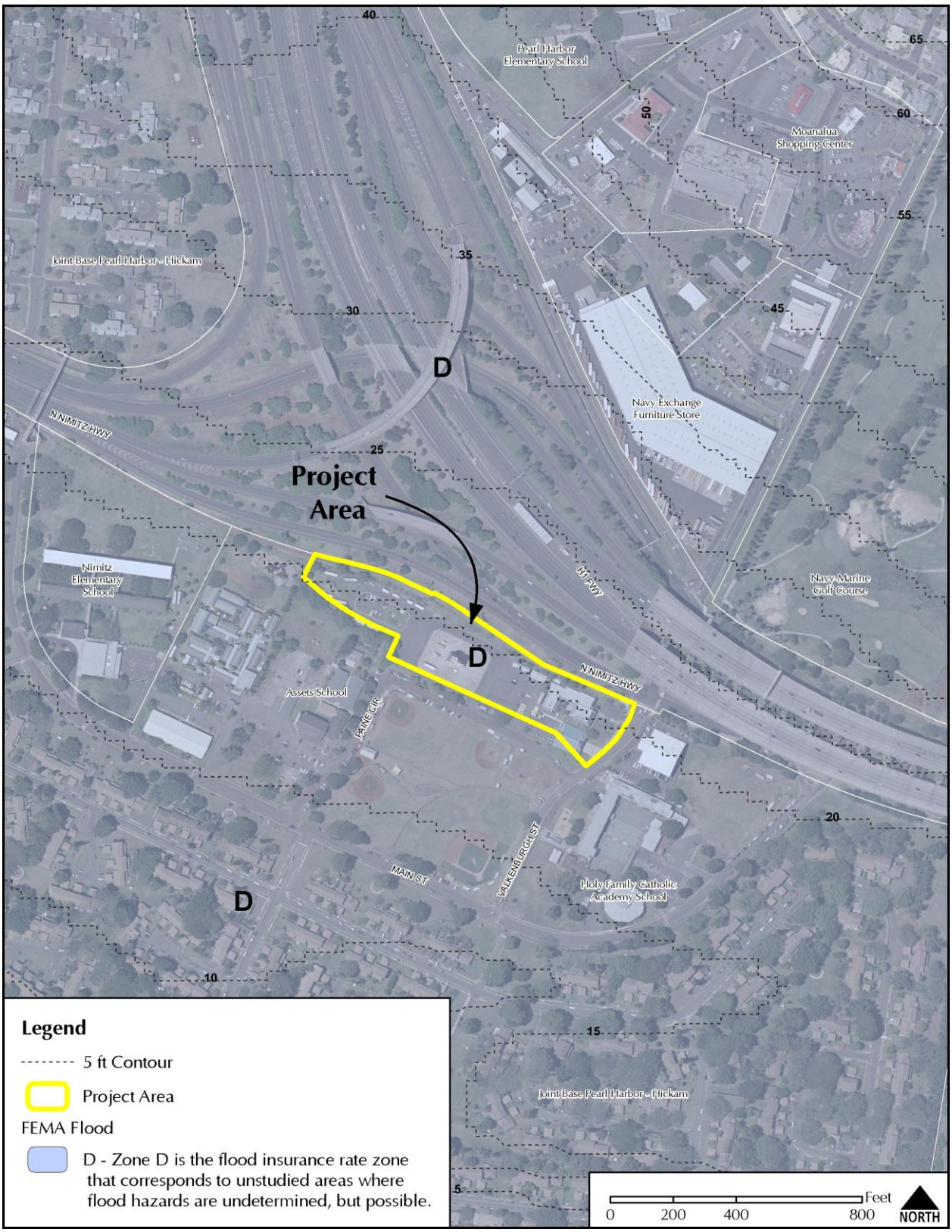


Figure 1-7 Flood Insurance Rate Map

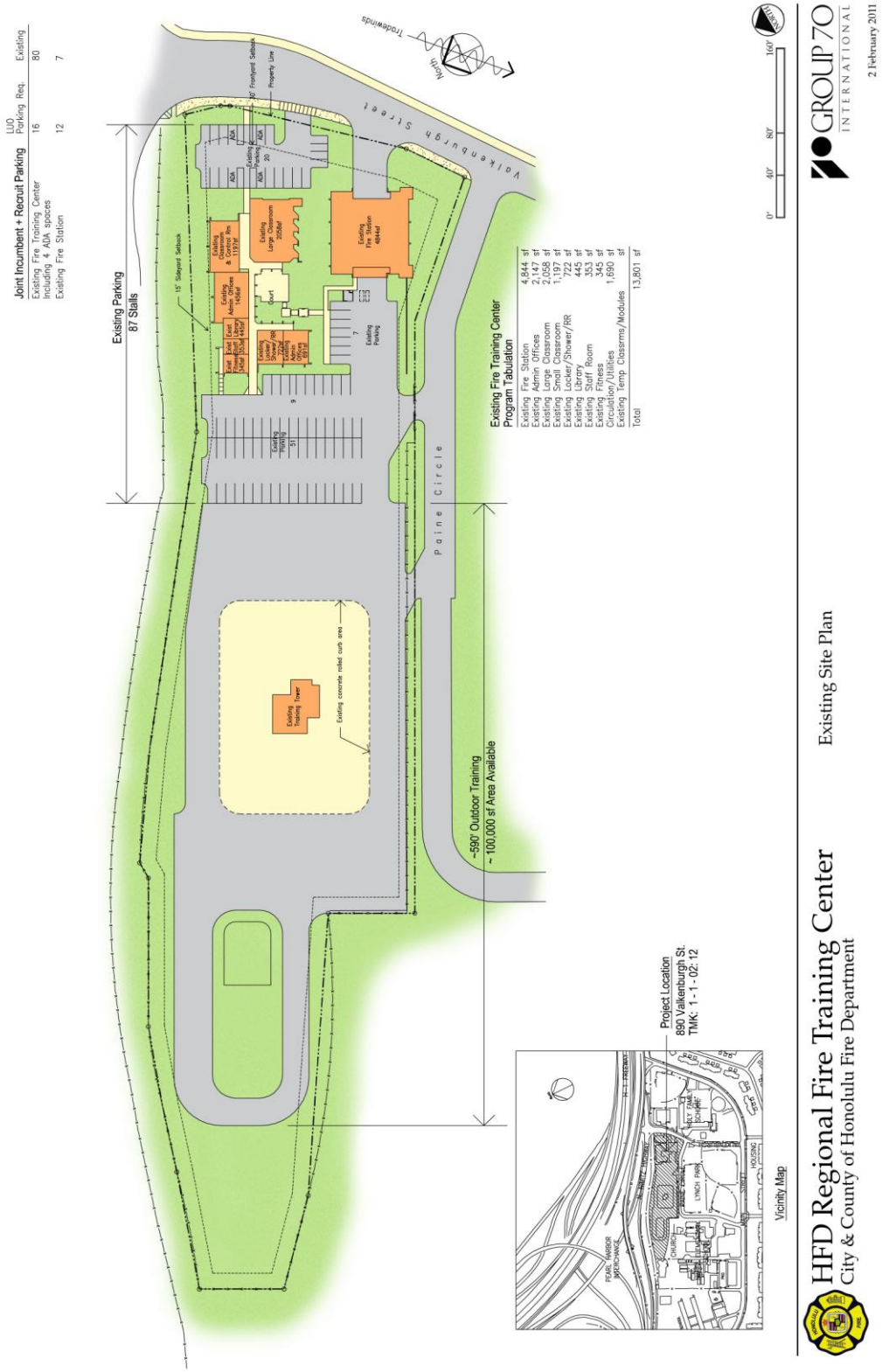


Figure 1-8 Existing Site Conditions

2.0
Description of the Proposed Action

2.0 DESCRIPTION OF THE PROPOSED ACTION

2.1 BACKGROUND

The Charles H. Thurston Training Center, located near the airport on Valkenburgh Street, serves as the primary venue for the training and education of Honolulu's firefighters. The 5.16-acre property, which also contains Honolulu Fire Department (HFD)'s Mokulele Fire Station 8, was conveyed from the U.S. Navy to the City and County of Honolulu (City) in 2005. Surrounding uses include churches, schools, military family housing, a golf course, park, Nimitz Highway and the H-1 Freeway.

The existing training center includes classrooms and administrative offices, restrooms, a library, a fitness area with locker and showers, a medical services office, fire training tower, and storage. A number of trailers and shipping containers have been converted into training modules and are also located on site. The size and configuration of these facilities are inadequate to meet the current and future needs of the HFD fire training program.

In envisioning a redevelopment of the training center to meet HFD needs, a charette was held and six major themes developed. The improvements to the HFD Regional Fire Training Center would: 1) provide a good learning environment; 2) emphasize health and well-being; 3) be efficient and flexible; 4) incorporate high tech learning; 5) carry-on HFD's legacy and heritage; and 6) be a good neighbor to the surrounding uses. Additionally, the training center will be based on environmentally sustainable principles and employ sustainable design strategies in its planning and design. The major themes resulted in a conceptual Master Plan, whose proposed implementation is the focus of this assessment.

2.2 PROJECT LOCATION AND CHARACTERISTICS

Location

The HFD Regional Fire Training Center is located in the ahupuaʻa of Moanalua (*Figure 2-1*). The project site is contained within 5.16 acres (Tax Map Key 1-1-002: 012). Nimitz Highway and the H-1 Freeway are directly adjacent to the site. The site is flat and largely paved in asphalt.

Ownership

The project site is owned by the City.

Adjacent Land Uses

The project site is located in the State Urban District and bounded by Trinity Missionary Baptist Church, Assets School, and Nimitz Elementary to the west; Air Force family housing and Lynch Park to the southwest; Holy Family Catholic Church and Academy to the south; Fleet Reserve Association Branch 46 to the southeast; and the Navy Exchange, Navy Marine Golf Course, Nimitz Highway and H-1 Freeway to the north.

Figure 2-1 Ahupua'a Boundary Map

Existing On-Site Land Uses

The site is currently used for classroom work and outdoor tactical fire training exercises (excluding live fire training) for recruits and incumbents. Companies use classrooms to train and practice their skills in Firefighting, Medical, CPR, HazMat, Search and Rescue, Fire Apparatus Operations, etc. The training tower is used to simulate various fire and rescue situations/scenarios, where firefighters can practice and improve their skills in the multiple rooms and levels of the structure. These activities are, but not limited to, high rise and residential firefighting evolutions, building search and rescue, ventilation and smoke evacuation, salvage and overhaul, various forms of rappelling and rope rescues, automatic sprinkler control, hose and ladder evolutions, standpipe connections and operations, etc. An exercise court and physical fitness room allow personnel to maintain fitness requirements. Administrative staff provides training support. Mokulele Fire Station 8 responds to calls in the area, and conducts various types of HFD business such as blood pressure checks, walk-in emergencies, public inquiries for information, fire pre-planning, and fire prevention inspection planning. Various apparatuses are also stored on-site.

2.3 PURPOSE OF THE PROPOSED PROJECT

The Training and Research Bureau (TRB) is located at the training center and assists with planning, coordinating, and evaluating HFD's training activities. To fulfill the HFD's mission statement, quality, dynamic, and essential training is provided for personnel through various training programs. The New Recruit program is an eight-month fire training, with a large portion of the training occurring in the classroom, occasionally reinforced with tactical work on the training tower, and additional, more 'dirty' tactical training at an alternate location. This type of tactical training includes, but is not limited to, live fire training, vehicle extrication, building collapse, trench and confined space rescue, simulated chemical spills, etc. The Incumbent program provides certification maintenance and/or upgrade classes for continued training. These programs ensure that responses to incidents, emergencies, and public assistance are performed in a safe, efficient, and professional manner.

The TRB conducts new and continuous research and testing on technology and techniques in the areas of weapons of mass destruction, terrorism, hazardous materials, fire fighting, water safety, driver training, apparatus operation, emergency medical response, etc. to assist personnel in accomplishing the HFD's mission. The TRB also coordinates cardiopulmonary resuscitation training and other safety courses for City employees and the public.

The Federal Fire Department and Honolulu Police Department's Specialized Services Division regularly utilize the training tower for various training missions. Emergency Medical Services utilize the site for apparatus operator training. It is not unusual for firefighters from the other counties or the State to be trained at this site and Honolulu area hospitals for short periods of time.

Functionally, the HFD has outgrown the current facility. Temporary trailers have been set up to house the firefighter recruit classroom functions, and recycled shipping containers serve as locker, weight, and storage rooms. The recruit break area and some training areas are situated under less than ideal "E-Z Corner" tents.

The training tower, although not designed for live fire training and lacking several key props, remains viable as a training resource and would be extremely costly to replace on-site or elsewhere. Currently, portable smoke generators are used in the tower to simulate fire conditions and a sliding door serves to simulate an elevator. While the tower was scheduled to be painted in 2011, it will need more structural concrete spall repair and upgrade work to support continued use.

High dollar value training equipment, such as a fire apparatus driving simulator, is housed in a temporary trailer, while other equipment such as the burn trailer, refurbished personnel buses, and training apparatuses are left out in the elements where they degrade in the sun and are subject to theft and vandalism. The recently acquired Mass Decon Trailer and Urban Search and Rescue (USAR) trailer, both with more than $400k of equipment inside, are also be subject to these outdoor conditions. A tractor trailer, located on-site at the fire station, moves these resources to emergency calls as needed. The HFD desires to keep these trailers and training modules at this central location so long as provisions to protect these assets are incorporated into development plans. Specific training modules (apparatus operations, USAR, HazMat) are also on-site and will remain.

To meet existing needs for additional classroom space, the HFD borrows, but most often rents, classroom spaces at the Fleet Reserve Center, the Japanese Cultural Center, Dole Cannery, and the Neil Blaisdell Center (NBC) Exhibition Hall. Candidate Physical Ability Test (CPAT) testing at the NBC cost the HFD approximately $17k per session in 2011. With the constant threat of litigations regarding the consistency of how this test is applied, it is imperative that the HFD have a permanent facility to conduct the test. Once permanent facilities are constructed, the CPAT testing can occur on-site.

The HFD and Emergency Services Division (ESD) are in the preliminary stages of merging their administrations and operations, which will have an impact on both the HFD Headquarters and Regional Fire Training Center, resulting in an increase in functions and personnel. Currently, the number of people onsite include: 24 full-time staff, 6 training officers, 5 firefighters at the station, 24-30 firefighter recruits per class, and between 25-35 incumbents. The April 2011 recruit class increased to approximately 50-60 new recruits to prepare for the Asia Pacific Economic Cooperation forum in November, 2011. With the additional positions and functions added to the site, the HFD is looking at approximately 90 to 100 personnel when the facility is built out.

The TRB is committed to developing highly-trained, professional, and motivated personnel to provide the best fire protection, emergency response, and safety education possible to the residents of Honolulu. Therefore, the goal of the proposed improvements to the training center is to enhance the quality of training and education of new fire recruits and incumbent firefighters by creating a modern training center that is comparable to other fire training centers nationwide.

2.4 DESCRIPTION OF PROPOSED PROJECT

The Master Plan for the training center was conceived to: 1) construct a new Recruit Training Academy; 2) construct a new Incumbent Training Center to include possible regional training by other agencies separate from the new recruits; and 3) redevelop the existing fire station. The resulting Master Plan (*Figure 2-2*) creates a permanent, stand alone firefighter recruit training facility that physically separates firefighter recruit testing, hiring, and training from the training of incumbent firefighters. The Master Plan is anticipated to be implemented in three phases as described in the following pages.

Phase I – New Recruit Training Academy, Multi-Purpose High Bay Structure, and Training Tower Improvements *(39,663 Square Feet [sq. ft.])*

The new Recruit Training Academy will be a 3-story administration/classroom building with an adjoining one-story High Bay Multi-Purpose structure.

Functions for each floor of the new Recruit Training Academy are as follows:

1) *Ground Floor* - recruit day lockers & restrooms, recruit kitchenette, training center support storage, and special storage. There is also the possibility of additional vehicle storage with easy access to the training area.
2) *Second Floor* - classrooms with breakout rooms that have the potential to be arranged in different configurations, and observation deck for training and safety purposes.
3) *Third Floor* - recruit training administration offices (12 staff), kitchen/lunch room, fitness/rehab (for staff only), lockers/showers/restrooms, computer classroom, and observation deck.

The Recruit Training Academy will be situated east-west, perpendicular to the High Bay Multi-Purpose structure. The administration offices and observation deck will have views to the training tower. Single-loaded corridor design with exterior walkways and open stairwells, together with operable windows, will provide natural shade and cooling for control of direct sunlight (glare) and unwanted heat–gain. An open landscaped area at the west-end will provide for potential recruit use as a gathering area. The courtyard area at the junction of the two buildings will serve as a gathering space and focus for the Recruit Academy.

The High Bay Multi-Purpose structure will allow for a permanent 10,000 sq. ft. facility to house CPAT training and a Safe Haven area. The safe haven area will have the capacity to hold 50-150 people in the case of an emergency. The multi-purpose structure will also have 2,400 sq. ft. of Vehicle Storage Area that can accommodate (3) Engines, (1) Ladder Truck, and (2) Ambulances. This will protect and secure these HFD mobile assets which are currently unprotected from the elements. An additional 1,225 sq. ft. of high bay vehicle storage will be provided in the Recruit Training Academy building. The High Bay structure will be situated on the site running north-south with roll-up doors all around, as needed. The structure will face the existing tower to facilitate training and to capture trade winds for natural ventilation; southern exposure will be protected by the vehicle storage area.

The existing training tower will be retained for tactical high-rise, urban search and rescue, and rappelling operations training, and will be structurally repaired, refurbished and upgraded during Phase I. The existing concrete pad will be reduced in area, and a new standard 30 ft. curb will be installed around the tower as a necessity for full functionality. A new fire service-equipped elevator for moving equipment and for use in high-rise fire operations training will be installed, along with the installation of fall protection anchors and a mock helicopter rappelling platform. A helicopter fire training prop will be added.

Recruit parking will consist of 100 out of 80 required stalls.

Phase II – New Incumbent Fire Training Center *(47,946 sq. ft.)*

The Incumbent Fire Training Center will be a new single-loaded three-story building which will relocate (from Aiea and downtown Honolulu) and consolidate all fire training offices (fire training chief, staff, Fire Prevention Bureau, etc.) and provide an expanded regional training venue.

Functions for each floor of the new Incumbent Fire Training Center are as follows:

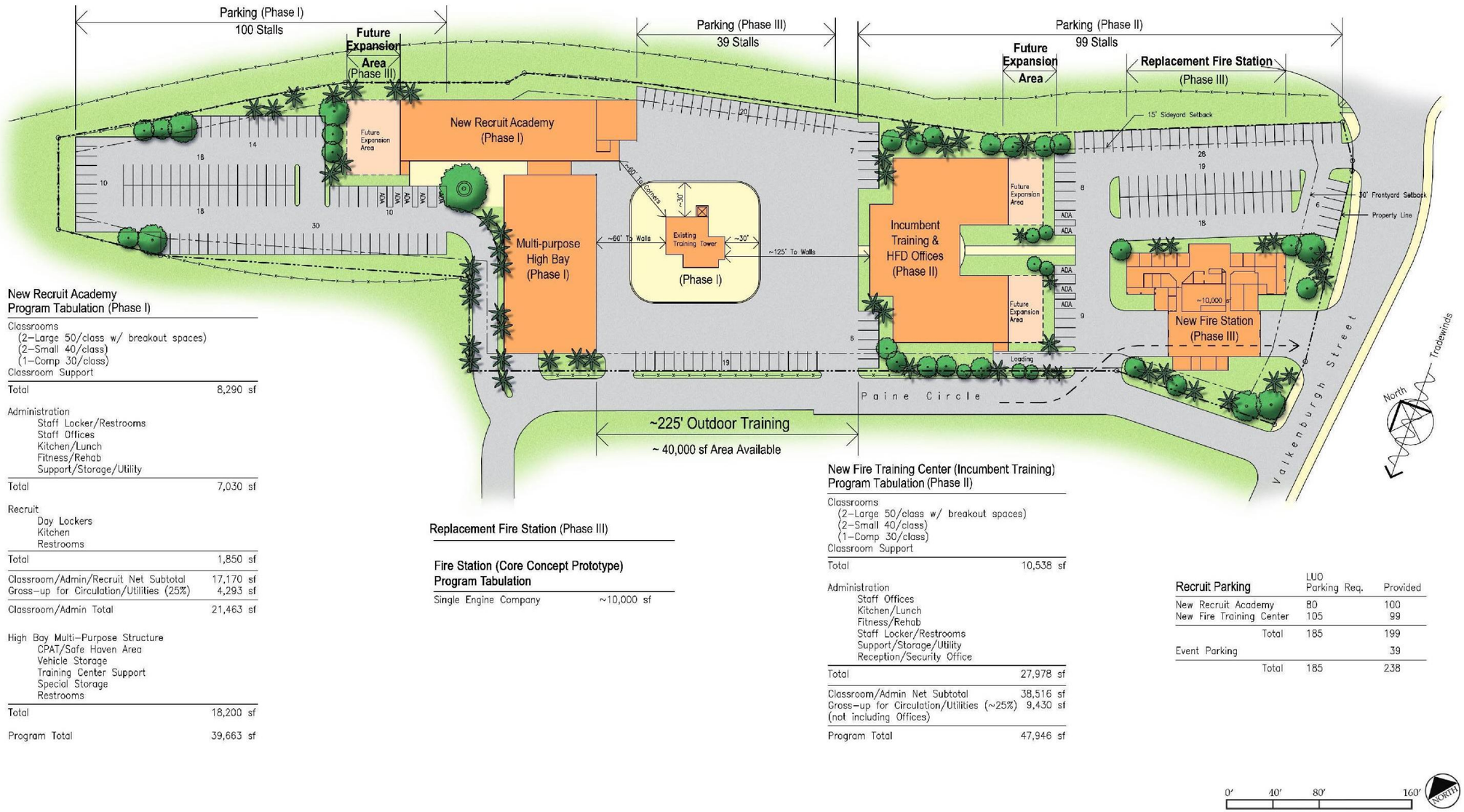
1) *Ground Floor* - fitness/rehab, lockers/showers/restrooms, administration (Fire Prevention Bureau)
2) *Second Floor* - classrooms, computer classroom, small administration area
3) *Third Floor* - administration offices (72 staff)

The Incumbent Fire Training Center is envisioned as a U-shaped courtyard building with exterior walkways, open stairwells and a landscaped courtyard facing east for potential cooling, natural ventilation and natural shading from the direct sunlight in the afternoon. The outdoor training area and fire tower will be directly visible from all floors of this building. Desirable views will be available to the south and south-west, especially from the third floor administration offices.

Incumbent parking will consist of 99 stalls, with an additional 98 stalls for event overflow parking.

Phase III –Replacement Fire Station and Potential Future Expansion

This phase fulfills the master plan with redevelopment of the existing Mokulele Fire Station 8. The new 10,000 sq. ft. Fire Station will be based on HFD's modular 'core-concept' design prototype for a single-engine company. The core concept design offers two benefits for the extended life and use of the facility. The first benefit is that this design offers a gender-neutral living and working environment, allowing the HFD the maximum flexibility in assigning personnel. The second benefit to the core concept design is that when the need arises, the station can be quickly expanded so additional resources may be brought into service with minimal disruption to the station.



New Recruit Academy Program Tabulation (Phase I)

Classrooms	
(2–Large 50/class w/ breakout spaces)	
(2–Small 40/class)	
(1–Comp 30/class)	
Classroom Support	
Total	8,290 sf
Administration	
Staff Locker/Restrooms	
Staff Offices	
Kitchen/Lunch	
Fitness/Rehab	
Support/Storage/Utility	
Total	7,030 sf
Recruit	
Day Lockers	
Kitchen	
Restrooms	
Total	1,850 sf
Classroom/Admin/Recruit Net Subtotal	17,170 sf
Gross–up for Circulation/Utilities (25%)	4,293 sf
Classroom/Admin Total	21,463 sf
High Bay Multi–Purpose Structure	
CPAT/Safe Haven Area	
Vehicle Storage	
Training Center Support	
Special Storage	
Restrooms	
Total	18,200 sf
Program Total	39,663 sf

Replacement Fire Station (Phase III)

Fire Station (Core Concept Prototype) Program Tabulation

Single Engine Company	~10,000 sf

New Fire Training Center (Incumbent Training) Program Tabulation (Phase II)

Classrooms	
(2–Large 50/class w/ breakout spaces)	
(2–Small 40/class)	
(1–Comp 30/class)	
Classroom Support	
Total	10,538 sf
Administration	
Staff Offices	
Kitchen/Lunch	
Fitness/Rehab	
Staff Locker/Restrooms	
Support/Storage/Utility	
Reception/Security Office	
Total	27,978 sf
Classroom/Admin Net Subtotal	38,516 sf
Gross–up for Circulation/Utilities (~25%) (not including Offices)	9,430 sf
Program Total	47,946 sf

Recruit Parking	LUO Parking Req.	Provided
New Recruit Academy	80	100
New Fire Training Center	105	99
Total	185	199
Event Parking		39
Total	185	238

HFD Regional Fire Training Center
City & County of Honolulu Fire Department

Proposed Site Plan

GROUP 70 INTERNATIONAL

2 February 2011

Figure 2-2 Proposed HFD Regional Fire Training Center Site Plan

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Approximately 9,750 total sq. ft. on three levels at the west end landscaped area of the Recruit Academy will be available for future expansion of classrooms or other needs. Approximately 10,440 total sq. ft. on 3 levels at the east-end of the Incumbent Fire Training Center will be available for future expansion.

The floor areas of the Regional Fire Training Center master plan project total approximately 117,799 sq. ft.

Table 2-1 Proposed Site Space Program for HFD Regional Fire Training Center

Function	Square Feet
Phase I – New Recruit Fire Training Academy	39,663
Phase II – New Incumbent Fire Training Center	47,946
Phase III – Replacement Fire Station & Expansion	30,190
TOTAL	**117,799**

2.4.1 Phasing

Proposed master plan improvements are anticipated to be constructed in three phases to avoid the use of temporary facilities and unnecessary relocation of personnel and equipment during construction (*Figure 2-2*). Phase I, estimated for occupancy in fiscal year 2018, will include the construction of the new Recruit Academy, upgrades to the existing training tower site, and supporting parking. Phase II, estimated for fiscal year 2020, will include the construction of a new Incumbent Fire Training Center. The existing fire training center, fire station, and parking stalls will remain in operation until the incumbent building is constructed. Demolition of the existing training center will occur after the move-in to the new center. Finally, Phase III, estimated for fiscal year 2025, will include a single-engine company core-concept prototype fire station to replace existing Mokulele Fire Station 8, and if needed, future expansion of the Recruit Academy.

Site work and infrastructure will be constructed in support of the new buildings. Emergency vehicle accesses and utilities will be phased to ensure service for improvements within each phase. Similarly, the parking lot paved in Phase I will include the number of stalls needed to support the facilities constructed in that phase. Expected total personnel at build out of the Regional Fire Training Center will be in the range of 162-378 by the Spring of 2026, with 93 administration and training staff, 24-30 recruit students, 36-210 incumbent students, 4-40 personnel using the training tower, and 5 firefighters at Mokulele Fire Station 8 at varying times throughout the week.

2.4.2 Summary of Projected Costs

Costs for the HFD Regional Fire Training Center project are estimated at approximately $49 million for civil and construction costs for Phases I, II and III. The estimate for construction of Phase I is approximately $22 million; Phase II, $21 million; and Phase III, $6 million. The costs will likely be met primarily through City Capital Improvement Program funds.

2.4.3 Proposed Design Elements and Themes

HFD's Motto is "Pride, Service, Dedication." The motto as well as HFD's Core Values of Safety, Teamwork, Integrity, Competence, and Commitment will be reflected in the design of the Regional Fire Training Center. A charette was held in 2006 at the Thurston Training Center to discuss the lifestyle of the Regional Fire Training Center's users and major themes for the facility redevelopment. HFD, the City Department of Design and Construction (DDC), Interact Group, and Group 70 International, Inc. participated in the charette. Six major themes emerged:

1) The HFD Regional Fire Training Center will provide a good learning environment. The center will be a regional training facility that is focused on the research, development, and delivery of All-Hazards public safety curriculum in an academic setting with a modicum of hands-on tactical training. Quiet areas will include the classrooms and landscaped courtyards. These will be separate and contained from active areas on-site that will be able to accommodate burn modules and other physical training activities.

2) The Training Center will promote health and well-being (wellness/fitness). Facilities to fulfill this theme include workout rooms, a basketball court, landscaped courtyards, covered and landscaped lanais for lunch/break areas, and other places to gather. The safety of the center users is of most concern, and a safe haven area will provide a location with a capacity to hold 50-150 people in the case of an emergency. Due to the continuous occupation of the facility by firefighters and the presence of potentially hazardous materials, special attention must be given to designing the facility to accommodate equipment and operational strategies to both protect the occupants and maintain a healthy environment.

3) The Training Center will be efficient and flexible. The Training Center supports the needs of the fire department and the community in which it is located. It must accommodate diverse functions, including housing, recreation, administration, training, community education, equipment and vehicle storage, equipment and vehicle maintenance, and hazardous materials storage. There must be the ability to convert a room into a Fire Control Center or back-up dispatch if needed. While it is usually only occupied by trained personnel, the facility may also need to accommodate the general public for community education or outreach programs. As firefighting technology evolves, the Training Center needs to evolve as well. The facility itself must be flexible and incorporate possible future expansion needs in the apparatus bay area, classroom and residential areas.

The overall efficiency of the Training Center will also be achieved with a balanced schedule of activities. The All-Hazards academic incumbent training facility will be set up similar in fashion to a community college with a catalog of classes for certification maintenance and/or upgrades. This will afford fire personnel and/or crews the ability to schedule their training on off duty days, so that daily manpower coverage for core public safety functions will not be affected or compromised. The establishment of a year-round firefighter recruit testing, hiring, and training schedule will allow the firefighter recruit training staff to work full-time at this process so that it will not deplete operational forces to fill in the positions. To accommodate these activities, the facility will operate 7 days/week, and evenings up to 8:00 pm.

4) The Training Center will be high-tech. Classrooms will provide the latest technology to provide high-level training. Computer labs will be designed for students to attend a variety of courses ranging from basic desktop applications to advanced courses. The facility must also support teleconferencing and distance learning from other parts of O'ahu and throughout the Pacific Region. It is also important to have the latest virtual driving simulators that reflect HFD's inventory of vehicles.

5) The Training Center will embody HFD's legacy and heritage. The HFD has served the island of O'ahu since 1850, and is the only fire department in the United States that was established by a ruling monarch. In 1893 firefighters started to receive salaries and the department purchased horses to pull its steam engines to fires rather than pulling them manually. The HFD responded to the famous Chinatown fires and to Hickam Air Force Base during the Pearl Harbor attack. The Training Center itself was named in honor of Charles H. Thurston, the 17th HFD fire chief who served from 1901 to 1928, the longest tenure of any fire chief in the department. Stories like these steeped in Hawai'i's culture and the HFD's history should be reflected throughout the facility, as well as with community outreach to schools and other groups.

6) The Training Center will be a good neighbor to surrounding uses. The Training Center is cognizant of their activities and how they may affect surrounding neighbors. It is important to be able to strike a balance between the needs of the facility and adjacent land uses, which include schools, churches, residences, a park, golf course, federal and state airports, and the freeway. As a good neighbor, elevation and massing of the facility will blend in with surrounding structures *(Figures 3-19 and 3-21).*

HFD is also exploring plans to relocate its heavy (dirty) tactical training programs from this site to another location of a more appropriate size. HFD is currently working with the Hawai'i Community Development Authority to locate a 20-30 acre site in Kalaeloa for an operational tactical training site to house live burn buildings, All-Hazards props and confined spaces, Urban Search and Rescue piles and trenches, an emergency vehicle operations course, surface water rescue training, etc.

2.4.3.1 Sustainable Design

The HFD Regional Fire Training Center will be based on environmentally sustainable principles and employ sustainable design strategies in its planning and design. The project will incorporate key energy and water saving design strategies to limit the project's environmental footprint and will be designed with a fully integrated approach to meet the Leadership in Energy and Environmental Design (LEED) Silver certification criteria. The overarching plan for each resource (e.g. power, water) should follow these basic principles: 1) Reduce demand; 2) Efficient systems; 3) On-site generation; and 4) Offset off-site resources needs and impacts.

Some examples of key sustainability strategies include:

Energy Saving Strategies:

- Incorporate on-site renewable energy generation system(s)
- Use solar water heater for on-site needs (sinks, showers)
- Design for flexibility and personal controls
- Provide good use of natural light
- Provide natural ventilation where applicable

Water Saving Strategies:

- Recover, treat, and reuse water
- Utilize rainwater catchment system for on-site irrigation and for use in building systems operation and maintenance
- Incorporate low-flow fixtures and appliances

Sustainable Sites Strategies:

- Reduce stormwater run-off by using pervious pavement and incorporating bioswales
- Incorporate proper building orientation and building envelope design to minimize heat gain (green roofs - vegetated, highly reflective or with photovoltaic panels), green vegetated walls)
- Minimize light trespass from building and site to improve nighttime visibility and reduce impact on nocturnal environments
- Use low-emitting materials such as zero VOC paints, adhesives and sealants, flooring systems, ceilings and walls, and furnishings.
- Separate ventilation systems for chemical storage (janitorial) and large copier rooms

2.5 PROJECT UTILITIES AND INFRASTRUCTURE

The existing project site is served by water and electric services, sewer connections, and solid waste collection services. The following section describes the physical characteristics of these site utilities with the addition of the new facilities. A Water, Wastewater and Drainage Report for the HFD Regional Fire Training Center project was completed by Sam O. Hirota, Inc. and is provided as *Appendix C*. Overall existing conditions, impacts, and mitigation measures for utilities are discussed in *Section 3.0* of this document.

2.5.1 Water Supply

The HFD Regional Fire Training Center is presently connected to the Navy water system for domestic and fire protection water service. No new or upgraded water system is required for this development. Phase I of the future development can be sustained with the current water use. Phases II & III will require additional water demands on the Navy's system. There will be a daily (weekday) increase in demand from 455.1 gallons (existing) to 575.7 gallons (Phase III), which is an increase of 120.4 gallons or 1.26 times the existing demand. However, based on inquiries with the Navy, the existing system can accommodate the increase in demand.

2.5.2 Wastewater

The HFD Regional Fire Training Center's flows are conveyed to the Navy's private wastewater system. Sewer laterals within the property are maintained and serviced by the City. Currently, the Navy's private wastewater system is being conveyed at one point by a pump station. As a result of this pump station being at capacity, there is a moratorium on development, more specifically the increase in wastewater loads, in the entire sewer-shed.

Phase I of the project can be completed without an increase in wastewater flows. In Phases II and III, there will be a daily increase in demand from 2,100 gallons (existing) to 5,960 gallons, which is an increase of 3,860 gallons or 2.84 times the existing demand. In order to accommodate the wastewater increase, an on-site holding tank will be constructed to hold wastewater during the day for release at night during off-peak hours into the existing system. No new or upgraded wastewater system will be required for the project as long as the holding tank is used.

2.5.3 Drainage System

Any increase in peak flows due to redevelopment of the project site will be mitigated by the use of either pervious pavements or detention of runoff, or a combination of both. However, if the underlying soils have very low permeability (typical of the underlying Makalapa (MdB) type soils), then a retention system or pervious pavement may not be feasible. Further geotechnical analysis may be required. If pervious pavement is not approved or is deemed not feasible due to geotechnical or other reasons, then underground detention would be required. If only a small area of pavement is allowed to be pervious, then a combination of both options may be required.

Water quality best management practices (BMPs) will be implemented at the project site to address compliance to National Pollutant Discharge Elimination System (NPDES) regulations. These BMPs will be designed and constructed in advance of any master plan improvements in appropriate locations. Additional BMPs and water quality treatment systems may be added at a later date as part of the master plan improvements in order to meet sustainable goals for the project, including LEED certification.

2.5.4 Gas

Gas service for propane is provided by The Gas Company to the various propane tanks on-site. The propane is used for fire training in the burn trailer, training tower and burn prop. It is expected that this service will continue to support training requirements.

Gas service for diesel and unleaded gasoline tanks is provided by Tesoro. This service is a City contract, awarded every year. The need for this service is also expected to continue in the future.

2.5.5 Solid Waste Disposal

Solid waste from the project site is currently disposed of at the H-POWER Plant in Campbell Industrial Park by the City Department of Environmental Services. These services will continue during and after expansion. The proposed project will generate solid waste during construction. To the extent possible, the construction solid waste will be distributed within the immediate project area for possible reuse.

Current recycling on-site is limited to bottles and paper. Recycling programs will be expanded on the proposed project site, with bins at each facility.

2.5.6 Electrical System

Electrical service for the project area is provided by Hawaiian Electric Company (HECO). The existing electrical service is at full capacity and is not able to support any further expansion. The proposed design will provide a new underground electrical service from HECO to sustain the increased needs of the expanded facility.

2.5.7 Telecommunications

Telecommunication services are served from Hawaiian Telecom (voice) and Time Warner Oceanic (CATV) from existing underground services. The new telecommunication distribution system will also be served from the same underground route as the electrical service.

2.5.8 Access, Roadways and Parking

Access to the HFD Regional Fire Training Center is through two ingress and egress points at Valkenburgh Street and Paine Circle. Valkenburgh Street is a predominantly two-lane, two-way roadway generally oriented in the north-south direction. Northeast of the HFD Regional Fire Training Center, Valkenburgh Street intersects the westbound direction of traffic along Nimitz Highway. Further south, Valkenburgh Street intersects Paine Circle. At this un-signalized T-intersection, the northbound approach of Valkenburgh Street has one lane that serves left-turn and through traffic movements while the southbound approach has one lane that serves through and right-turn traffic movements. Paine Circle is a two-lane, two-way roadway that provides access to adjacent HFD facility and Holy Family Catholic Academy. At the intersection with Valkenburgh Street, Paine Circle has one stop-controlled lane that serves left-turn and right-turn lanes.

Parking for 20 vehicles, including four ADA stalls, is currently located off of Valkenburgh Street. Another 67 stalls are accessed from Paine Circle. Overflow parking is available across the street at Lynch Park.

2.6 CONSTRUCTION CHARACTERISTICS

The proposed project will deconstruct/demolish and replace two of the three existing buildings. The project site will require some vegetation clearing, grubbing, minor grading and excavation (cut and fill), general construction, and landscaping.

2.6.1 Vegetation Clearing, Grubbing and Grading

The site will be cleared, grubbed and graded to develop the new facility and landscaped areas. During the construction of the training center, existing parking stalls will be relocated and the existing training center deconstructed, requiring some removal of the existing asphalt and construction materials.

The project site is generally level and a portion of the project will be infilled northwest of the existing training tower. The area is largely paved in asphalt where the trailers and containers are sited, with a minor raised grassy area that is used as a parking area. Modification to the topography to accommodate the project will be minimal, consisting of fine adjustments to site grades to allow for the building, pathways, drainage, and landscaping features. Excess material will be hauled offsite.

2.6.2 General Construction

The general construction of the facility will include the formation and placement of concrete foundations, the installation of mechanical equipment and electrical wiring and equipment, general carpentry work, painting and many other trades and work associated with typical construction activities.

Construction activity hours will be from 7:00 am to 6:00 pm. Construction will adhere to applicable noise regulations as per Title 11, Chapter 46, of the Hawai'i Administrative Rules 11-46. Typical construction vehicles will be used on the jobsite for the development of the training facility. These may include D9 dozers, front-end loaders, scraper, dump trucks, water trucks, etc. A permit from Hawai'i State Department of Transportation (DOT) Highways will be obtained for transport of oversize equipment and overweight loads.

The project will comply with NPDES permit requirements for construction activity. A NPDES permit for discharge of stormwater associated with construction activities will be obtained for the HFD site. The requirements of the approved NPDES permit and erosion control plan will be adhered to during construction as appropriate. Construction, grading and drainage plans for the project will be submitted to appropriate agencies, such as DOT Highways Division, for review and approval.

2.7 OCCUPANCY AND HOURS OF OPERATION

At build-out, the new Recruit Academy and HFD Offices will continue to operate from 7:45 am to 4:30 pm, Monday through Friday. Incumbent training activities, such as re-certification and certification upgrades, will also take place during these days and times, with elective training being available until 8:00 pm Monday through Saturday. The Mokulele Fire Station 8 will operate 24 hours a day, seven days a week. The training tower will be open for use seven days a week from 7:45 am up to 8:00 pm, and will typically be used for a maximum of 3 to 4 hours per day. Between one apparatus/company and seven apparatuses/companies plus a battalion commander (4-40 personnel), may operate at the training tower at any one time. The Multi-Purpose High Bay building will operate from 7:45 am to 8:00 pm seven days a week, facilitating CPAT and tactical training for new recruits until 4:30 pm Monday through Friday. Additional incumbent training activities will take place in the High Bay building when not in use by recruits.

3.0
Description of the Environmental Setting, Potential Impacts and Mitigation Measures

3.0 DESCRIPTION OF THE ENVIRONMENTAL SETTING, POTENTIAL IMPACTS AND MITIGATION MEASURES

This section describes the existing environmental setting and identifies possible impacts of the proposed project. Strategies to mitigate those potential impacts are also identified.

3.1 TOPOGRAPHY

Existing Conditions

The Honolulu Fire Department (HFD) Training Center site is relatively flat and located between 15 feet (ft.) and 25 ft. above mean sea level *(Figure 3-1).* On the Training Center site, there is a very gentle slope from the northeast corner towards the southwest corner. Elevations of the surrounding topography (1-mile radius) vary by direction. Elevation gradually declines to sea level to the west (Pearl Harbor) and south (Pacific Ocean). The Koʻolau Range, stretching from north to east of the site, reaches a maximum elevation of 3,150 ft., approximately 9 miles east of the site.

Anticipated Impacts and Mitigation Measures

Some grading will be required to implement the proposed improvements, but no significant impacts to the site topography are anticipated. Much of the usable portion of the site was modified and improved upon when the existing training center and fire station structures were originally developed.

Best Management Practices (BMPs) will be implemented pursuant to the required Grading Permit to mitigate any potential impacts of soil erosion and fugitive dust during grading or excavation. Grading plans will be prepared by a licensed civil engineer to ensure slope stability and mitigate potential erosion and storm water runoff.

3.2 SOILS

Existing Conditions

Soil types within the project site were identified with digital map data from the U.S. Department of Agriculture, Natural Resources Conservation Service, 2007 (formerly known as the Soil Conservation Service). As depicted in *Figure 3-2*, the soils at the HFD Training Center site are classified as "MdB": Makalapa Clay, 2-6 percent slopes. This soil type, formed in volcanic tuff, is moderately deep, well-drained, and occurs on gently sloping uplands. The surface layer is clay and the subsoil is clay to silty clay loam. The clays are very sticky and very plastic and crack widely upon drying, so the shrink-swell potential is high. The soil is mildly alkaline in the surface layer and mildly alkaline to moderately alkaline in the subsoil. Permeability and runoff are slow and the erosion hazard is slight, making the soil useful for urban development and pasture.

Figure 3-1 Topography Map

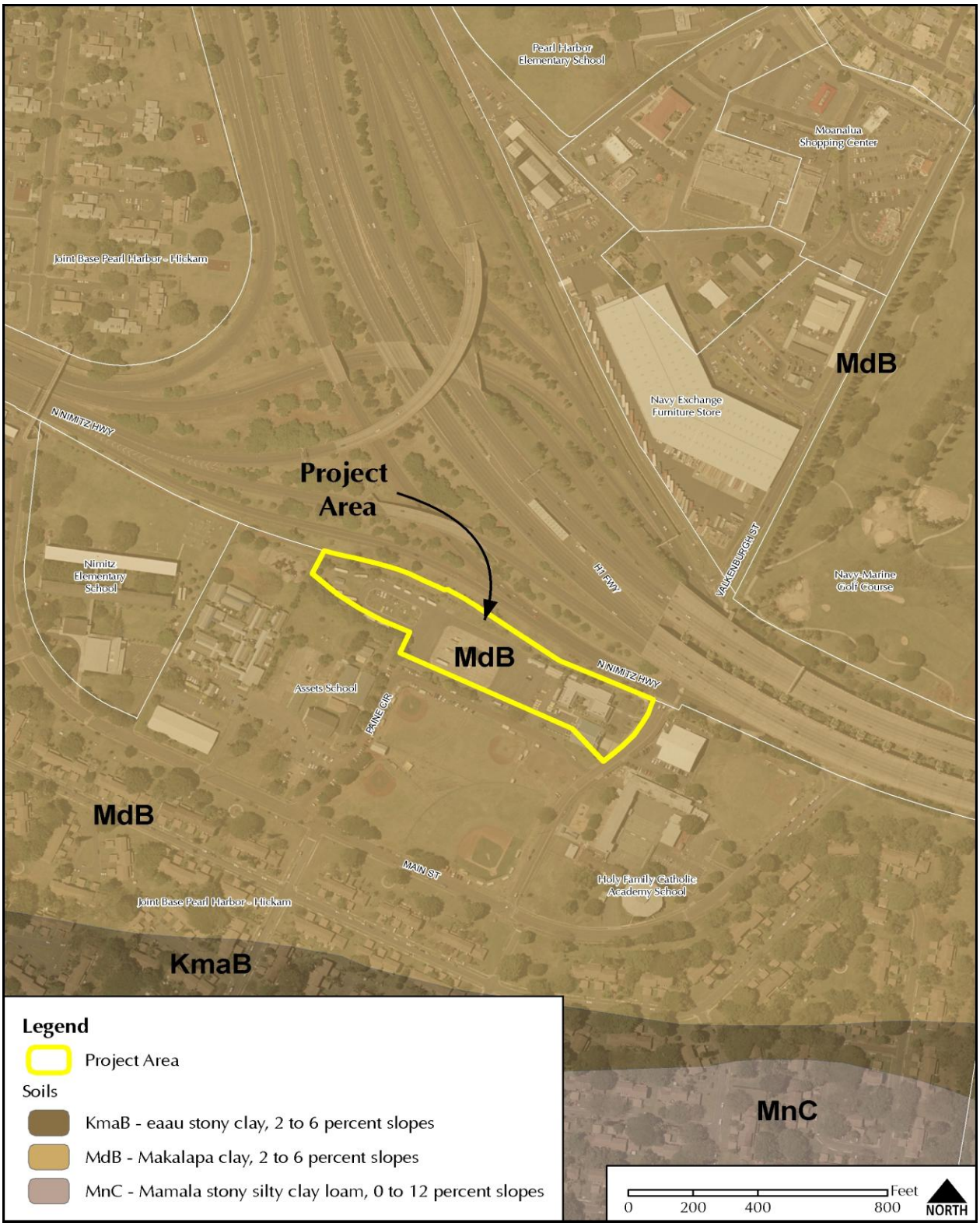

Figure 3-2 USDA NRCS Soils Map
(U.S. Department of Agriculture, Natural Resources Conservation Service, 2007)

Anticipated Impacts and Mitigation Measures

The proposed project will not change the overall soil composition at the site. However, due to grading and leveling, some soil will be redistributed on the site. Earth moving activities during construction (e.g., grading, clearing, excavation) have potential to impact air quality through fugitive dust and water quality through storm water runoff. These impacts are addressed in *Section 3.7 Air Quality* and *Section 3.9.3 Storm Drainage*. BMPs will be implemented as described in these sections to mitigate potential adverse impacts.

3.3 CLIMATE

Existing Conditions

Climate on O'ahu can be characterized as having low day-to-day and month-to-month variability. Annual and daily variation in temperature depends to a large degree on elevation above sea level, distance inland, and exposure to trade winds.

Winds are predominantly "trade winds" from the east-northeast except for occasional periods when "Kona" storms may generate strong winds from the south, or when the trade winds are weak and land breeze to sea breeze circulations develop. Wind speeds typically vary between about 5 and 20 miles per hour (mph) providing relatively good ventilation much of the time. Lower velocities (less than 10 mph) occur frequently and the usual northeasterly trade winds tend to break down in the Fall giving way to more light, variable wind conditions through the Winter and on into early Spring.

The project area's temperatures generally have small seasonal variations between the warmest months (August and September) and the coolest months (January and February). The climate in Moanalua is warm during summer when temperatures tend to be in the high 80°s, and also warm during winter when temperatures tend to be in the low 80°s. Temperature variations between night and day tend to be fairly limited during summer with a difference that can reach 15° Fahrenheit, and fairly limited during winter with an average difference of 11° Fahrenheit.

Rainfall in general is highly variable depending upon elevation and location with respect to the tradewinds. Moanalua is semi-arid with an annual average precipitation of 35.0 inches. Average monthly rainfall varies only slightly with an average difference of 3.0 inches from the wetter months of December to February to the drier months of June to September. The wettest month of the year is December with an average rainfall of 4.3 inches.

Anticipated Impacts and Mitigation Measures

The proposed action will have no effect on climatic conditions, and therefore no mitigation measures are proposed.

3.4 NATURAL HAZARDS

Existing Conditions

The HFD site is located within the Flood Insurance Rate Map Zone D *(Figure 1-7)*, which is outside of the 500-year floodplain and defined as an area of undetermined but possible flood hazards (Hawai'i Statewide GIS Program, 2004).

No hurricanes have significantly impacted the project area in recent history, however the potential for tropical storms to cause future damage cannot be dismissed.

The majority of earthquakes in Hawai'i are directly related to volcanic activity on the Island of Hawai'i. The entire City and County of Honolulu (City) lies in a seismic zone designated as 2A. Under the International Building Code (IBC) seismic provision, a Zone 2A area could experience seismic activity between .75 and .10 of the earth's gravitational acceleration (g-force).

Anticipated Impacts and Mitigation Measures

To prevent ponding or localized flooding resulting from storm run-off, existing drainage infrastructure will be maintained, while new infrastructure will be designed and constructed to meet applicable standards. All construction will necessarily conform to relevant building codes to mitigate the risk of wind and seismic damage.

3.5 FLORA AND FAUNA

Existing Conditions

The site of the training center, and the surrounding area, has been extensively altered by prior urbanization. No threatened or endangered plant or animal species are known to exist on the subject property. The developed portion of the property is landscaped with introduced plants that include kiawe (*Prosopis pallida*), plumeria (*Plumeria sp.*), and monkeypod (*Samanea saman*). Birds and animals common to urban areas, such as rats (*Rattus sp.),* mice (*Mus musculus*), and domesticated and feral cats (*Felis sp.)* and dogs (*Canis sp.),* reptiles and insects were sighted or presumed to exist on the site.

Anticipated Impacts and Mitigation Measures

It is not expected that the expansion and operation of HFD's Regional Fire Training Center will result in deleterious impacts to any botanical, avian, or mammalian species. No protected species of plants were located and none are anticipated to occur in this urbanized area.

A landscaping design has not been completed for the project at this time. The landscape design phase is the ideal time to make decisions that can greatly reduce maintenance costs. Maintenance can be reduced through the selection of appropriate landscaping material, siting, and installation. The following are some design concepts that will help minimize the amount of maintenance required:

- Install high-quality plant material of the appropriate size
- Use plants that are native, micro-climatically adapted, low maintenance, and pest-resistant whenever possible
- Plant groundcover or install mulch at slopes and shady areas where grass will not grow.

None of the existing trees surrounding the proposed project site are considered to be endangered or threatened. Where possible, trees will be preserved in place and included into the planned landscape design. Healthy trees that cannot stay in their current location should be transplanted and continue to serve as on-site landscaping at the Training Center. The proposed improvements are not expected to have a significant negative impact on birds or introduced wildlife in the area.

3.6 WATER QUALITY AND RESOURCES

Existing Conditions

There are no wetlands or other surface water resources at the project site. The nearest surface water source is a freshwater pond, located at the Navy Marine Golf Course. According to Mink and Lau's 1990 publication "Aquifer Identification and Classification for Oahu: Groundwater Protection Strategy for Hawaii," the project area is located above an upper and lower aquifer within the Moanalua Aquifer System, which is part of the Honolulu Aquifer Sector. The upper aquifer is a basal, unconfined, sedimentary aquifer, characterized as moderately saline with high vulnerability to contamination. This aquifer is neither used as a drinking water source nor considered ecologically important. The lower aquifer is a basal, confined aquifer in horizontally extensive lavas, characterized as an irreplaceable, currently used drinking water source with fresh salinity (less than 250 milligrams of Chlorine - per liter of water) and a low vulnerability to contamination.

Anticipated Impacts and Mitigation Measures

There are no surface waters or wetlands at the HFD site. Below the site, a sedimentary caprock aquifer that is not used for drinking water nor is ecologically important overlies a confined freshwater aquifer. Although the upper aquifer has a high vulnerability to contamination, the lower aquifer has a low risk for being contaminated. As there may be storm water runoff and other discharges of water during demolition and construction of the proposed facilities, the private developer will be required to prepare a BMP to address protection of water resources during demolition and construction. This BMP would be required to obtain the NPDES General Permit from the Hawai'i State Department of Health (DOH). Therefore, the proposed action would have no significant impacts on water quality and resources.

3.7 AIR QUALITY

Existing Conditions

An Air Quality Impact Report was conducted by J.W. Morrow, Environmental Management Consultant in January 2012 for the proposed project *(Appendix A).* In general, air quality in Hawai'i is excellent due to the predominant northeast trade winds. Based on air quality data

collected and published by the DOH 2010, Hawai'i complies with the standards of the Clean Air Act of 1970 and its subsequent amendments, including the National Ambient Air Quality Standards and State Ambient Air Quality Standards. The air in Hawai'i is clean and low in pollutants, as O'ahu is in attainment of all air quality standards.

Some localized conditions, such as heavy traffic at intersections, can negatively impact air quality. Vehicle emissions from motor vehicle traffic on nearby roadways (Nimitz Highway and H-1) are currently the most common type of pollution generated in the vicinity of the project site. Once construction starts, air quality may be affected by the generation of fugitive dust, construction equipment and worker vehicle emissions. An additional source that could affect air quality are the burn modules used at the HFD site that burn propane and utilize artificial smoke to simulate actual fire conditions.

Anticipated Impacts and Mitigation Measures

During construction, dust conditions will be controlled by frequent watering of roadways and other soil management measures, including the use of metal track-out elimination devices, landscaping of bare areas, and wind fencing on perimeters and around subdivided areas within the site. The work shall be in conformance with the air pollution control standards and regulations of the DOH. Equipment will be maintained in proper working order to minimize emissions. These impacts are mostly temporary in nature. The training fires are exempt from air pollution control permitting; however emissions fall well below federal and state standards, so no mitigation is necessary.

3.8 NOISE

Existing Conditions

Y. Ebisu and Associates conducted an Acoustic Study for the project in August 2011 (*Appendix B*). The study describes the existing and future noise environments in the vicinity of the proposed HFD Regional Fire Training Center project site and provides recommendations for mitigating noise impacts associated with the project.

Title 11, Chapter 46, of the Hawai'i Administrative Rules (HAR) 11-46 defines maximum permissible sound levels which are intended to protect, control, and abate noise pollution from stationary sources and construction, industrial, and agricultural equipment. As detailed below, maximum permissible sound levels in various zoning districts are set for excessive noise sources during the day (7 AM to 10 PM) and night (10 PM to 7 AM) at the property line where the activity occurs.

- Class A - Residential, conservation, preservation, public space, open space, or similar type zones – 55 decibel (dBA) (day) and 45 dBA (night)
- Class B - Multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type zones – 60 dBA (day) and 50 dBA (night)
- Class C - Agriculture, country, industrial, or similar type zones – 70 dBA (day) and 70 dBA (night)

Noise from an HFD pump truck during drafting operations represents one of the loudest outdoor activities at the facility. Major contributors to the existing background ambient noise levels within the project area are largely attributed to motor vehicle traffic along the H-1 Freeway and Nimitz Highway. Traffic noise levels are highest during the AM peak hour, and remain relatively constant thereafter through the PM peak hour. A detailed analysis of traffic noise modeling conducted for the project is provided in *Appendix D*.

Anticipated Impacts and Mitigation Measures

Traffic Noise

Predictions of future traffic noise levels were made for the Year 2025 with and without the proposed project. Significant noise impacts resulting from project-related traffic are not expected to occur. The highest traffic noise level increases associated with project traffic are expected to occur along Valkenburgh Street between Nimitz Highway and Paine Circle and along Paine Circle west of the Valkenburgh Street intersection; however these increases will be masked by higher noise levels occurring from the H-1 Freeway. The buildings of the Holy Family Catholic Church and Academy and the Trinity Missionary Baptist Church are not expected to experience a measurable increase in future traffic noise levels as a result of the project. Existing traffic noise from Nimitz Highway and H-1 Freeway will continue to control the background noise levels in the project vicinity.

Based on the predicted traffic noise levels and frequency spectrum of the traffic noise, an exterior-to-interior noise reduction is required to achieve interior noise levels of 40 dBA in the Recruit Training Academy and Incumbent Training & HFD Offices. These traffic noise reduction requirements can be satisfied by using specialized exterior walls and roofing, and by using minimum 1/4 inch thick, laminated glass for the exterior windows. Exterior doors should be avoided, if possible, along the north, east, and west faces of the buildings.

Noise Occurring from Pump Truck Drafting Operations

The closest noise-sensitive neighbors to the HFD Regional Fire Training Center's drafting pit are the Holy Family Catholic Church and Academy approximately 450 ft. to the east, housing units approximately 720 ft. to the south, and the Trinity Missionary Baptist Church approximately 420 ft. to the west. Predicted noise levels during drafting operations at these three locations range from 60 dBA to 65 dBA. These predicted sound levels are similar to existing traffic noise levels from H-1 Freeway, and are not considered to be overly intrusive.

Predicted noise levels of drafting operations are expected to be higher at the project's new buildings, ranging from approximately 10 to 300 ft. from the drafting operations. The planned Incumbent Training & HPD Offices building is located next to the Drafting Pit, and will require special sound attenuation treatments due to the very high noise level of 98 dBA expected along the building's south wall. The Multi-Purpose High-Bay and New Recruit Academy Buildings will require lesser sound attenuation treatments due to the lower drafting noise levels of 68 to 69 dBA predicted along their east facing walls.

Construction Noise

While noise may be generated during the construction period, the project is not expected to significantly impact neighboring areas. Construction activities will be monitored by the State to comply with the provisions of the regulation for community noise control. The dominant noise sources during construction will be earth moving equipment. Noise levels associated with construction equipment typically range from 80 to 95 dBA at 50 ft. from the source. While significant impacts to neighboring areas are not anticipated, mitigation measures will be implemented to minimize construction noise impacts. These measures include limiting work to daytime hours and reducing truck/equipment idling when not in use. All project activity will comply with the DOH's Administrative Rules, Chapter 11-46, "Community Noise Control".

3.9 UTILITIES AND INFRASTRUCTURE

Sam O. Hirota, Inc. prepared a preliminary engineering report and drainage calculations for the proposed project in December 2011 *(Appendix C)*.

3.9.1 Water System

Existing Conditions

Domestic Water Service

The training facility and Mokulele Fire Station are currently serviced and maintained by the Navy's private water system. The 16-inch Navy water main supplies the HFD Training Center and Mokulele Fire Station as well as the surrounding Ohana Nui neighborhood. This water main runs along the northern boundary of the training center site.

An 8-inch water main connected to the 16-inch water main runs approximately parallel to Valkenburgh Street along the east side of the project site. From this 8-inch main, an existing 2.5-inch service lateral services the Mokulele Fire Station, the locker room, and irrigation system (which currently does not work properly). The buildings near the fire station are served from an existing 2-inch water meter. There is a 12-inch water main that runs in a north to southern direction east of the existing training tower, which connects to the existing 16-inch water line. A series of 12-inch, 8-inch and 6-inch water lines return into the project site and are primarily utilized for fire training. There are also two dry standpipes located around the training tower which are used during training. See *Figure 3-3* for more detail.

An underground drafting pit (approximately 15,000 gallons) is located off of Paine Circle, and is used for fire pump equipment testing. Pumping appliances can be attached without the need for fire personnel to operate fire hoses for extended periods. The depleted pit is refilled with water from fire hydrants. There is a small leak from the pit into the ground.

Fire Protection System

The existing fire protection water system is comprised of four charged and two dummy on-site fire hydrants within the training center, two off-site hydrants near the training tower on Paine Circle, and one off-site hydrant near the entrance to the Valkenburgh parking lot. HFD criteria require a hydrant within 150 ft. of a building. The existing water system cannot provide adequate fire protection for the proposed project per Board of Water Supply standards.

Anticipated Impacts and Mitigation Measures

Domestic Water Service

The HFD training center is presently connected to the Navy water system for domestic and fire protection water service. No new or upgraded water system is required for this project. Phase I of the future project can be sustained with the current water use. Phases II & III will require additional water demands on the Navy's system. There will be a daily (weekday) increase in demand from 455.1 gallons (existing) to 575.7 gallons (Phase III), which is an increase of 120.4 gallons or 1.26 times the existing demand. Based on inquiries with the Navy, the existing system can accommodate the increase in demand. However, plans include minimizing water consumption and wastewater discharge by the use of ultra-high efficiency plumbing fixtures and minimizing energy use with thermal solar water heating systems. Should use of the Navy system not be available in the future, the property will need to connect with City facilities off-site.

Fire Protection System

A new water main will be constructed to meet fire protection demands for the proposed HFD site. Fire hydrants will be added in accordance with HFD requirements to provide fire protection coverage for the new buildings. Separate water line taps for fire department connections and sprinkler systems can be added as needed to support the new buildings.

3.9.2 Wastewater System

Existing Conditions

The training center's flows are conveyed to the Navy's private wastewater system. Sewerage from the site is transported to a series of gravity lines and then to a pump station located along Kuntz Road. Sewer laterals within the property line are maintained and serviced by the City. The Navy's pump station is undersized and at hydraulic capacity. As a result, there is a moratorium on any project that increases flows to the pump station.

Anticipated Impacts and Mitigation Measures

New sewer lines will be installed as needed to service the proposed buildings. The alignment of the new sewer lines will be set with consideration of the finish grades around the new buildings to minimize the cover over the pipes.

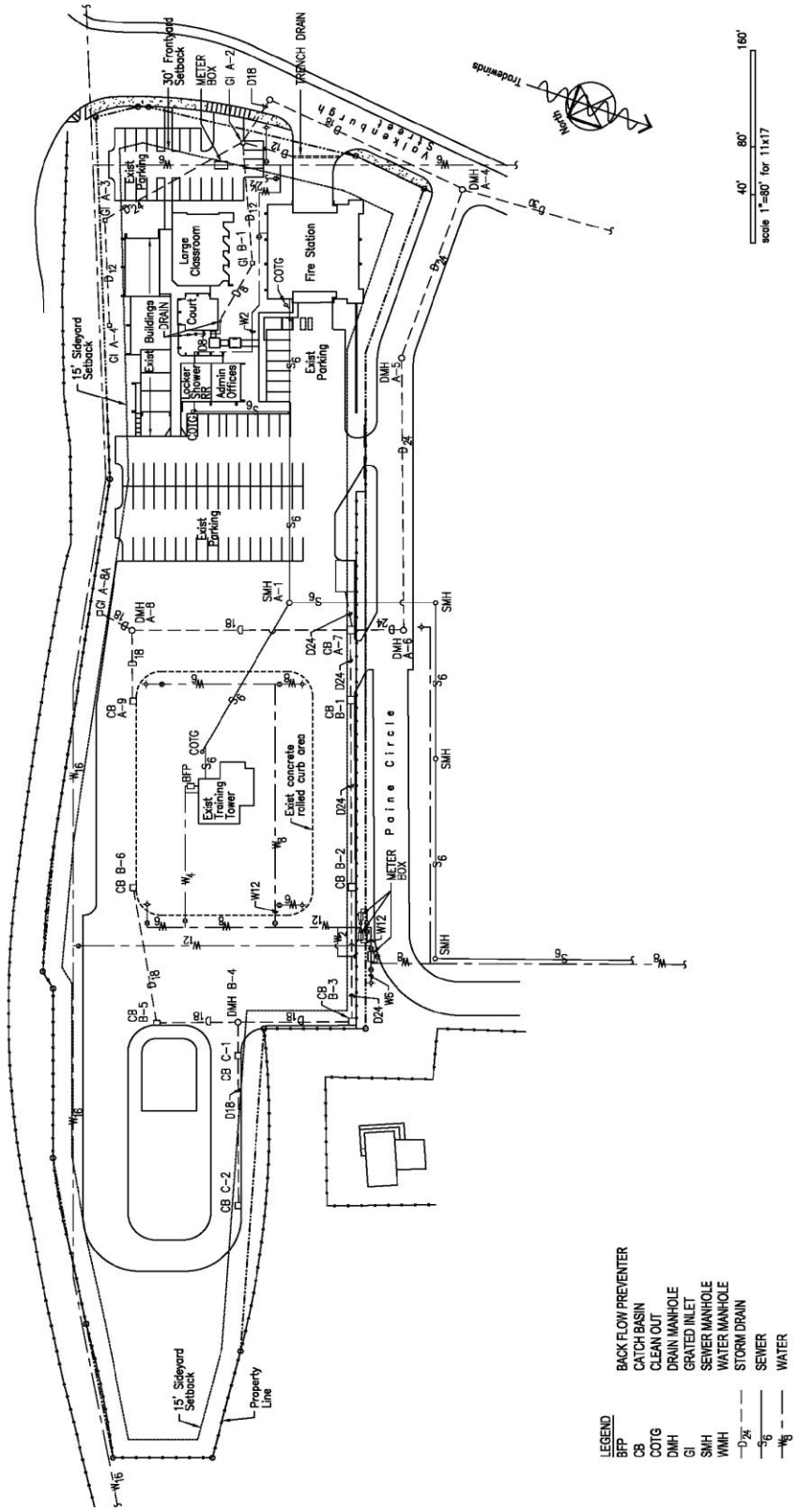

Figure 3-3 Existing Utilities

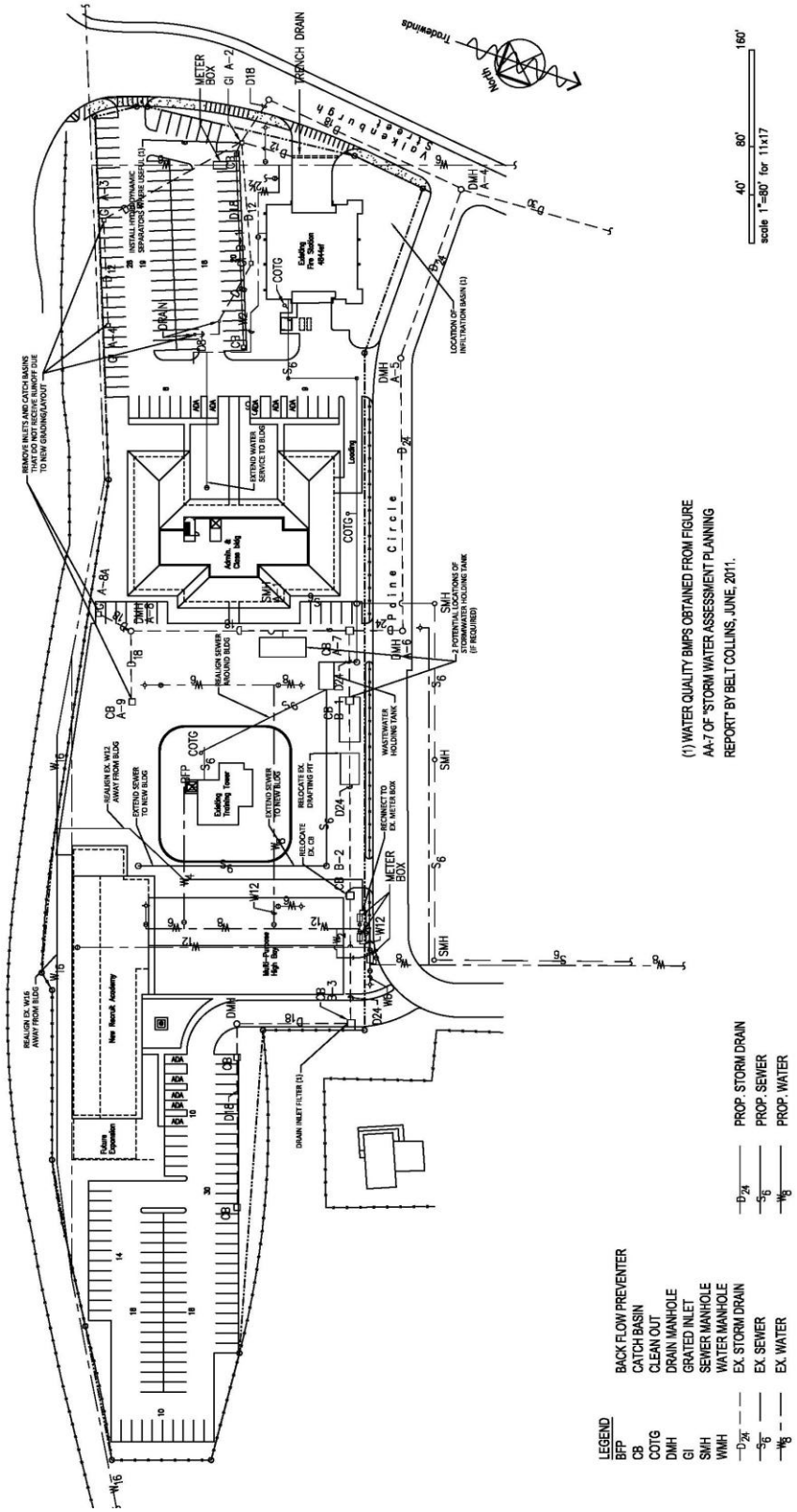

Figure 3-4 Proposed Utilities

Phase I of the project can be completed without an increase in wastewater flows to the Navy systems. In Phases II and III, there will be a daily increase in demand from 2,100 gallons (existing) to 5,960 gallons, which is an increase of 3,860 gallons or 2.84 times the existing demand. In order to accommodate the wastewater increase, an on-site holding tank will be constructed to release increased wastewater flows at night during off-peak hours into the existing system. No new or upgraded wastewater system will be required for this development as long as the holding tank is used. Should use of the Navy system not be available in the future, the property will need to connect with City facilities off-site.

3.9.3 Storm Drainage

Existing Conditions

According to the 2011 Water, Wastewater and Drainage Report provided by Sam A. Hirota, Inc. *(Appendix C)* the current buildings, paved and unpaved areas of the training center total 67% impervious surface and a 33% pervious surface. The site generally drains to the south, with a minor area north of the site draining into the site. See *Figures 3-3 and 3-5* for more detail.

There are currently two main storm sewer systems that drain the site, one for the eastern portion and one for the western portion. The eastern portion of the site drains into a series of grate inlets, catch basins, and a trench drain along the entrance of the fire station. This storm sewer system collects as an 18-inch line that connects to an existing 24-inch line along Valkenburgh Street. The western portion of the site drains into a series of grate inlets & catch basins, which collects as a 24-inch line along Paine Circle. Eventually, the Paine Circle line ties into the Valkenburgh Street line, and continues as a 30-inch drain line.

The underground draft pit is located next to the western catch basin. The seal used for priming the draft pit pump is leaking oil and requires repair.

Anticipated Impacts and Mitigation Measures

No new or upgraded drainage system is required for this development. Any increase in peak flows due to redevelopment of the project site will be mitigated by the use of either pervious pavements or detention of runoff or a combination of both *(Figure 3-6).* Water quality BMPs will be implemented at the project site to address compliance to National Pollutant Discharge Elimination System (NPDES) regulations. These BMPs will be designed and constructed in advance of any master plan improvements in appropriate locations. Additional BMPs and water quality treatment systems may be added at a later date as part of the master plan improvements in order to meet sustainable goals for the project, including Leadership in Energy and Environmental Design (LEED) certification. No significant storm drainage impacts are anticipated.

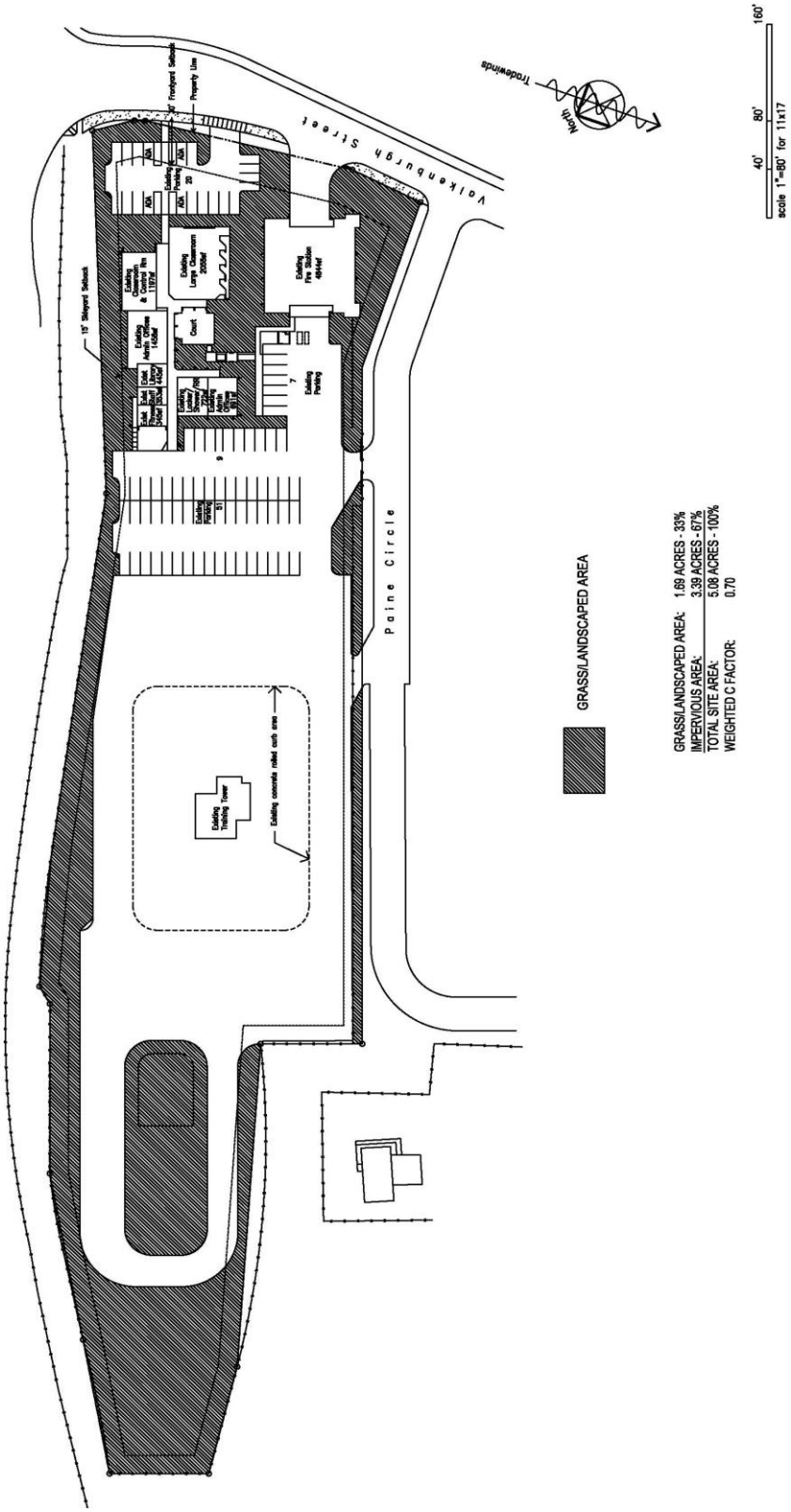

Figure 3-5 Existing Drainage Conditions

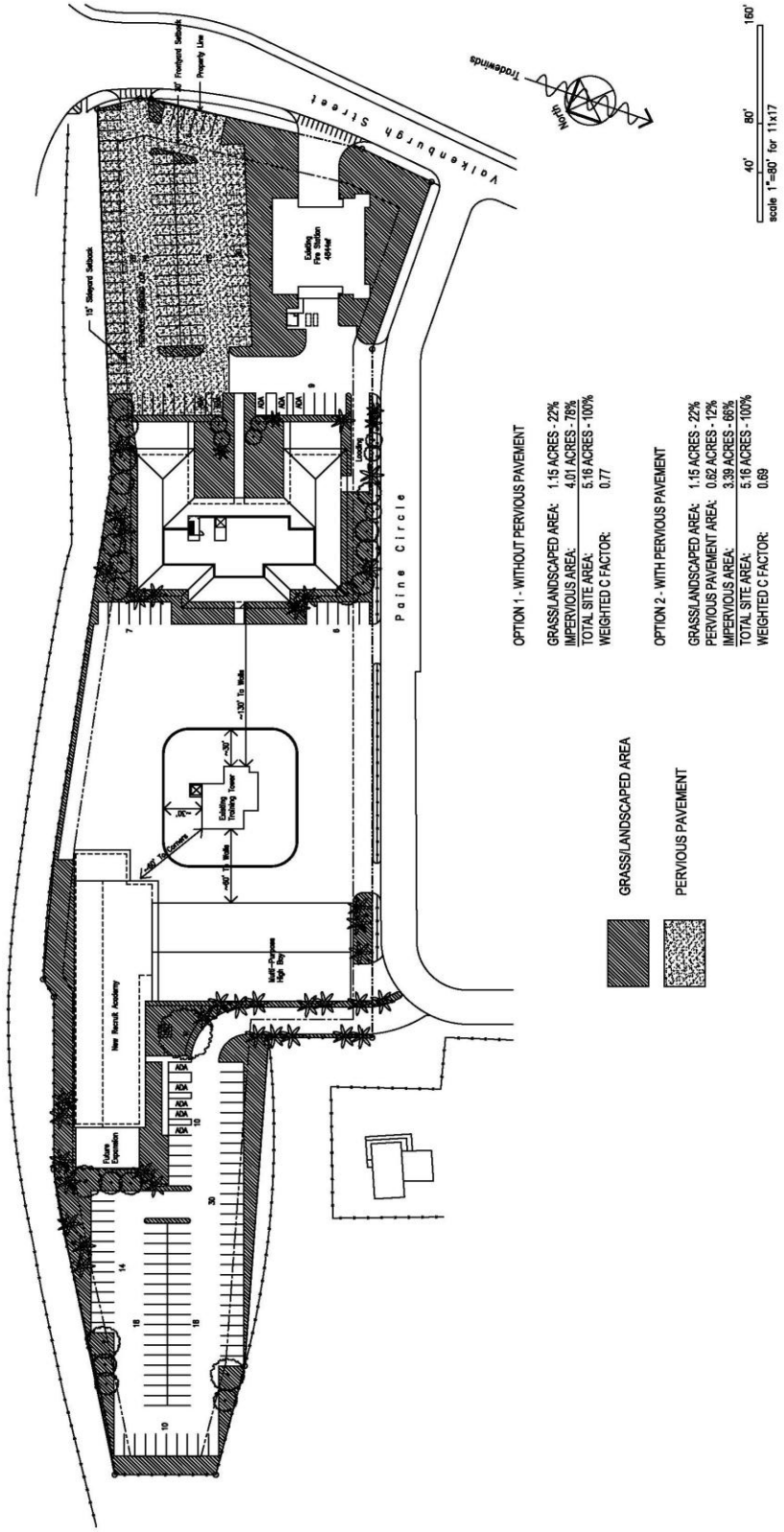

Figure 3-6 Proposed Drainage Conditions

3.9.4 Gas

Existing Conditions

Propane gas service is currently provided by The Gas Company to service one 120-gallon, three 80-gallon, and three 10-gallon propane tanks on-site. The propane is used in the fire station kitchen and for fire training in the burn trailer, training tower and burn prop. This Low Pressure Gas (LPG) burns cleanly.

Gasoline service to the training center is currently supplied from Tesoro once a month. There are two 1,000 gallon underground storage tanks (UST) by the fire station; one for diesel, and one for unleaded. The USTs went through remediation in 2006. The Veeder-Root fuel management system is used for monitoring the tanks.

Anticipated Impacts and Mitigation Measures

Propane and gasoline will continue to be used after project completion. Since the propane burns cleanly, and the gasoline tanks are monitored via the Veeder-Root system, no significant gas impacts are anticipated.

3.10 HAZARDOUS WASTE

Existing Conditions

Hazardous waste is defined as liquid, solid, contained gas, or sludge wastes that contain properties that are dangerous or potentially harmful to human health or the environment (Environmental Protection Agency, 2010). There are no current onsite concerns regarding hazardous waste contamination or spills.

Anticipated Impacts and Mitigation Measures

No significant impacts related to hazardous waste from the construction of the project are anticipated. As necessary, any studies will be prepared in conformance with procedural guidelines provided in ASTM E 1527-00, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment.

3.11 MECHANICAL, ELECTRICAL AND COMMUNICATIONS

Existing Conditions

Mechanical Systems

The training center and fire station are currently cooled by window air conditioners.

Electrical Systems

The existing electrical service is at full capacity and is not able to support any further expansion. Electrical service for the project area is provided by Hawaiian Electric Company (HECO).

Communications

Telecommunication services are served from Hawaiian Telecom (voice) and Time Warner Oceanic (CATV) from existing underground services.

Anticipated Impacts and Mitigation Measures

Mechanical Systems

To help meet Leadership in Energy and Environmental Design (LEED) certification, reducing the energy needed by air conditioning is a priority. The building envelope design should be tight with no thermal breaks and very energy efficient with high insulation values for the roof, walls, windows, etc.

Natural ventilation is not a desirable cooling option for the classrooms due to the excessive noise on the site caused by the nearby Honolulu International Airport and Fighter jets from Joint Base Pearl Harbor Hickam, highway traffic from H-1 Freeway and Nimitz Highway, and other outside training center activities. The use of Variable Refrigerant Flow (VRF) in the classrooms and offices is recommended and will save energy. VRF is a decoupled system that will only cool the spaces that are in use, using technology such as carbon-dioxide monitoring sensors. Operable windows will be installed in each of the classrooms for use in case of power outages or air conditioning failure.

Lockers and storage rooms don't require air conditioning, just negative air flow. The multipurpose high bay building will be naturally ventilated. For the buildings without air conditioning, maximizing thermal comfort by optimizing the building envelope to reduce heat gain is recommended, as well as incorporating techniques to maximize air movement through cross-ventilation and ceiling fans.

Electrical Systems

The proposed design will provide a new underground electrical service from HECO to sustain the increased needs of the expanded facility. In addition, the buildings will utilize sustainable strategies to maximize energy use through techniques such as daylighting, ultra high efficient lighting, and renewable energy through photovoltaic panels and wind turbines.

Telecommunications

The new telecommunication distribution system would also be served from the same underground route as the electrical service. Existing service providers have sufficient capacity to accommodate proposed redevelopment activities for utility services at the HFD site. Therefore, no significant impacts are anticipated for electric and telecommunication systems.

3.12 ROADWAYS AND TRAFFIC

A Traffic Impact Assessment Report (June 2011) was prepared for the HFD Regional Fire Training Center project by Wilson Okamoto Corporation to identify and assess potential impacts of the project on existing roadways and traffic conditions (*Appendix D).*

Access to the proposed project will be provided via driveways off of Valkenburgh Street and Paine Circle. Northeast of the project site, Valkenburgh Street intersects the westbound direction of traffic along the State of Hawaii's Nimitz Highway. South of the intersection with the westbound direction of traffic along Nimitz Highway, Valkenburgh Street intersects the eastbound direction of traffic along Nimitz Highway. Nimitz Highway accommodates airport-related traffic to the nearby Honolulu International Airport. Further south, Valkenburgh Street intersects Paine Circle. Paine Circle provides access to the adjacent HFD facility and Holy Family Catholic Academy.

Existing Conditions

Morning and afternoon peak hour traffic counts were conducted at each of the five analyzed intersections in February 2011. *Figure 3-7* and *Figure 3-8* illustrate the existing traffic study area for each of the following intersections:

- Valkenburgh Street and Nimitz Highway (Westbound)
- Valkenburgh Street and Nimitz Highway (Eastbound)
- Valkenburgh Street and Paine Circle
- Valkenburgh Street and HFD driveways
- Paine Circle and HFD driveways

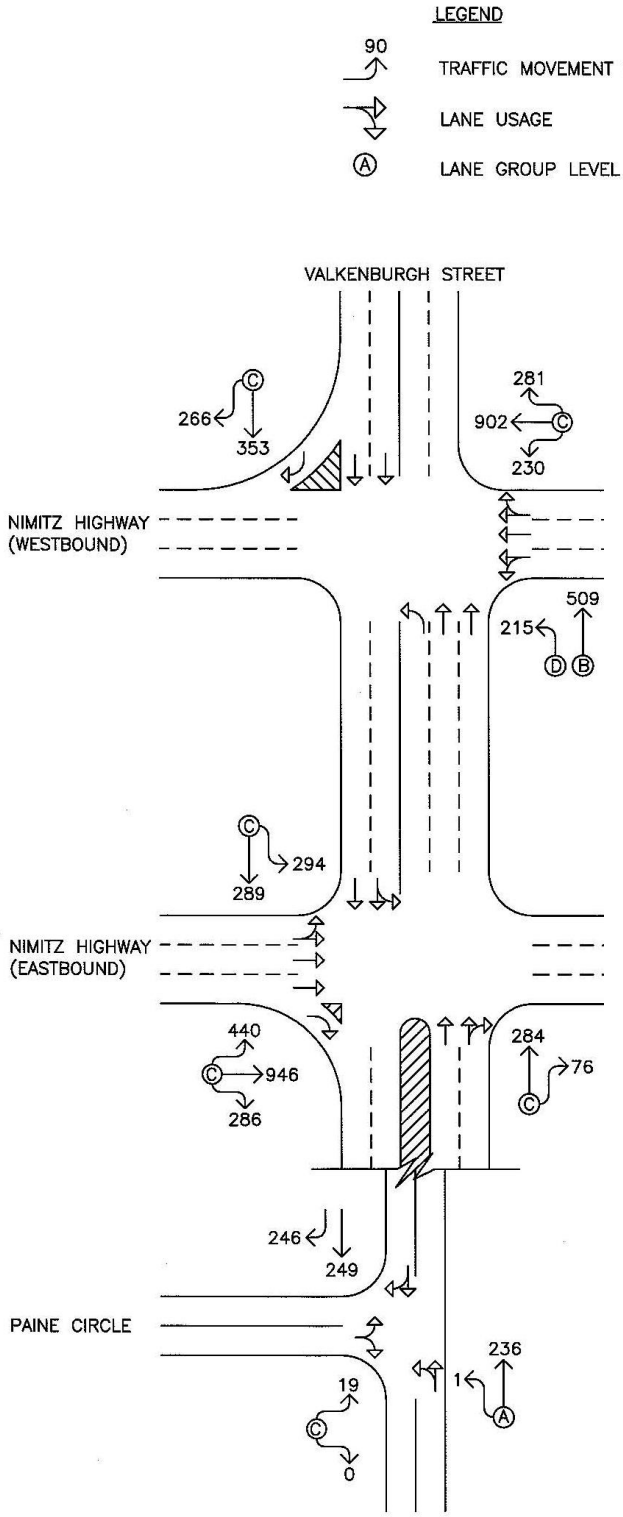

Figure 3-7 Existing AM Peak Hour of Traffic

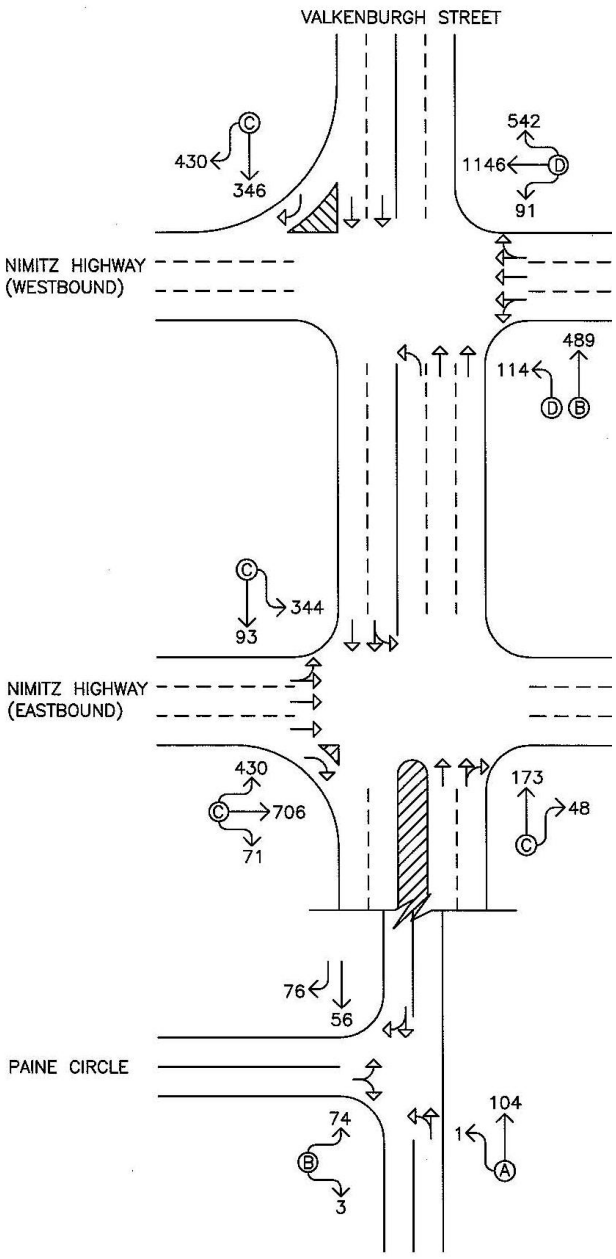

Figure 3-8 Existing PM Peak Hour of Traffic

Level of service (LOS) is a qualitative measure describing the condition of traffic flow, ranging from ideal or free-flow traffic operating conditions at LOS "A" to unacceptable or potentially congested traffic operating conditions at LOS "F". The City has established LOS "D", which is typically recognized as the minimum satisfactory level of service in most urban areas, as the minimum acceptable level of service for its intersections. *Table 3-1* below summarizes the results of the level of service analysis for each of the five study intersections. Results are provided for existing conditions, future conditions without the project, and future conditions with the project, during the AM and PM peak periods.

Table 3-1 Existing and Projected LOS Traffic Operating Conditions

Intersection	Critical Traffic Movement		AM			PM		
			Existing	2025 w/o Project	2025 with Project	Existing	2025 w/o Project	2025 with Project
Valkenburgh St/ Nimitz Hwy (WB)	WB	LT-TH-RT	C	D	D	C	D	D
	NB	LT	D	D	D	D	D	D
	SB	TH-RT	C	D	D	D	D	D
Valkenburgh St/ Nimitz Hwy (EB)	EB	LT-TH-RT	C	C	C	C	C	C
	NB	TH-RT	C	C	C	C	C	C
	SB	LT-TH	C	C	C	C	C	C
Valkenburgh St/ Paine Circle	EB	LT-RT	C	C	C	B	B	B

EB = Eastbound SB = Southbound LT = Left Turn TH = Through
NB = Northbound WB = Westbound RT =Right Turn

Anticipated Impacts and Mitigation Measures

Traffic impacts include activity during the construction period and long term operations. Plans to mitigate the construction period traffic impacts include off-peak movement of equipment and materials to minimize the disruption to traffic flow. Dust and noise pollution will be contained through job-site construction management and adherence to State and County laws. A Construction Traffic Management Plan will also be prepared to minimize conflicts with traffic along surrounding roadways during construction activities.

New trips generated by the HFD Regional Fire Training Center project are expected to be associated with the increase in personnel on-site. The existing training center and fire station can have up to a total of 100 personnel on-site that arrive during the AM period and depart during the PM peak period. With the proposed project, this number is expected to increase by approximately 121 personnel, for a total of 221 personnel arriving and departing during peak periods.

Future Traffic Volumes without the Project

Projected traffic operations in year 2025 without the project are expected to deteriorate from existing conditions due to the anticipated ambient growth in traffic in the project vicinity (*Table 3-1*). The westbound approach of Nimitz Highway with Valkenburgh Street is expected to deteriorate from LOS "C" to LOS "D" during both peak periods while the southbound approach of that intersection is expected to deteriorate from LOS "C" to LOS "D" during the AM peak period. The remaining critical movements at this intersection, as well as the other study intersections, are expected to operate at levels of service similar to existing conditions during both peak periods.

Future Traffic Volumes with the Project

The Year 2025 cumulative AM and PM peak hour traffic conditions with the HFD Regional Fire Training Center project are summarized in *Table 3-1* and illustrated in *Figures 3-9 and 3-10.* Traffic operations under Year 2025 with project conditions are expected to remain similar to Year 2025 without project conditions during both peak periods, illustrating no significant impact to traffic operations caused by the project.

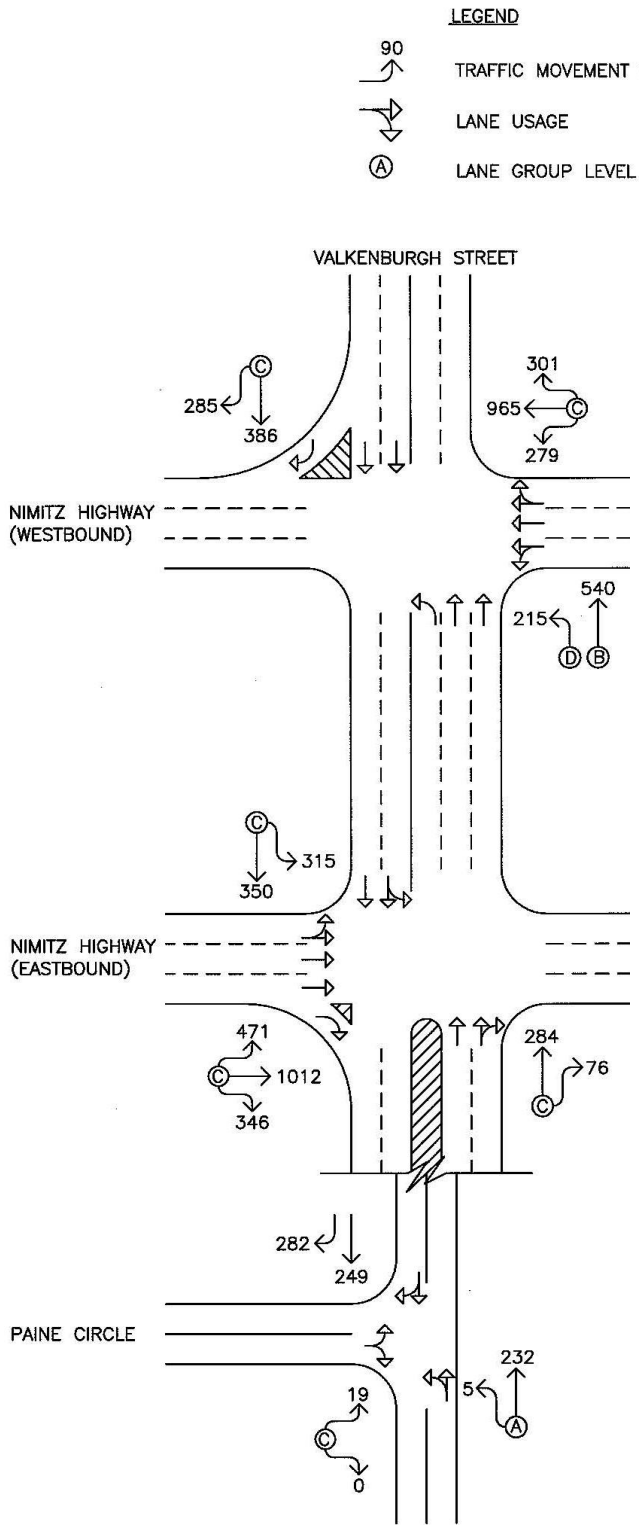

Figure 3-9 Year 2025 AM Peak Hour with Project

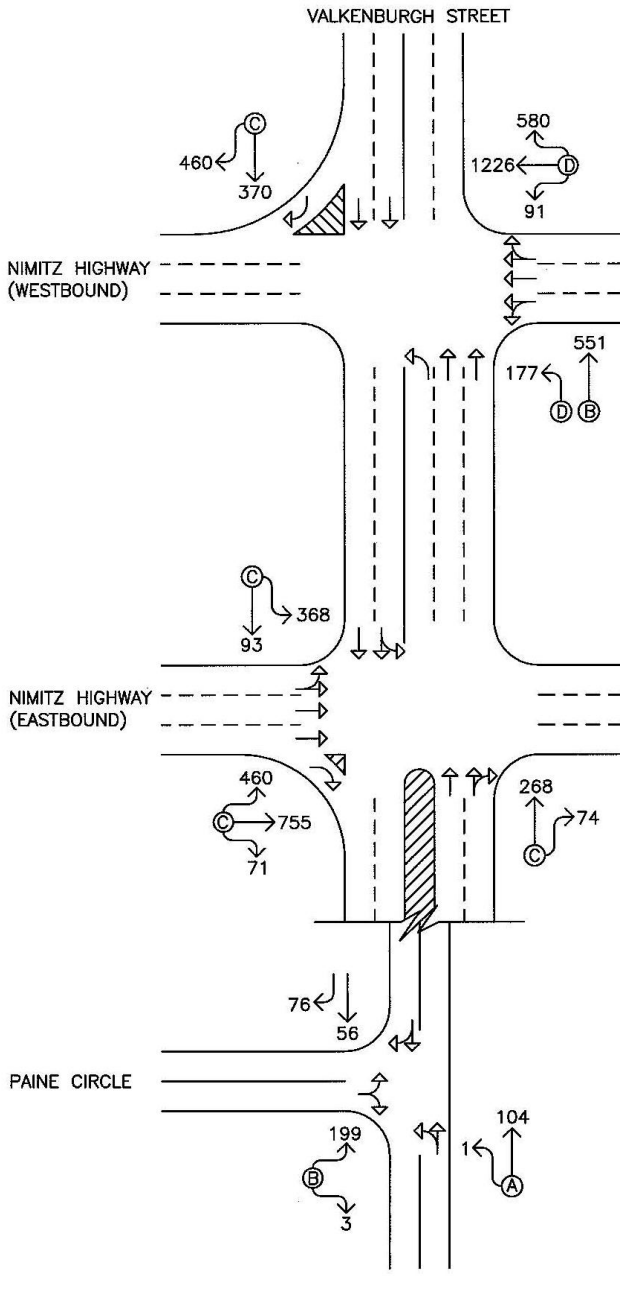

Figure 3-10 Year 2025 PM Peak Hour with Project

Recommendations

The development of the HFD Regional Fire Training Center is not expected to have a significant impact on traffic operations in the project vicinity. However, due to the proximity of the training center to Nimitz Highway, a currently congested major east-west roadway, and the Holy Family Catholic Academy, it is recommended that consideration be given to scheduling of the start and end times of classes and training sessions during off-peak periods. Other mitigation measures considered for the project include:

1) Maintain sufficient sight distance for motorists to safely enter and exit all driveways.
2) Provide adequate on-site loading and off-loading service areas and prohibit off-site loading operations.
3) Provide adequate turn-around area for service, delivery, and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto public roadways.
4) Maintain sufficient turning radii at all driveways to avoid or minimize vehicle encroachments to oncoming traffic lanes.
5) Restrict turning movements at the northern driveway along Valkenburgh Street to right-turn-in and right-turn-out traffic movements only due to the proximity of that driveway to Nimitz Highway.

3.13 PARKING AND LOADING

Existing Conditions

The HFD Regional Fire Training Center currently has 87 parking stalls on-site. Most of the parking is in an open parking lot off of Paine Circle. The main parking lot is located northwest of the buildings. A smaller parking lot fronts the facility on Valkenburgh Street. Other parking areas support the Fire Station. This current parking situation is limited, and HFD currently has a "hand-shake" agreement with the Navy to use an open field of Lynch Park for parking at the corner of Paine and Valkenburgh.

Probable Impacts and Mitigation Measures

All existing parking capacity will be relocated on-site with the proposed project. The HFD Fire Training Center will also require additional parking to be provided on-site. A new parking lot will be constructed by converting an existing low-use asphalted area into a landscaped parking area, holding 100 new parking spaces. After the Incumbent Training building is constructed, the existing facility will be demolished and replaced with a new parking area for 99 parking spaces. Future expansion will allow for 39 more parking stalls at the perimeter of the site near the training tower.

Overall, the total number of stalls provided (238 stalls) will exceed the total number of stalls required (185) by land use zoning. *Table 3-2* provides a detailed breakdown of the parking for the proposed project.

Americans with Disabilities Act (ADA) stalls for handicapped users is and will continue to be provided on the project site. ADA parking will be provided for the new buildings.

During construction, there will be minor impacts to parking. However, appropriate mitigation measures will be carried out to minimize any disruption to parking and traffic flow within the project site. No mitigation measures are required for the parking related to the HFD expansion project once construction of the project is completed.

Table 3-2 Proposed Parking for the HFD Regional Fire Training Center

	Required Parking	Provided Parking
New Recruit Academy	80 stalls	100 stalls
New Fire Training Center	105 stalls	99 stalls
Overflow Event Parking	-	39 stalls
TOTAL	**185 stalls**	**238 stalls**

3.14 SOCIO-ECONOMIC CHARACTERISTICS

Existing Conditions

The HFD training center is located in the traditional moku of Kona and the ahupuaʻa of Moanalua on the island of Oʻahu.

Anticipated Impacts and Mitigation Measures

Expansion of HFD's Training Center is not expected to adversely impact property values in the area. The site is bounded and not adjacent to private residences or commercial properties.

The construction cost for the Training Center expansion is estimated at $49 million and will be funded by the City. Construction will commence after all land use and building permits are received. Groundbreaking is expected to begin in 2016. The new Recruit Academy will be built first followed by renovations to the training tower. The new Incumbent Training Center will be constructed and the existing training center will remain in operation until construction is completed. Finally the new core concept single company fire station will be built in place of the current station. The project will create short-term economic benefits as a result of design and construction employment.

The proposed project continues the site's use and will not displace any private residential, commercial, or industrial activities. By keeping the existing training center operational while the new incumbent building is under construction, there will be minimal disruption to normal work routines.

Upon completion, the proposed improvement will have beneficial long-term social and economic impacts including increased opportunities for the HFD to provide an enhanced training and educational facility for new fire recruits as well as incumbent firefighters. In addition, the expansion of the training center will facilitate additional employment opportunities for O'ahu residents through training in areas related to the fire, police, and paramedic professions. No specific socio-economic mitigation actions are recommended.

3.15 PUBLIC FACILITIES AND SERVICES

This section discusses the project's probable impact on public facilities and services of the project site and surrounding area.

3.15.1 Educational Facilities

Existing Conditions

The HFD site is located in the Radford Complex Public School District. Chester W. Nimitz Elementary School is immediately northwest of the training center with 2 other public schools located in the vicinity: Pearl Harbor Kai Elementary School and Mokulele Elementary School. In addition, private schools nearby include Assets School and Holy Family Catholic Academy.

Anticipated Impacts and Mitigation Measures

No adverse educational impacts are anticipated. On the other hand, numerous beneficial impacts, including a local workforce trained in first responder situations, with increased employment opportunities are expected to result from the project.

3.15.2 Police

Existing Conditions

The project site is located in District 5, Sector 1 of the Honolulu Police Department, and is served from the Kalihi City Police Station, approximately 3.8 miles away.

Anticipated Impacts and Mitigation Measures

During the construction phase, this project should have only a limited and minimal impact on the police department's operations or ability to provide adequate protection services to the surrounding community. In spite of mitigation measures, construction-related dust, noise, traffic, and odors may cause an increase in calls for police service to the area. However, once completed, there should be no impact on the facilities or operations of the Honolulu Police Department. District 5 police service should be adequate for the proposed project. No mitigation is expected to be required.

3.15.3 Fire

Existing Conditions

There are five fire stations that respond to emergencies in the project area: Fire Station 1, Fire Station 2, and Hickam Fire Station which are Federally-operated and located at Joint Base Pearl Harbor - Hickam; and Moanalua Fire Station No. 30 and Mokulele Fire Station 8, which are operated by the City. The latter is on location at the training center. There is a "mutual aid agreement" between the HFD and the Federal Fire Department to permit the closest facility to respond to an emergency. The Mokulele Fire Station is closest to the training center and is the first responder for the area.

Anticipated Impacts and Mitigation Measures

This project is expected to have minimal impact on the HFD's operations or ability to provide fire protection services to the project area and surrounding community. During construction of the new Mokulele station, calls will be directed to Moanalua Fire Station No. 30. The planned training facility structures will be designed to meet fire and building code requirements. This will include providing necessary hydrants and meeting fire flow requirements for water system improvements, as well as providing approved fire access roads if necessary. Appropriate design plans will be coordinated in conjunction with the HFD during the project's design phase.

3.15.4 Medical Emergencies

Existing Conditions

Numerous major hospitals and clinics are in relative proximity to the HFD site, including Pali Momi Medical Center, Kuakini Medical Center, The Queens Medical Center and Straub Clinic & Hospital. Prompt attention is available to patients in medical emergencies. The nearest emergency hospital, Pali Momi Medical Center, is located approximately 3.0 miles from the project site.

Anticipated Impacts and Mitigation Measures

The proposed project will not impact the handling of medical emergencies. The Pali Momi Medical Center will continue to function in its present locations and will be accessible to the HFD site. No mitigation is proposed.

3.15.5 Solid Waste Management

Existing Conditions

Solid waste disposal services are provided by the City Department of Environmental Services. The HFD improvement project will generate additional solid waste; however, recycling efforts will be made. An existing recycling program is limited to bottles and paper, but will likely expand as the project moves forward.

Anticipated Impacts and Mitigation Measures

Additional trash bins will be provided for the HFD Training Center to accommodate increased use. No mitigation is proposed but recycling programs should reduce overall levels of solid waste generation.

3.15.6 Public Transit

Existing Conditions

Two bus stops are located at the intersection of Nimitz Highway and Valkenburgh Street, with additional stops located further down on Nimitz Highway and Valkenburgh Street. Bus numbers 9, 19, 20, 40, 40A, 42, 62, and 88A stop at the locations closest to the training center.

Anticipated Impacts and Mitigation Measures

The project may also cause a small increase in bus ridership, but is not expected to greatly impact the bus service. The Honolulu Rail Transit will have a route makai of Nimitz Highway, immediately mauka of the training center. Two stops are planned on either side of the training center – Hickam to the west and Honolulu International Airport to the east. Automobile traffic may be reduced and bus ridership may increase due to the rail. No mitigation is proposed.

3.15.7 Honolulu International Airport

Existing Conditions

Federal Aviation Regulation 49 CFR Part 77 establishes standards and notification requirements for objects affecting navigable airspace. The Federal Aviation Administration Compliance Manual, Order 5190.6B, Chapter 20, describes compatible land use and airspace protection. Requirements from these documents that may affect this project include height limitations, lighting, and smoke. An existing object is, and a future object would be, an obstruction to air navigation if it is of greater height than any of the following heights or surfaces: (a) A height of 500 ft. above ground level at the site of the object; (b) A height that is 200 ft. above ground level or above the established airport elevation, whichever is higher, within 3 nautical miles of the established reference point of an airport. Specific characteristics to be avoided near all airports include: (a) Sources of glare (such as from mirrored or other highly reflective buildings or building features) or bright lights (including search lights and laser light displays); (b) Distracting lights that could be mistaken for airport lights; and (c) Sources of dust, steam, or smoke that may impair pilot visibility.

The tallest of the training center buildings is the training tower, at approximately 66 ft. high. The lights on the property are within regulations. Fire training does not use wood or other products which would produce smoke. The propane that is used burns clean without smoke, and smoke from the smoke generator dissipates within 100 ft. of the source.

Anticipated Impacts and Mitigation Measures

No buildings within the project design will be taller than the training tower, which is well below regulations. The buildings and building features will use materials that do not produce glare, and lighting will be within requirements. Training will continue as is, without using materials that produce copious amounts of smoke.

3.16 ARCHAEOLOGICAL RESOURCES

Existing Conditions

The project area is located within the Oʻahu district of Kona, and is situated in the *ahupuaʻa* (traditional land division) of Moanalua. Moanalua is approximately 3,700 acres, extending from the leeward crest of the Koʻolau Range to include the Āliapaʻakai crater (Salt Lake) through to the Honolulu Airport. Moanalua Ahupuaʻa is bordered by the ahupuaʻa of Kalihi to the west and Hālawa to the east.

Previously Identified Historic Properties

No previously identified historic properties are known in the immediate vicinity of the project area. Historic properties indicated within two kilometers include the former Kaloaloa Fishpond, Kaʻihikapu Fishpond, and Lelepaua Fishpond. A 1935 map of the Honolulu Plantation Company indicates that the entire project area was in commercial sugar cane fields 11 and 12 (*Appendix E, Figure 13*).

Previous Study in the Project Area

The 1996 Anderson and Bouthillier study produced an archaeological / historical resources sensitivity map which indicates that the present project area falls within a zone of "low" probability of archaeological and cultural resources with sensitivity increasing south, closer to the coast. More recent summaries of the results of archaeological investigations at the former Hickam AFB show that in over 100 recent excavations, including over 50 in the Anderson and Bouthillier "High Sensitivity" zone, there have only been three areas in which sites have been designated (*Figure 3-11*). These sites are over 1.0 mile away from the project area. The likelihood of significant subsurface deposits in eastern Hickam appears to be not high or even moderate but, as a generalization, may be expected to be rather low.

Results of Field Inspection

On February 2, 2011, Cultural Surveys Hawaiʻi (CSH) conducted a pedestrian site inspection of the project area. The purpose of the site inspection was to observe current conditions and to assess the possibility, in association with background research conducted by CSH, of historic properties in the project area. CSH walked the entire project area. Inspection revealed an absence of historic properties in or in the immediate vicinity of the project area.

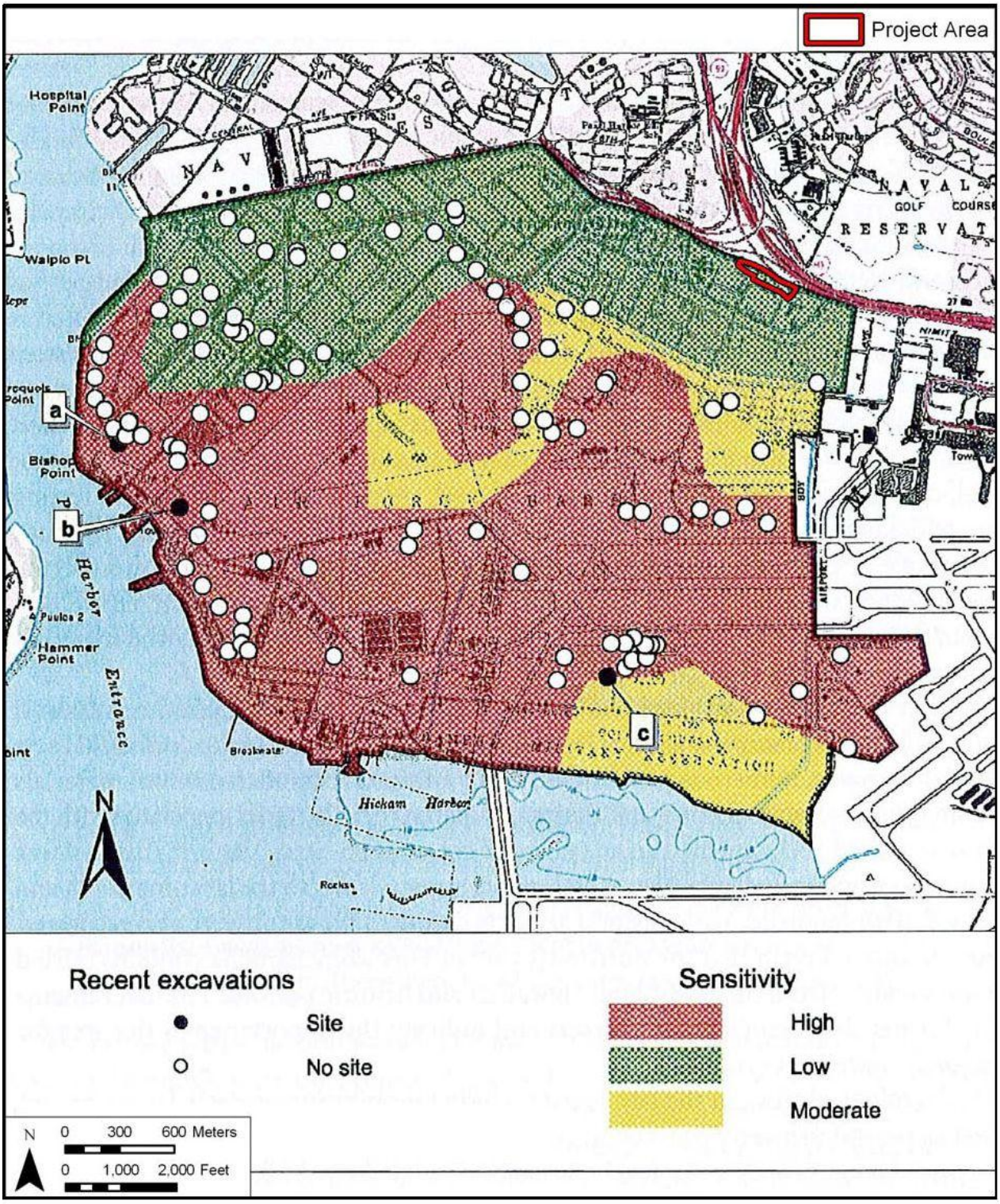

Figure 3-11 Results of Recent Archaeological Investigations

Anticipated Impacts and Mitigation Measures

Based on available information, including background research and preliminary community consultation, research indicates that archaeological sites are far from the HFD training center project site, and there is a low likelihood of encountering historically-significant cultural deposits in a subsurface context. Decades of land modification and grading related to sugar cultivation, military infrastructure, and the development of the HFD Charles H. Thurston Training Center and Mokulele Fire Station have likely destroyed or severely impacted any surface historic property that may have existed within the current survey area. Consequently, CSH's effect recommendation for the proposed project is "no historic properties affected," and that an archaeological inventory survey is not warranted for the proposed project.

CSH recommends an on-call archaeological monitoring program be implemented for all construction activities related to the current project. A qualified archaeological monitor will remain on-call during all ground disturbance activities. Periodic spot-checks may be performed by the archaeological monitor in order to observe and document subsurface impact, exposed sediment characteristics, and the construction process. If, in the unlikely event intact cultural resources are encountered during the course of development activities, all work in the immediate area should stop and the on-call archaeological monitoring firm promptly notified.

CSH is currently pursuing an agreement with State Historic Preservation Division (SHPD) for concurrence with the recommendation for an archaeological monitoring program. This request is included at *Appendix E.*

3.17 CULTURAL PRACTICES AND RESOURCES

A Cultural Impact Assessment (CIA) for the HFD Regional Fire Training Center project was prepared by Cultural Surveys Hawai‘i, Inc. in July 2011 and is included as *Appendix F.* For this study, the Area of Potential Effect consisted of the 5.16-acre project area in the context of the ahupua‘a of Moanalua.

Existing Conditions

The project requires compliance with the State of Hawai‘i environmental review process under Chapter 343, HRS, which requires consideration of a proposed project’s effect on traditional cultural practices. Through document research and cultural consultation efforts, the CIA provides preliminary information that was applicable to the assessment of the HFD Regional Fire Training Center project and its potential impacts to cultural practices.

Hawaiian organizations, agencies and community members have been contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the project area and the vicinity. The organizations consulted included the State Historic Preservation Division (SHPD), the Office of Hawaiian Affairs (OHA), the O‘ahu Island Burial Council (OIBC), Hui Mālama I Na Kūpuna ‘O Hawai‘i Nei, Moanalua Gardens Foundation, the Moanalua Senior Citizens Club and community and cultural organizations in the Moanalua area.

As pertinent to the HFD Regional Fire Training Center project area and its planned programmatic objectives and outreach outcomes, the noteworthy findings and applicable recommendations from this study include the following:

1) Moanalua is an ahupuaʻa rich in natural and cultural resources and has been favored by Hawaiian aliʻi (chiefs). The ahupuaʻa has protected offshore waters, flowing streams and springs, and habitable cave shelters, which made it attractive to early settlers. The upland valleys, Kamananui and Kamanaiki, are known for their endemic flora and culturally significant features

2) The lower valleys were the focus for occupation with the cultivation of taro, coconut, banana, breadfruit, and bark cloth. The lowlands were also known for their extensive fishponds and salt ponds. At the time of the Mahele (Land Division), activity was based in the lowlands, which were used for wetland taro farming; house lots; dry land agriculture; fishponds; and irrigation ditches. Wetland taro fields made up 88% of the Land Commission Award (LCA) parcels and 84% of the acreage (*Appendix F*). No commoner land commission awards are known in the vicinity of the project area. It was common for the aristocracy and/or their konohiki (overseers) to retain fishponds and unique cultural resources such as the coastline at the mouth of Puʻuloa (Pearl Harbor).

3) Taro fields were converted to rice cultivation by the end of the Nineteenth Century. Land use in other areas shifted to ranching and sugar plantations. A map of the Honolulu Plantation Company lands circa 1930 indicates that the project area was formerly commercial sugar cane fields.

4) The development of infrastructure and facilities for military and industrial use were significant factors in the transformation in Moanalua in the twentieth century with, for example, Rogers Airport, Pearl Harbor, Hickam Air Force Base, Tripler Army Hospital, and Fort Shafter.

5) In terms of cultural resources, Moanalua has had at least four documented heiau (temples), not all are intact; four petroglyph stones; and five fishponds. Other important wahi pana (storied places) include the house of bones, Keanaakamano (cave of the shark man), and Namakalele a place known for the – "flying eyes" of the woman who once lived there.

6) The ahupuaʻa was first held by ancient valley chiefs, then seized by Maui chiefs, and later seized by Kamehameha of Hawaiʻi Island. He divided it between two uncles. One died in 1880, and passed it onto his son, Hoapili. When the other died in 1884, the land reverted back to Kamehameha and his wife Kaʻahumanu. In 1839, Hoapili leased land to the first foreigner, Captain William Sumner who, under the Mahele, was one of two major awardees. The other major awardee was Lot Kamehameha (who was Hoapiliʻs heir). Princess Ruth inherited Moanalua from Lot Kamehameha in 1872 and then Princess Pauahi Bishop inherited it from her. In 1883, Princess Pauahi bequeathed Moanalua Ahupuaʻa to Samuel Mills Damon who developed Moanalua for residential, agricultural, and industrial use. A relatively smaller portion of it was preserved as what is now known as Moanalua Gardens. Beginning in the 1800s, the United States began acquiring portions of the Damon Estate and developing it for military purposes.

7) The Project area is in an indicated zone of "low" probability of archaeological and cultural resources, based on Anderson and Bouthillier (1996) and Hammatt and Shideler (2011).

8) CSH attempted to contact 32 community members and government agency and community organization representatives. Of the 15 people that responded, four kūpuna (elders) and/or kamaʻāina (Native-born) participated in formal interviews for more in-depth contributions to the CIA.

9) This community consultation conducted for the study yielded the following:

   a. Moʻolelo (oral traditions) indicate that Moanalua is a place with deep ancestral and historical significance for community participants. They unanimously describe Moanalua as a special place with a richness of natural, cultural, and spiritual resources. Mr. Roddy Akau describes Moanalua as one of the richest ahupuaʻa on Oʻahu.

   b. According to oral and written history, Moanalua was revered by some of the earliest Polynesians, mountain chiefs, and Hawaiian aliʻi. Mr. Akau describes how Papa and Wākea (ancestors of the Hawaiian people) produced Kamawaelualani who married Kahikilaulani, a princess from Kahiki. Their unity produced ancient valley chiefs. Mr. Akau and Mr. Dwight Damon also note the association of Moanalua with the Kamehameha line. Mr. Akauʻs connection is personal as his family name is Kapahiʻkaua o Kamehameha, - "the battle sword of Kamehameha" and derives from his fourth great grandfather who was born in 1795 during Kamehamehaʻs battle with Kalanikūpule (then King of Oʻahu). Mr. Damon relates how Kamehameha the Great – "came to Moanalua after consolidating the islands… King Kamehameha the Great gave the ahupuaʻa to Kameʻeiamoku who gave it to his son Hoapili who made Prince Lot (later Kamehameha V) his future heir, who willed it to Princess Ruth, who willed it to Princess Bernice Pauahi in May 1883. In October, 1884, Mrs. Bishop willed the ahupuaʻa of Moanalua to her friend, Samuel Mills Damon.

   c. All community consultants described the fishponds and fisheries of Moanalua as an incredible resource of the past. In a letter dated April 12, 2011, Ms. Phyllis Cayan of SHPD commented, "This area was part of Oʻahuʻs bounty of fishing – both offshore and in the former fishpond…Certainly, food production whether by fishing or gathering would have been an important part of the culture therein." Mr. George Downing explains that Moanalua had an abundance of fish – ōʻio (bonefish) and mullet. Dr. Ishmael Stagner relates moʻolelo from his kūpuna about the rich marine resources of Moanalua such as limu līpoa and limu kohu (species of seaweeds), which were gathered until prior to the building of the seaplane runway in the 1960s. Growing up he also remembers: pāpio (juvenile big eye jack), manini (convict tang), mullet, and oysters–even some with momi (pearls). Mr. Akau says that in the 1400s and 1500s the largest fishponds on Oʻahu were created in Moanalua such as Kaihikapu and Lelepaua, which was about 350 acres and located just mauka of the current fire and police stations. Mr. Damon notes that Lelepaua was being filled in by 1900. In 1910 Salt Lake (Āliamanu) was filled with water by Samuel Mills Damon and the McCandless brothers in order to create a mullet pond, which is now the site of the Honolulu Country Club.

d. Mr. Damon describes changing land use of the area noting that in the 1800s, the lowlands of Moanalua, specifically the – "basin of Kamananui Valley" were used for cattle ranching by William Sumner and J.I. Dowsett. By the late 1800s, Mr. Samuel Mills Damon took over these leases, and leased to the Honolulu Plantation Company who cultivated sugar cane in ʻĀliamanu, Salt Lake and Makalapa areas, which include the area where the Thurston Fire Station is located on Valkenburgh St[reet]." Mr. Damon notes that makai of Kaloaloa became known as Damon Tract, - where locals leased residential and farm land from the Damon Estate at what is now a light industrial district and Honolulu International Airport.

e. Community participants describe numerous cultural sites in Moanalua. In proximity to the project area are the fishponds and the salt ponds. Mr. Damon suggests that the project may uncover artifacts. Mr. Akau and Dr. Stagner describe the use of the flat lands (Kaloaloa or Kahauiki) as Makahiki (ancient festival beginning around the middle of October and lasting about four months, with sports and religious festivities and taboo on war) grounds. Mr. Damon explains that Prince Lotʻs (later Kamehameha V) cottage, which was – "built to entertain foreign dignitaries," was originally erected – "between the present-day ʻŌlelo building and Puʻuloa Road," and by 1960 was moved to Moanalua Gardens where it still stands.

f. The community consultants who participated in this study do not anticipate direct cultural impacts will result from the proposed project; however, they have recommendations for proceeding in a culturally and environmentally pono (correct, just) manner: Mr. Stagner recommends that the HFD hold Makahiki Games in this area annually during the Makahiki season to perpetuate traditional land-use and cultural education. Mr. Akau recommends following protocol and offering appeasement to the spirits of the land, even though the area is already developed. Mr. Downing is primarily concerned with the marine environment and says that although the project area is inland, it is connected, so pollution occurring from new development can trickle down into the shore lines. He encourages the City and State to be aware of and responsible for maintaining the integrity of these marine environments.

Anticipated Impacts and Mitigation Measures

Based on available information, including background research and preliminary community consultation, no potential direct impacts of the proposed project on Native Hawaiian or other ethnic groups' cultural practices, sites, and traditions are anticipated. No mitigation is required.

Although previous archaeological surveys in proximity to the project did not locate any cultural sites, should historic, cultural or burial sites or artifacts be identified during ground disturbance, the project will immediately cease all work and the appropriate agencies notified pursuant to applicable law. Measures will also be taken to minimize environmental impacts during construction, such as recognizing the mauka-makai connections and concerns for the near shore waters. Finally, the project will consider the suggestions from community participants, including proceeding with the project in a culturally and environmentally pono or just manner (*Appendix F*).

3.18 VISUAL RESOURCES

Existing Conditions

City and State governments have policies to protect important public views, view planes, and viewsheds. Important views include those of the Wai'anae and Ko'olau Mountains, the coastline, and the Pacific Ocean. According to these policies, views of these resources from public places, including major roadways, should be preserved; new development should seek to minimize impacts on these scenic resources.

The HFD Training Center is situated on a fairly level plain south of the Nimitz Highway, with buildings to the east, west and southwest, and open park space to the south. *Figure 3-12* provides an aerial perspective of the project area. This perspective shows light shrubbery with buildings and open spaces surrounding the site and that it is bounded by Nimitz Highway, Valkenburgh Street, and Paine Circle. The accompanying view analysis provides visual perspectives of the existing conditions of the project site, including from the prominent vantage point of a raised on-ramp to the H-1 Freeway.

The HFD Training Center is accessible via the H-1 Freeway as it merges onto Nimitz Highway. Views from an on-ramp to the H-1 Freeway, elevated over the off-ramp to Nimitz Highway show the tower as a focal point, with an open paved area, parked vehicles, surrounding shrubbery and Lynch Park in the background *(Figure 3-13)*. Views from the H-1 Freeway off-ramp immediately before merging with Nimitz Highway show small trees initially shading the tower from view giving way to small shrubs and grass that allow full views of the HFD's training center *(Figure 3-14)*. Turning onto Valkenburgh Street (*Figure 3-15*), a portion of the Training Center classrooms are visible, slightly screened by small trees.

Turning onto Paine Circle from Valkenburgh, the Mokulele Fire Station is on the corner to the right with the training tower in the distance *(Figure 3-16).* A view looking mauka from the Fire Station shows the raised H-1 Freeway in the background *(Figure 3-17).* The HFD Training Center is screened by trees when viewed from Lynch Park, with only the elevated training tower within sight *(Figure 3-18).*

Anticipated Impacts and Mitigation Measures

The project site is not identified as within the Significant Panoramic Views (Map A1) of the Primary Urban Center Development Plan of the City and County of Honolulu. The proposed project will be set back from the main roadway, and is flat and directly adjacent to an elevated freeway. As indicated above, the project site is slightly screened from public view by trees and shrubs, and is visible from the Nimitz Highway and elevated H-1 Freeway. The proposed HFD improvements will be integrated into the current boundaries of the site and will generally conform to the heights depicted in the concept renderings (*Figures 3-19 and 3-21*). No new rooftop will be higher than the existing training tower, which is the tallest structure of the project site. Specifically, impacts to the elevated vantage point from H-1 Freeway are not expected to be significant.

The project will have a minimal effect on public views of hillsides, and landscaping will be used to improve the visual character of the project site from roadway perspectives along Nimitz Highway, Valkenburgh Street and Paine Circle. Accordingly, significant adverse impacts on visual resources are not anticipated.

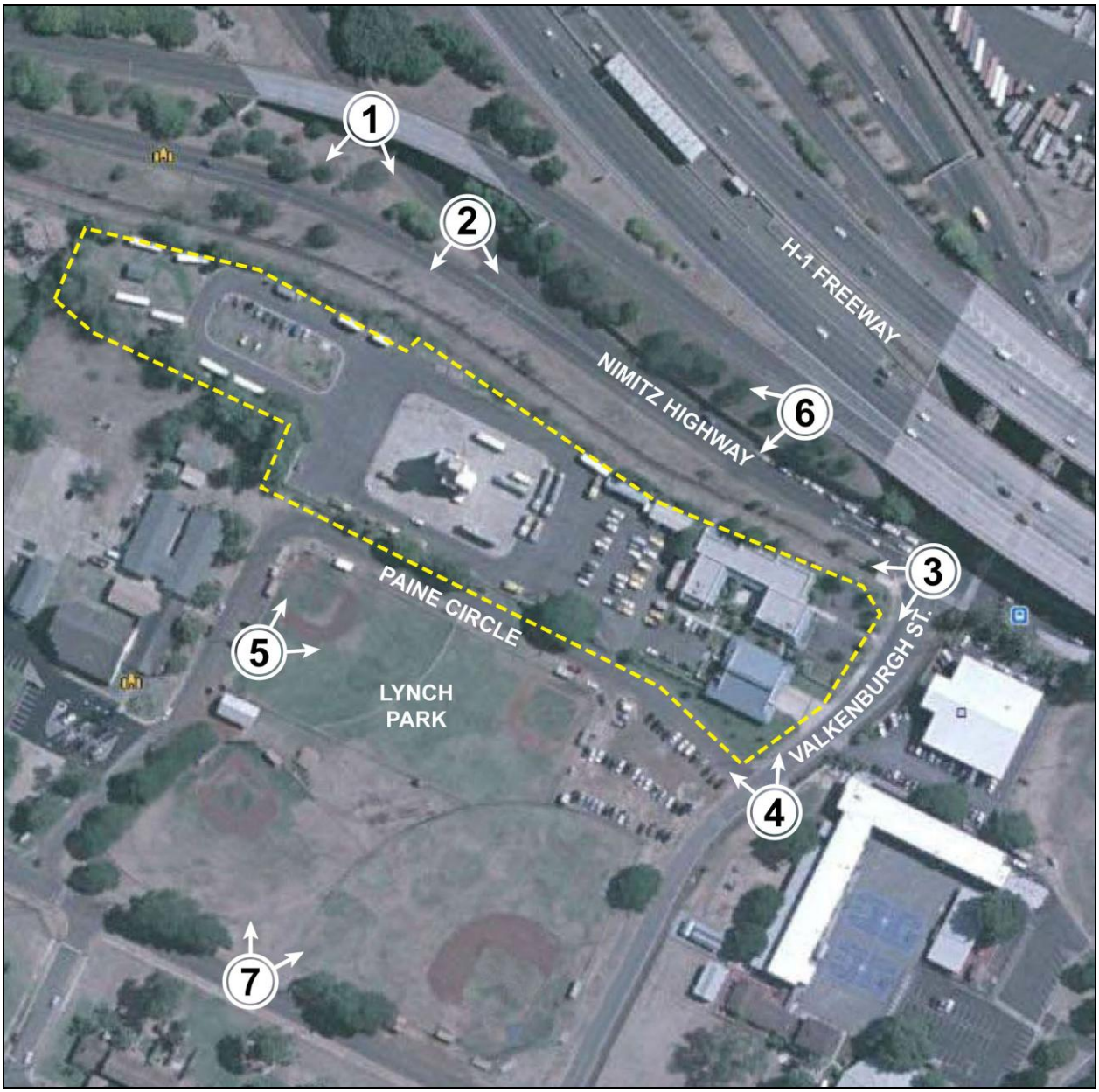

Figure 3-12 Visual Analysis Photo Key

Figure 3-13 Existing view from H-1 Freeway on-ramp above Nimitz Highway (Key 1)

Figure 3-14 Existing view from the H-1 Freeway off-ramp immediately before merging with Nimitz Highway (Key 2)

Figure 3-15 Existing view approaching Valkenburgh Street from Nimitz Highway (Key 3)

Figure 3-16 Existing view of Mokulele Fire Station on the corner of Paine Circle and Valkenburgh Street (Key 4)

Figure 3-17 Existing view of the Training Center looking mauka from Lynch Park (Key 5)

Figure 3-18 Existing view from H-1 Freeway on-ramp above Nimitz Highway (Key 6)

Figure 3-19 Conceptual view from H-1 Freeway on-ramp above Nimitz Highway (Key 6)

Figure 3-20 Existing view of the Training Center looking mauka from Lynch Park (Key 7)

Figure 3-21 Conceptual view of the Training Center looking mauka from Lynch Park (Key 7)

3.19 POTENTIAL CUMULATIVE AND SECONDARY IMPACTS

Cumulative effects are impacts which result from the incremental effects of an activity when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The HFD Training Center improvement project will build upon HFD's mission by providing a modern and well-equipped training environment for new and incumbent firefighters and other first responders. The project is not anticipated to generate substantial cumulative impacts.

Secondary effects are impacts that are associated with, but do not result directly from, an activity. A minor increase in City jobs may result from the proposed project; however this would have incidental impacts on population. Overall, the project's secondary impact would be a beneficial effect on public health and emergency response operations.

4.0
Alternatives to the Proposed Project

4.0 ALTERNATIVES TO THE PROPOSED PROJECT

This Draft Environmental Assessment (EA) evaluates alternatives to the proposed project described in *Section 2.0*. The following provides discussion of the alternatives to the proposed project.

4.1 ALTERNATIVE A – NO-ACTION ALTERNATIVE

The "no-action" is the baseline against which all other alternatives are measured. "No-action" refers to the future site and program conditions that will likely result should the proposed project not proceed.

This alternative will result in keeping the existing Honolulu Fire Department (HFD) training center on the site, operating in approximately 15,000 square feet (sq. ft.), with a capacity for approximately 50-65 students. Continued use of temporary tents, recycled shipping containers and trailers for classes, restrooms, training, lockers, fitness and storage will be necessary, making it difficult to maintain a high level of training. In contrast, the average size of a fire training center nationally is 47,000 sq. ft. on 53 acres. In this alternative, construction of the proposed expansion would not occur and the anticipated improvements to the training center would be foregone. While the selection of this alternative would mean that approximately $49 million of public monies would not be expended on the project, it would also mean that the existing HFD training program would not be enhanced and modernized. The need for the rental of additional facilities would continue in order to carry out all of the necessary training of Hawai'i's fire fighters. The training of fire fighters from throughout the Pacific would not be accommodated.

4.2 ALTERNATIVE B – ALTERNATIVE LOCATION FOR THE PROPOSED PROJECT

Alternatives for this training facility have been considered with lands at Kalaeloa being identified as available. Kalaeloa would allow for a shared location for the indoor classroom facilities as well as the more 'dirty' tactical work and an Emergency Vehicle Operator Course (EVOC) track. However, the use of this site as a location for the Regional Training Center is not favorable for several reasons. If the new training facility were located in Kalaeloa, there would be the need to build a completely new facility, possibly including infrastructure, bringing the cost of construction much higher than improvements to an existing facility. Also, Kalaeloa is a remote location, and with this remote location comes loss in travel time for staff and students.

4.3 ALTERNATIVE C – LARGER SPACE PROGRAM

The master planning process employed to develop a program of space needs for the HFD Regional Fire Training Center expansion considered a larger-scaled program of improvements. In addition to what is currently being proposed this option considered the construction of 10,440 sq. ft. of expansion to the incumbent fire training center. Although the larger-scaled improvements alternative could provide additional benefits identified by the proposed project, current economic restraints prevent this level of expansion at this time. The current proposed project was determined to best meet program requirements and financial and site resources.

5.0
Plans and Policies

5.0 PLANS AND POLICIES

In this section, the project's consistency with applicable land use policies and design guidelines are discussed as set forth in the Americans with Disabilities Act (ADA), Hawai'i State Plan, State Land Use Law, the State 2050 Sustainable Plan, the City and County of Honolulu (City) General Plan, the Primary Urban Center (PUC) Development Plan, and the Land Use Ordinance (LUO).

5.1 AMERICANS WITH DISABILITIES ACT OF 1991

In 1991, the Federal government enacted the ADA to provide equal accessibility for persons with disabilities. Part of this statute requires building designs to consider the needs of persons with disabilities. Chapter 103-50 of the Hawai'i Revised Statutes (HRS) covers "buildings, facilities and sites utilizing state or county funds, or federal funds administered by the state or county." Since the Honolulu Fire Department (HFD) Regional Fire Training Center is a public facility, it falls under the jurisdiction of the 1991 Act and all new structures will consider the needs of persons with disabilities.

Discussion:

The intent of the proposed redevelopment project is to continue to operate as a regional fire training center for the HFD. Accordingly, the design of the new buildings will comply with ADA requirements using the 2010 ADA Standards for Accessible Design.

5.2 HAWAI'I STATE PLAN

The Hawai'i State Plan establishes a statewide planning system that provides goals, objectives, and policies that detail priority directions and concerns of the State of Hawai'i. These will be discussed as they relate to the proposed project.

It is the goal of the State, under the Hawai'i State Planning Act (Chapter 226, HRS), to achieve the following:

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

Specific objectives and policies of the State Plan that pertain to the project are as follows:

Section 226-6 Objective and policies for the economy--in general.

(a) Planning for the State's economy in general shall be directed towards achievement of the following objectives:

(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people.

(2) A steadily growing and diversified economic base that is not overly dependant on a few industries.

(b) To achieve the general economic objectives, it shall be the policy of this State to:

(2) Promote Hawai'i as an attractive market for environmentally and socially sound investment activities that benefit Hawai'i's people.

(6) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.

(10) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.

(11) Maintain acceptable working conditions and standards for Hawai'i's workers.

(15) Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new, potential growth industries in particular.

Section 226-10 Objective and policies for the economy--potential growth activities.

(a) Planning for the State's economy with regard to potential growth activities shall be directed toward achievement of the objective of development and expansion of potential growth activities that serve to increase and diversify Hawai'i's economic base.

(b) To achieve the potential growth activity objective, it shall be the policy of this State to:

(2) Expand Hawaii's capacity to attract and service international programs and activities that generate employment for Hawaii's people.

(5) Promote Hawai'i's geographic, environmental, social and technical advantages to attract new economic activities into the State;

(8) Develop, promote, and support research and educational and training programs that will enhance Hawai'i's ability to attract and develop economic activities of benefit to Hawai'i.

Section 226-21 Objective and policies for socio-cultural advancement--education.

(a) Planning for the State's socio- cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.

(b) To achieve the education objective, it shall be the policy of this State to:

(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.

(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.

Section 226-26 Objectives and policies for socio-cultural advancement--public safety.

(a) Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:

(1) Assurance of public safety and adequate protection of life and property for all people.

(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic wellbeing of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.

(3) Promotion of a sense of community responsibility for the welfare and safety of Hawaii's people.

(b) To achieve the public safety objectives, it shall be the policy of this State to:

(1) Ensure that public safety programs are effective and responsive to community needs.

(d) To further achieve public safety objectives related to emergency management, it shall be the policy of this State to:

(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.

(2) Enhance the coordination between emergency management programs throughout the State.

Section 226-102 Overall Direction.

The State shall strive to improve the quality of life for Hawai'i's present and future population through the pursuit of desirable courses of action in six major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, and principles of sustainability.

Discussion:

The proposed redevelopment of the HFD Regional Fire Training Center is consistent with the objectives and policies of the State Plan listed above. The project will offer increased and diversified opportunities to Hawai'i's people for the technical training and pursuit of highly skilled employment within the State of Hawai'i. This will increase organizational readiness in emergency management and public safety throughout the State. The project will also incorporate sustainable design principles throughout the site.

5.3 HAWAI'I STATE LAND USE DISTRICT BOUNDARIES

The State of Hawai'i Land Use Law regulates the classification and uses of lands in the State to accommodate growth and development, and to retain the natural resources in the area. All State lands are classified by the State Land Use Commission as Urban, Rural, Agricultural, or Conservation, with consideration given to the General Plan of the County.

The proposed project site lands are designated Urban District. Chapter 205-2 (b) HRS, states that:

> *"Urban districts shall include activities or uses as provided by ordinances or regulations of the county within which the urban district is situated."*

Discussion:

The existing and proposed use of the project is consistent with the Urban District designation.

5.4 2050 SUSTAINABILITY PLAN

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

The 2050 Plan delineates five goals toward a sustainable Hawai'i accompanied by strategic actions for implementation and indicators to measure success or failure. The goals and strategic actions that are pertinent to the HFD Regional Fire Training Center redevelopment are as follows:

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

Strategic Actions:

- *Develop a sustainability ethic.*
- *Conduct ongoing forums and cross-sector dialogue to promote collaboration and progress on achieving Hawai'i's sustainability goals.*

Discussion:

The HFD Regional Fire Training Center will be a sustainability model for the education and training facilities of Honolulu's firefighters, and the HFD's marker in environmental stewardship. The training center will be based on environmentally sustainable principles and employ sustainable design strategies in its planning and design. The project will incorporate design strategies to limit the facility's environmental footprint and will be designed with a fully integrated approach to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification criteria.

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

Strategic Actions:

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

Discussion:

The goal of the proposed improvements to the HFD Regional Fire Training Center is to enhance the quality of training and education of new fire recruits as well as incumbent firefighters throughout the Pacific. This will be achieved by creating a modern training center that is comparable to other fire training centers nationwide. The new facilities will provide training opportunities to fulfill current needs and enable firefighters to improve their skills, helping to create a more skilled and resilient workforce.

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

Strategic Actions:

- *Reduce reliance on fossil (carbon-based) fuels.*
- *Conserve water and ensure adequate water supply.*
- *Increase recycling, reuse and waste reduction strategies.*

Discussion:

Designed with a fully integrated approach to meet LEED certification criteria, the overarching plan for energy and water resources should be in line with the following basic principles: 1) Reduce demand; 2) Design efficient systems; 3) On-site generation (e.g. power, water); and 4) Offset off-site resource needs and impacts. Design strategies may include incorporating natural lighting, energy-efficient mechanical and electrical systems, efficient plumbing systems, and architectural design features such as energy-efficient windows to decrease cooling loads on the buildings and increase interior thermal comfort levels.

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

Strategic Actions:

- *Strengthen public education.*
- *Provide access to diverse recreational facilities and opportunities.*

Discussion:

The HFD Regional Fire Training Center will promote health and well-being and provide an opportunity to strengthen career pathways for new and incumbent firefighters and other groups (such as police and paramedics) to enhance Hawai'i's workforce.

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

Strategic Actions:

- *Celebrate our cultural diversity and island way of life.*

Discussion:

One of the themes resulting from a charette in 2006 emphasized that improvements to the HFD Regional Fire Training Center would carry on and embody HFD's legacy and heritage, which has served the island of O'ahu since 1850. It is the only fire department in the United States that was established by a ruling monarch. Detailed building and landscaping design will reflect the HFD's heritage.

5.5 CITY AND COUNTY OF HONOLULU GENERAL PLAN

Adopted by resolution in 1977, the 2002 revised edition of the General Plan for the City and County of Honolulu (City) sets forth the long-range objectives for the general welfare and prosperity of the people of O'ahu and broad policies to attain those objectives. The General Plan provides objectives and policies intended to guide and coordinate City land use planning and regulation, and budgeting for operations and capital improvements.

Population

Objective A: To control the growth of O'ahu's resident and visitor populations in order to avoid social, economic, and environmental disruptions.

Policy 4: Seek to maintain a desirable pace of physical development through City and County regulations.

Objective B: To plan for future population growth.

Policy 1: Allocate efficiently the money and resources of the City and County in order to meet the needs of O'ahu's anticipated future population.

Policy 2: Provide adequate support facilities to accommodate future growth in the number of visitors to O'ahu.

Objective C: To establish a pattern of population distribution that will allow the people of O'ahu to live and work in harmony.

Policy 1: Facilitate the full development of the primary urban center.

Discussion:

The proposed redevelopment of the HFD Regional Fire Training Center will be compatible with the existing urban environment. As the population continues to grow, the new training center will be able to meet the rising need for adequately trained fire fighters.

Economic Activity

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

Policy 1 Encourage the growth and diversification of O'ahu's economic base.

Policy 2: Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of O'ahu residents.

Policy 4: Encourage the development of local, national, and world markets for the products of O'ahu-based industries.

Policy 5: Encourage the wider distribution of available employment opportunities through such methods as shortening the work week and reducing the use of overtime.

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

Policy 2: Provide for a high quality and safe environment for visitors and residents in Waikiki.

Policy 8: Preserve the well-known and widely publicized beauty of O'ahu for visitors as well as residents.

Objective E: To prevent the occurrence of large scale unemployment.

Policy 1: Encourage the training and employment of present residents for currently available and future jobs.

Policy 2: Make full use of State and Federal employment and training programs.

Policy 3: Encourage the provision of retraining programs for workers in industries with planned reductions in their labor force.

Objective G: To bring about orderly economic growth on O'ahu.

Policy 1: Direct major economic activity and government services to the primary urban center and the secondary urban center at Kapolei.

Discussion:

The redevelopment of the training center will facilitate additional employment opportunities for O'ahu residents through training in areas related to the fire, police, and paramedic professions. This facility will also be available for those from the neighbor islands as well as throughout the Pacific. Incumbent training will be set up in similar fashion to a community college with a catalog of classes for certification maintenance and/or upgrades. This will afford fire personnel and/or crews the ability to schedule their training on off duty days, so that daily manpower coverage for core public safety functions will not be affected or compromised. This will also reduce the use of overtime by one individual coordinating the scheduling of classes for others, or to pay for testing. Located in the Primary Urban Center, the facility will be an asset to those professions that contribute to the safety and well-being of O'ahu residents and visitors.

Natural Environment

Objective A: To protect and preserve the natural environment.

Policy 6: Design surface drainage and flood-control systems in a manner which will help preserve their natural settings.

Policy 7: Protect the natural environment from damaging levels of air, water, and noise pollution.

Objective B: To preserve and enhance the natural monuments and scenic views of O'ahu for the benefit of both residents and visitors.

Policy 3: Locate roads, highways, and other public facilities and utilities in areas where they will least obstruct important views of the mountains and the sea.

Discussion:

The project site is situated in urban lands and is flat and largely paved in asphalt. The improvements to the facility will not significantly impact viewplanes. Noise created from the site will be at or below the levels of noise created by the nearby Nimitz Highway.

The project aims to implement sustainable design principles in its planning and design. To prevent stormwater run-off, bioswales, pervious surfaces, and other sustainable practices will be incorporated into the site design. Rainwater catchment systems may be used to recover rainwater for reuse in on-site irrigation and in building systems operation and maintenance.

Energy

Objective A: To maintain an adequate, dependable, and economical supply of energy for O'ahu residents.

Policy 3: Support programs and projects which contribute to the attainment of energy self-sufficiency on O'ahu.

Policy 5: Give adequate consideration to environmental, public health, and safety concerns, to resource limitations, and to relative costs when making decisions concerning alternatives for conserving energy and developing natural energy resources.

Objective C: To fully utilize proven alternative sources of energy.

Policy 1: Encourage the use of commercially available solar energy systems in public facilities, institutions, residences, and business developments.

Discussion:

Key energy-saving strategies that could be incorporated during the early stage of the HFD Regional Fire Training Center redevelopment, planning and design process include on-site renewable energy generation system(s), solar water heaters, use of natural light and ventilation, and incorporating proper building orientation and building envelope design to minimize heat gain. The project will be designed to achieve LEED certification.

Physical Development and Urban Design

Objective A: To coordinate changes in the physical environment of O'ahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.

Policy 8: Locate community facilities on sites that will be convenient to the people they are intended to serve.

Objective B: To develop Honolulu (Waialae-Kahala to Halawa), Aiea, and Pearl City as the Island's primary urban center.

Policy 1: Stimulate development in the primary urban center by means of the City and County's capital improvement program and State and Federal grant and loan programs.

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

Policy 2: Integrate the City and County's urban-design plan into all levels of physical planning and developmental controls.

Policy 9: Design public structures to meet high aesthetic and functional standards and to complement the physical character of the communities they will serve.

Discussion:

The proposed redevelopment of the HFD Regional Fire Training Center will be compatible with the existing airport community. This location is centrally located for those living on O'ahu, as well as conveniently located near the airport for those flying in from out of town to use the facility. Architecturally, the new facilities will be visually compatible and integrate with the surrounding neighborhood.

Public Safety

Objective B: To protect the people of O'ahu and their property against natural disasters and other emergencies, traffic and fire hazards, and unsafe conditions.

Policy 7: Provide adequate fire protection and effective fire prevention programs.

Policy 8: Provide adequate search and rescue and disaster response services.

Policy 9: Design safe and secure public buildings.

Policy 10: Provide adequate staff to supervise activities at public facilities.

Discussion:

The redevelopment of this training center will be crucial in meeting current and future needs to assure that our public safety personnel are properly trained with the latest technology and information to protect the people of O'ahu in a variety of emergency situations. The design of the HFD Regional Fire Training Center will provide for the safe execution of training drills, and the installation of a multi-purpose high-bay structure will protect and secure HFD mobile assets from the elements and vandalism.

Health and Education

Objective A: To protect the health of the people of O'ahu.

Policy 2: Encourage prompt and adequate ambulance and first-aid services in all areas of O'ahu.

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

Policy 1: Support education programs that encourage the development of employable skills.

Policy 3: Encourage the after-hours use of school buildings, grounds, and facilities.

Policy 4: Encourage the construction of school facilities that are designed for flexibility and high levels of use.

Policy 5: Facilitate the appropriate location of learning institutions from the preschool through the university levels.

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

Policy 1: Encourage continuing improvement in the quality of higher education in Hawai'i.

Policy 2: Encourage the development of diverse opportunities in higher education.

Discussion:

The vision for this project is to create a regional training facility that is focused on the research, development, and delivery of All-Hazards public safety curriculum in an academic setting with a modicum of hands-on tactical training. This will be designed as a permanent, stand alone firefighter recruit training facility that physically separates firefighter recruit testing, hiring, and training from the training of incumbent firefighters. The six themes resulting from a charette in 2006 emphasize that improvements to the HFD Regional Fire Training Center would: 1) provide a good learning environment; 2) emphasize health and well-being; 3) be efficient and flexible; 4) incorporate high tech learning; 5) embody HFD's legacy and heritage; and 6) be a good neighbor to surrounding uses. The facility will operate seven days a week, and will establish a year-round firefighter recruit testing, hiring, and training schedule. This will be set up similar in fashion to a community college with a catalog of classes for certification maintenance and/or upgrades.

Firefighter recruit training is now six months long, but projected to be as long as eight months if all certifications were invoked. Allowances must be made for replacement of fire fighters who separate from service and about 20 – 30 who retire every year. A recruit class is typically about 24 recruits, with larger recent classes to support for the Asia Pacific Economic Cooperation (APEC) forum in November, 2011.

Government Operations and Fiscal Management

Objective A: To promote increased efficiency, effectiveness, and responsiveness in the provision of government services by the City and County of Honolulu.

Policy 1: Maintain City and County government services at the level necessary to be effective.

Discussion:

The redevelopment and upgrades of the HFD Regional Fire Training Center will allow for efficient delivery of public safety curriculum and directly impact the City and County of Honolulu's effectiveness in their response to emergency needs.

5.6 CITY AND COUNTY OF HONOLULU PRIMARY URBAN CENTER DEVELOPMENT PLAN

The Primary Urban Center Development Plan, prepared by the City and County of Honolulu Department of Planning and Permitting, envisions the Honolulu of 2025. The vision and plan for the Primary Urban Center (PUC) emphasizes retaining the qualities that attract both residents and visitors, while encouraging growth and redevelopment to accommodate the projected increases in jobs and residential population. The key elements of the vision reflect the size and importance of the PUC:

- Honolulu's natural, cultural, and scenic resources are protected and enhanced.
- Liveable neighborhoods have business districts, parks and plazas, and walkable streets.
- The PUC offers in-town housing choices for people of all ages and incomes.
- Honolulu is the Pacific's leading city and travel destination.
- A balanced transportation system provides excellent mobility.

The project site is designated Lower-Density Residential on the PUC Land Use Map *(Figure 1-5)*. Relevant policies and guidelines are included in *Section 4.8, Civic and Public Safety Facilities:*

4.8.2 Policies

> *Provide adequate staffing and facilities to ensure effective and efficient delivery of basic governmental service and protection of public safety.*

4.8.3 Guidelines

> *As population increases, provide support for civil defense building shelters and improved technology, equipment and training for fire fighting, police protection and paramedical services.*

Discussion:

The HFD serves the PUC from 21 fire stations including Mokulele Fire Station 8 at the project site. In general, existing fire stations are adequate to serve expected future growth in the PUC. However, the training facility itself is inadequate to meet the needs of the HFD fire training program. Improvements to the training center will enhance the quality of the HFD's training program and will create a modern and well-equipped training environment for fire fighting, specialized police protection and paramedical services to support the PUC and entire Island.

5.7 CITY AND COUNTY OF HONOLULU LAND USE ORDINANCE GUIDELINES

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

Section 21-3.40 Preservation districts--Purpose and intent.

> *(d) Should lands be removed from either the state-designated conservation district or from federal jurisdiction, all uses, structures and development standards shall be as specified for the P-2 general preservation district.*

Sec. 21-3.40-1 Preservation uses and development standards.

> *(c) Within the P-2 general preservation district, permitted uses and structures shall be as enumerated in Table 21-3.*
>
> *(d) Within the P-2 general preservation district, development standards shall be as enumerated in Table 21-3.1.*

<u>Discussion:</u>

The subject property is designated as "F-1: Military and Federal Preservation" by the City's LUO *(Figure 1-3)*. Because the lands were received from Federal jurisdiction, all uses, structures and development standards shall be as specified for the P-2 general preservation district.

The function of the HFD Regional Fire Training Center is a public use and structure, therefore this activity is a permitted use in the P-2 district. The existing facility and facility designs do not meet the criteria for development standards in the P-2 district, such as maximum building area and building heights. A Waiver Permit from the City will be required to support the redevelopment and continued function of this site.

6.0
Findings Supporting Anticipated Determination

6.0 FINDINGS SUPPORTING ANTICIPATED DETERMINATION

6.1 ANTICIPATED DETERMINATION

After reviewing the significance criteria outlined in Chapter 343, Hawai'i Revised Statutes (HRS), and Section 11-200-12, State Administrative Rules, Contents of Environmental Assessment (EA), the proposed action has been determined to not result in significant adverse effects on the natural or human environment. A Finding of No Significant Impact (FONSI) is anticipated.

6.2 REASONS SUPPORTING THE ANTICIPATED DETERMINATION

The potential impacts of the facilities improvements and future operation of the proposed Honolulu Fire Department (HFD) Regional Fire Training Center have been examined and discussed in this Draft EA. As stated earlier, there are no significant environmental impacts expected to result from the proposed action. This determination is based on the assessments as presented below for criterion (1) to (13).

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

The archaeological and cultural landscapes have been documented in studies conducted specifically for the project area. As detailed in *Section 3.18 and 3.19* of this report, the project does not involve any known loss or destruction of existing natural or cultural resources. The only specific area of concern is the unknown potential for the inadvertent discovery of subsurface historical or cultural resources, including the unknown possibility of iwi kūpuna (ancestral remains).

Given the low potential for an inadvertent find, it is not recommended at this time that specific archaeological mitigation be in place during demolition and construction. However, if any cultural, historic, or archaeological resources are unearthed or ancestral remains are inadvertently discovered, the State Department of Land and Natural Resources (DLNR), State Historic Preservation Division (SHPD), the O'ahu Island Burial Council (OIBC) representative and participating interests from lineal descendents and individuals will be notified. The treatment of these resources will be conducted in strict compliance with the applicable historic preservation and burial laws.

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

The proposed activities are consistent with current use and will not curtail the range of beneficial uses of the environment. The project will increase beneficial uses of the facility. The new recruit training center, expanded incumbent training center, and renovations to the training tower will enhance HFD's training and education program and create a modern training facility that can accommodate fire fighters from Hawai'i and throughout the Pacific region.

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

The proposed project does not conflict 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 related to that section.

(4) Substantially affects the economic or social welfare and community practices of the community or State.

Short-term economic benefits anticipated during construction will include direct, indirect, and induced employment opportunities and multiplier effects but not at a level that would generate significant economic expansion. Long-term economic benefits anticipated during future operations include increased investments into HFD's fire training program and more skilled and resilient firefighters that will fill the need and improve the health, welfare, and safety of Hawai'i's residents and visitors.

(5) Substantially affects public health.

The project is consistent with existing land use and is not expected to affect public health, except in beneficial ways mentioned in item (4) above. However, there will be temporary short-term impacts to air quality emanating from possible dust emissions and temporary degradation of the acoustic environment in the immediate vicinity resulting from construction equipment. Construction-related impacts of noise, dust, and emissions will be mitigated by compliance with the Hawai'i State Department of Health (DOH) Administrative Rules.

The project will also result in an increase in the number of graduates from the new fire recruit training program. The increase in trained firefighters will fill existing vacancies and translate to an overall improvement in the public health of Hawai'i's citizens.

Furthermore, the training center expansion is designed to encourage a healthy lifestyle for staff and recruits with expanded fitness centers.

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

The project will not have substantial secondary impacts such as significant population changes or affects on public facilities. Even with the ultimate increase in square footage, the amount of firefighters and staff on site at any given time will have no population impacts. As a result, there will be minor impacts to public facilities.

(7) Involves a substantial degradation of environmental quality.

The proposed development will not involve a substantial degradation of environmental quality, and continues the current use. The existing site is mostly paved in asphalt and located in an urban, built up area adjacent to a highway and an interstate freeway. There is a neighborhood park south of the site, and churches and schools surrounding it. Sustainable building and site design will be used, therefore enhancing environmental quality.

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

The project represents the full master plan envisioned for the HFD Regional Fire Training Center and does not involve a commitment for larger actions.

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

The project area does not contain identified rare, threatened or endangered species or habitat. No impact is anticipated.

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

General temporary impacts associated with construction have been identified and mitigation measures discussed in this EA. No detrimental long-term impacts to air, water, or acoustic quality are anticipated with this proposal.

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

The entire project site lies within Zone D, an area of undetermined but possible flood hazards and lies outside of the designated tsunami zone. The site has long been developed and the proposal will not affect environmentally sensitive areas. Proposed improvements will comply with necessary design requirements and building codes.

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

The project site is not identified as within the Significant Panoramic Views (Map A1) of the Primary Urban Center (PUC) Development Plan of the City and County of Honolulu (City). The proposed project will be set back from the main roadway. The site is flat and directly adjacent to an elevated freeway. The project will have a minimal effect on public views of hillsides and will be designed and landscaped to minimize view impacts.

(13) Require substantial energy consumption.

Improvements to the HFD Regional Fire Training Center will increase power consumption from the island's electrical grid. However, new structures will have energy-saving measures which may include a selection of energy-efficient systems for air-conditioning, lighting, water heating, and motorized equipment to help to reduce consumption needs and lower overall operational costs. Renewable energy generation may include photovoltaic systems and/or wind turbines. The project will pursue Leadership in Energy and Environmental Design (LEED) Silver certification.

6.3 SUMMARY

Based on the above findings, the proposed HFD Regional Fire Training Center will not have significant socio-economic or environmental impacts. The EA recommends mitigation measures to alleviate impacts when such impacts are identified.

The proposal will improve the quality of building design, improve utilization of the site, and improve HFD's training program.

7.0
List of References

7.0 LIST OF REFERENCES

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8.0
Agencies, Organizations and Individuals Receiving Copies of the Environmental Assessment

8.0 AGENCIES, ORGANIZATIONS AND INDIVIDUALS RECEIVING COPIES OF THE ENVIRONMENTAL ASSESSMENT

A Pre-Consultation Memo and Participant Letter were sent in March 2011 to initiate the environmental review process. The following is a list of agencies and other parties that were presented notice of the proposed project or were contacted during the pre-consultation period of the Draft EA, and those that will be provided an opportunity to review the Draft EA. Comments received during this pre-consultation process are also provided following this list.

Respondents and Distribution	Pre-Consultation Contact	Pre-Consultation Comments Received	Receiving Draft EA	Draft EA Comments Received	Receiving Final EA/ FONSI
Federal Agencies					
Federal Fire Department Hawai'i	X		X		
Navy Exchange	X		X		
Navy Marine Golf Course	X		X		
Navy Region Hawai'i	X		X		
U.S. Army Corps of Engineers	X		X		
U.S. Coast Guard Sector Honolulu	X		X		
U.S. Fish and Wildlife Service	X		X		
State of Hawai'i Agencies					
Department of Accounting and General Services (DAGS)	X	X	X		
Department of Agriculture	X		X		
Department of Business, Economic Development, and Tourism (DBEDT)	X		X		
DBEDT, Strategic Industries Division	X		X		
DBEDT, Office of Planning	X		X		
Department of Defense	X	X	X		
Department of Education	X	X	X		
Department of Hawaiian Home Lands (DHHL)	X		X		
Department of Health (DOH)	X		X		
Department of Human Services	X	X	X		
Department of Labor and Industrial Relations (DLIR)	X	X	X		

Respondents and Distribution	Pre-Consultation Contact	Pre-Consultation Comments Received	Receiving Draft EA	Draft EA Comments Received	Receiving Final EA/ FONSI
State of Hawai'i Agencies (continued)					
Department of Land and Natural Resources (DLNR)	X	X	X		
DLNR, Historic Preservation Division (SHPD)	X		X		
Department of Transportation (DOT)	X	X	X		
DOT Crash/Rescue Facilities	X		X		
Emergency Medical Services Division	X		X		
Hawai'i Housing Finance & Development Corp (HHFDC)	X	X	X		
Office of Environmental Quality Control (OEQC)	X	X	X		
Office of Hawaiian Affairs (OHA)	X	X	X		
University of Hawai'i (UH), Environmental Center	X		X		
City and County of Honolulu					
Board of Water Supply	X	X	X		
Department of Community Services	X	X	X		
Dept of Design and Construction	X	X	X		
Dept. of Emergency Management	X	X	X		
Department of Environmental Services	X		X		
Department of Facility Maintenance	X		X		
Department of Parks and Recreation	X	X			
Dept of Planning and Permitting (DPP)	X		X		
Department of Transportation Services	X	X	X		
Honolulu Fire Department (HFD)	X	X	X		
Honolulu Police Department	X	X	X		
Office of the Mayor	X		X		
Elected Officials					
State Senator Glenn Wakai	X		X		
State House Rep. Aaron Ling Johanson	X		X		
Councilmember Romy M. Cachola	X	X	X		

Respondents and Distribution	Pre-Consultation Contact	Pre-Consultation Comments Received	Receiving Draft EA	Draft EA Comments Received	Receiving Final EA/ FONSI
Libraries					
Hawai'i State Library	X		X		
Salt Lake Public Library	X		X		
UH Hamilton Library	X		X		
Citizen Groups, Individuals & Consulted Parties					
Assets School	X		X		
Chevron Refinery Fire Brigade	X		X		
Fleet Reserve Association Branch 46	X		X		
Hawai'i Fire Chiefs Association	X		X		
Hickam Communities, LLC	X		X		
Holy Family Catholic Church and Academy	X		X		
Moanalua Shopping Center	X		X		
Neighborhood Board #18 – Aliamanu/Salt Lake	X		X		
Nimitz Elementary School	X		X		
Pearl Harbor Kai Elementary School	X		X		
Tesoro Refinery Fire Brigade	X		X		
Trinity Missionary Baptist Church	X		X		

NEIL ABERCROMBIE
GOVERNOR

BRUCE A. COPPA
COMPTROLLER

RYAN T. OKAHARA
DEPUTY COMPTROLLER

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

(P)1072.1

APR - 7 2011

APR - 8 2011

Ms. Christine Ruotola
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawai'i 96813-4307

Dear Ms. Ruotola:

Subject: Pre-Consultation for Draft Environmental Assessment (DEA) for Honolulu Fire Department Regional Training Center
Honolulu, Oahu, Hawai'i
TMK: (1) 1-1-002: 012

Thank you for the opportunity to provide comments for Pre-consultation DEA for the subject property. The proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions, please call me at 586-0400 or have your staff call Ms. Gayle Takasaki of the Public Works Division at 586-0584.

Sincerely,

BRUCE A. COPPA
State Comptroller

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
Hitoshi Hida AIA
Roy H. Nihei AIA, CSI, LEED AP
Ralph E. Portmore AICP
James I. Nishimoto AIA
Stephen Yuen AIA
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Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Bruce A. Coppa
State Comptroller
State of Hawaii
Department of Accounting and General Services
P.O. Box 119
Honolulu, HI 96810-0119

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Mr. Coppa:

Thank you for your Pre-Consultation comment letter dated April 7, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that the Department of Accounting and General Services has no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola, AICP
Principal

NEIL ABERCROMBIE
GOVERNOR

MAJOR GENERAL DARRYLL D. M. WONG
DIRECTOR OF CIVIL DEFENSE

EDWARD T. TEIXEIRA
VICE DIRECTOR OF CIVIL DEFENSE

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

PHONE (808) 733-4300
FAX (808) 733-4287

RECEIVED
APR 21 2011
GROUP 70 INT'L

April 20, 2011

Ms. Christine Ruotola
Group 70 International, Incorporated
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Ruotola:

Pre-Consultation for Draft Environmental Assessment
Honolulu Fire Department Regional Training Center

This is in response to your letter of March 23, 2011, regarding the above subject. Thank you for the opportunity to comment on this proposed project. After review of the documents you have sent for this development, we have no early consultation comments to make. The proposed area falls within coverage area of existing warning sirens. We will anticipate reviewing the Draft Environmental Assessment when it is completed and will make any appropriate comments at that time.

If there are any questions, please have your staff contact Ms. Clarice Chung, Training Officer, at (808) 733-4300, extension 523.

Sincerely,

EDWARD T. TEIXEIRA
Vice Director of Civil Defense

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
Hitoshi Hida AIA
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Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Lt. Col. Doug Mayne
Vice Director of Civil Defense
State of Hawaii
Department of Defense
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Lt. Col. Mayne:

Thank you for your Pre-Consultation comment letter dated April 20, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge the Department of Defense comment that the proposed area falls within coverage area of existing warning sirens, and understand that there are no additional comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola, AICP
Principal

NEIL ABERCROMBIE
GOVERNOR

KATHRYN S. MATAYOSHI
SUPERINTENDENT

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

RECEIVED
APR 22 2011
GROUP 70 INT'L

OFFICE OF THE SUPERINTENDENT

April 19, 2011

Ms. Christine Mendes Ruotola
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Ruotola:

SUBJECT: Pre-Consultation for the Draft Environmental Assessment Honolulu Fire Department Regional Training Center, Honolulu, Hawaii TMK: 1-1-002:012

The Department of Education (DOE) appreciates the opportunity to provide pre-consultation comments for the Draft Environmental Assessment (DEA) of the proposed Honolulu Fire Department Regional Training Center.

Based on the project information provided, the DOE has no comment to offer at this time. We would, however, like to be provided with an opportunity to comment on the DEA when it becomes available.

Should you have any questions, please do not hesitate to call Roy Ikeda of the Facilities Development Branch at 377-8301.

Very truly yours,

Kathryn S. Matayoshi
Superintendent

KSM:jmb

c: Randolph Moore, Assistant Superintendent

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
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James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Kathryn S. Matayoshi
Superintendent
State of Hawaii
Department of Education
P.O. Box 2360
Honolulu, HI 96804

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Ms. Matayoshi:

Thank you for your Pre-Consultation comment letter dated April 19, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that the Department of Education has no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola, AICP
Principal

NEIL ABERCROMBIE
GOVERNOR

PATRICIA McMANAMAN
DIRECTOR

PANKAJ BHANOT
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
Benefit, Employment & Support Services Division
820 Mililani Street, Suite 606
Honolulu, Hawaii 96813

April 14, 2011

Refer to 11:0180

RECEIVED
APR 18 2011

Ms. Christine Ruotola
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Ruotola:

Thank you for your letter dated March 23, 2011 that requests the Department review the Pre-Consultation for Draft Environmental Assessment for the Honolulu Fire Department Regional Training Center, located at 890 Valkenburgh Street, Honolulu, Hawaii 96818. The Director of the Department of Human Services (DHS) has forwarded your letter to me for a response.

After a review of the proposed project, we do not have any recommendations or concerns to approve the project. As long as the proposed project will help to facilitate the families' access to and from the nearby elementary school and child care programs, we do not foresee any impact on any child care services in the community.

If you have any questions or need further information, please contact Ms. Kathy Ochikubo, Child Care Program Specialist, at (808) 586-7058.

Sincerely,

Luanne Murakami
Acting Division Administrator

c: Patricia McManaman, Director

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
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Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Luanne Murakami
Administrator
City and County of Honolulu
Department of Human Services
820 Mililani Street, Suite 606
Honolulu, Hawaii 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Ms. Murakami:

Thank you for your Pre-Consultation comment letter dated April 14, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

The Draft EA discusses ways in which to improve the traffic situation in the area, helping to facilitate families' access to and from the nearby schools. We acknowledge that the Department of Human Services does not have any recommendations or concerns to approve the project.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

NEIL ABERCROMBIE
GOVERNOR

DWIGHT TAKAMINE
DIRECTOR

AUDREY HIDANO
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS
830 PUNCHBOWL STREET, ROOM 321
HONOLULU, HAWAII 96813
www.hawaii.gov/labor
Phone: (808) 586-8844/Fax: (808) 586-9099

May 23, 2011

RECEIVED
MAY 26 2011

Christine Ruotola, Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307

Dear Ms. Ruotola:

This is in response to your request for comments dated March 23, 2011, on the Draft Environmental Assessment for the proposed HFD Regional Fire Training Center located at 890 Valkenburgh Street, Honolulu, island of Oahu.

The Department of Labor and Industrial Relations has no comments, and we foresee no impact on our existing or proposed programs.

Should you have any questions, please call me at 586-8844.

Sincerely,

DWIGHT TAKAMINE
Director

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
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Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Dwight Takamine
Director
State of Hawaii
Department of Labor and Industrial Relations
830 Punchbowl Street, Room 321
Honolulu, HI 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Mr. Takamine:

Thank you for your Pre-Consultation comment letter dated May 23, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that the Department of Labor and Industrial Relations has no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola, AICP
Principal

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
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
APR 21 2011
GROUP 70 INT'L

April 20, 2011

Group 70 International
925 Bethel Street 5th Floor
Honolulu, Hawaii 96813-4307

Attention: Ms. Christine Ruotola

Ladies and Gentlemen:

Subject: Pre-Consultation for Draft Environmental Assessment for Honolulu Fire Department Regional Training Center

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

Other than the comments from Engineering Division, Division of Forestry & Wildlife, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0414. Thank you.

Sincerely,

Charlene Unoki
for Russell Y. Tsuji
Administrator

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

→ Wayne Chang
review - comment

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 28, 2011

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
x Office of Conservation & Coastal Lands
__Land Division –
x Historic Preservation

RECEIVED
LAND DIVISION
2011 MAR 30 P 3:52
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Pre-Consultation for Draft Environmental Assessment for Honolulu Fire Department Regional Training Center
LOCATION: Island of Oahu
APPLICANT: Group 70 International on behalf of Honolulu Fire Department

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by April 20, 2011.

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

Attachments

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

Signed: Paul J. Conry
Date: 3/30/11

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
LAND DIVISION
2011 MAR 18 A 8:56
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 28, 2011

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
x Office of Conservation & Coastal Lands
__Land Division –
x Historic Preservation

FROM: Charlene Unoki, Assistant Administrator
SUBJECT: Pre-Consultation for Draft Environmental Assessment for Honolulu Fire Department Regional Training Center
LOCATION: Island of Oahu
APPLICANT: Group 70 International on behalf of Honolulu Fire Department

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by April 20, 2011.

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

Attachments

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

Signed:
Date: 4/12/11

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Charlene Unoki
REF: Pre-Consultation for DEA for Honolulu Fire Department Regional Training Center Oahu.008

COMMENTS

(X) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone D, an area where flood hazards are undetermined.

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

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

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

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

( ) Mr. Mario Siu Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.
( ) Mr. Carter Romero at (808) 961-8943 of the County of Hawaii, Department of Public Works.
( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
( ) Ms. Wynne Ushigome at (808) 241-4890 of the County of Kauai, Department of Public Works.

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

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

( ) Additional Comments: _____

( ) Other: _____

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

Signed: _____
CARTY CHANG, CHIEF ENGINEER
Date: 4/12/11

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
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James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Russell Y. Tsuji
Administrator
State of Hawaii
Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Mr. Tsuji:

Thank you for your Pre-Consultation comment letter dated April 20, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that the Department of Land and Natural Resources, Engineering Division confirms that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone D, an area where flood hazards are undetermined, and that Land Division has no other comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

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

---

NEIL ABERCROMBIE
GOVERNOR

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

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
JAN S. GOUVEIA
RANDY GRUNE
JADINE URASAKI

IN REPLY REFER TO:

STP 8.0415

May 3, 2011

GROUP 70 INTL
MAY 11 2011
RECEIVED

Ms. Christine Mendes Ruotola
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Ruotola:

Subject: Honolulu Fire Department (HFD) Regional Training Center
Pre-Consultation for Draft Environmental Assessment (DEA)

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

DOT understands HFD proposes to redevelop the existing HFD training center in three phases. Phase I will include the construction of a new recruit academy, upgrades to the existing training tower site, and supporting parking. Phase II will include the construction of a new incumbent building and supporting parking. Phase III will include a single engine company core concept prototype fire station to replace the existing fire station. The number of people on the site during normal business hours may range from 190 to 280 staff instructors and trainees with a total of 238 parking stalls. Access to the project is from Valkenburgh Street.

The DEA should discuss and evaluate project-generated traffic impacts, from the training center, on the nearby State highway facilities as well as any impacts from airport/aircraft operations due to the close proximity to Honolulu International Airport.

DOT requests at least four copies of the DEA when available. If there are any questions, including the need to meet with DOT Airport or Highways staff, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7976.

Very truly yours,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
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James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Glenn M. Okimoto
Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Mr. Okimoto:

Thank you for your Pre-Consultation comment letter dated May 3, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

In response to your comments:

1. Project-generated traffic impacts from the training center on the nearby State Nimitz highway, including construction period impacts and mitigation measures, will be discussed and evaluated in the Draft EA.
2. Any impacts on the project from airport/aircraft operations due to the close proximity to Honolulu International Airport will also be discussed. Airport-related traffic will be included in the traffic counts.

Upon completion, we will be providing your office with four copies of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

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

Barbara Natale

From: Christine Ruotola
Sent: Friday, April 01, 2011 10:31 AM
To: 'Janice.N.Takahashi@hawaii.gov'
Cc: Barbara Natale
Subject: RE: Pre-Consult. for DEA Honolulu Fire Dept. Regional Training Center

Thank you Janice

From: Janice.N.Takahashi@hawaii.gov [mailto:Janice.N.Takahashi@hawaii.gov]
Sent: Friday, April 01, 2011 10:13 AM
To: Christine Ruotola
Subject: Pre-Consult. for DEA Honolulu Fire Dept. Regional Training Center

Christine,
We have no comments to offer on the proposed action. Thanks.

Janice Takahashi
Chief Planner
Hawaii Housing Finance and Development Corporation
677 Queen Street, Suite 300
Honolulu, Hawaii 96813
Phone: 808-587-0639 Fax: 808-587-0600
Email: Janice.N.Takahashi@hawaii.gov

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INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
Hitoshi Hida AIA
Roy H. Nihei AIA, CSI, LEED AP
Ralph E. Portmore AICP
James I. Nishimoto AIA
Stephen Yuen AIA
Linda C. Miki AIA
George I. Atta AICP, LEED AP
Charles Y. Kaneshiro AIA, LEED AP
Jeffrey H. Overton AICP, LEED AP
Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Janice Takahashi
Chief Planner
Hawaii Housing Finance and Development Corporation
677 Queen Street, Suite 300
Honolulu, HI 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Ms. Takahashi:

Thank you for your Pre-Consultation comment email dated April 1, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that the Hawaii Housing Finance and Development Corporation has no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

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

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

GARY HOOSER
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET, SUITE 702
HONOLULU, HI 96813

March 29, 2011

Christine Ruotola
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813

Dear Ms. Ruotola:

Subject: Pre-Consultation for Draft Environmental Assessment Honolulu Fire Department Regional Training Center

Thank you for your letter dated March 23, 2011 requesting the Office of Environmental Quality Control's (OEQC) review of the subject project. OEQC has no comments to offer at this time.

If you have any questions, please call Rebecca Alakai at 586-4185.

Sincerely,

Rebecca Alakai

Rebecca Alakai
Senior Planner

GROUP 70
INTERNATIONAL

PRINCIPALS

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

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

Linda C. Miki
AIA

George I. Atta
AICP

Charles Y. Kaneshiro
AIA, LEED AP

Jeffrey H. Overton
AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

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

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

August 1, 2012

Rebecca Alakai
Senior Planner
State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, HI 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Ms. Alakai:

Thank you for your Pre-Consultation comment letter dated March 29, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that the Office of Environmental Quality Control has no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

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

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD11/5573B

April 18, 2011

MAY - 6 2011

Christine Mendes Ruotola, Principal Planner
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawai'i 96813-4307

Re: Pre-Draft Environmental Assessment Consultation
Honolulu Fire Department Training Center Improvements Project
Moanalua, Island of O'ahu

Aloha e Christine Mendes-Ruotola,

The Office of Hawaiian Affairs (OHA) is in receipt of your March 23, 2011 letter requesting comments ahead of a draft environmental assessment to support proposed improvements (project) at the Honolulu Fire Department's Regional Fire Training Center (center) in Moanalua on the Island of O'ahu. The project will be completed in three phases. It is our understanding all project activities will occur on a 5.16 ace parcel where the existing center is located.

By letter dated March 23, 2011 OHA responded to an early consultation request from Cultural Surveys Hawai'i, Inc. who will be preparing the cultural impact assessment for the project. We anticipate that the CIA will be a supporting document within the DEA.

OHA has no substantive comments at this time. We look forward to reviewing the DEA and providing additional comments at that time. Please send one CD and one hardcopy of the DEA to OHA attn: Compliance Monitoring Program when it becomes available. Should you have any questions or concerns, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Chief Executive Officer

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
Hitoshi Hida AIA
Roy H. Nihei AIA, CSI, LEED AP
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George I. Atta AICP, LEED AP
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Jeffrey H. Overton AICP, LEED AP
Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Clyde W. Nāmuʻo
Chief Executive Officer
State of Hawaii
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, HI 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawaiʻi)

Dear Mr. Nāmuʻo:

Thank you for your Pre-Consultation comment letter dated April 18, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We would like to also thank you for responding to an additional consultation request from Cultural Surveys Hawaiʻi, Inc. for their preparation of the Cultural Impact Assessment (CIA). The CIA will be included as an appendix in the EA.

We acknowledge that the Office of Hawaiian Affairs has no comments on the subject matter at this time.

Upon completion, we will be providing your Compliance Monitoring Program office with one electronic and one hardcopy of the Draft EA for review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

BOARD OF WATER SUPPLY

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

PETER B. CARLISLE, MAYOR

RANDALL Y. S. CHUNG, Chairman
DENISE M. C. DE COSTA
ANTHONY R. GUERRERO, JR.
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ADAM C. WONG

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GLENN M. OKIMOTO, Ex-Officio

WAYNE M. HASHIRO, P.E.
Manager and Chief Engineer

DEAN A. NAKANO
Deputy Manager

April 1, 2011

RECEIVED
APR - 5 2011

Ms. Christine Mendes Ruotola
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Ruotola:

Subject: Your Letter Dated March 23, 2011 Requesting on the Pre-Consultation for Draft Environmental Assessment, Honolulu Fire Department Regional Training Center, TMK: 1-1-2: 12

Thank you for the opportunity to comment on the proposed HFD training center.

We understand the consultant is inquiring on the possibility of serving the proposed training center with the Navy's water system.

If water service is not available from the Navy and water service is requested from the Honolulu Board of Water Supply (BWS), the applicant will be required to extend approximately 2600 linear feet of water main from the end of the existing BWS water system to the parcel, and install a fire hydrant. However, please be advised that this information is based upon current data and, therefore, the BWS 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.

If water is made available from the BWS, 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.

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

Very truly yours,

PAUL S. KIKUCHI
Chief Financial Officer
Customer Care Division

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
Hitoshi Hida AIA
Roy H. Nihei AIA, CSI, LEED AP
Ralph E. Portmore AICP
James I. Nishimoto AIA
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Jeffrey H. Overton AICP, LEED AP
Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Paul S. Kikuchi
Chief Financial Officer
City and County of Honolulu
Board of Water Supply
630 South Beretania Street
Honolulu, HI 96843

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Mr. Kikuchi:

Thank you for your Pre-Consultation comment letter dated April 1, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge your comments that should water service need to be requested from BWS, the applicant will be required to extend the water main from the end of the existing BWS water system to the parcel, and install a fire hydrant; as well as be required to pay the Water System Facilities Charges for resource development, transmission and daily storage.

We will continue to pursue serving the proposed training center with the Navy's water system; however, water availability will be confirmed when the building permit application is submitted for approval.

We will provide your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

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

DEPARTMENT OF COMMUNITY SERVICES
CITY AND COUNTY OF HONOLULU
715 SOUTH KING STREET, SUITE 311 ● HONOLULU, HAWAII 96813 ● AREA CODE 808 ● PHONE: 768-7762 ● FAX: 768-7792

PETER B. CARLISLE
MAYOR

SAMUEL E. H. MOKU
DIRECTOR

BRIDGET HOLTHUS
DEPUTY DIRECTOR

RECEIVED
APR 1 2011
GROUP 70 INT'L

March 30, 2011

Ms. Christine Ruotola
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813

Dear Ms. Ruotola:

Subject: Pre-Consultation for Draft Environmental Assessment
Honolulu Fire Department Regional Training Center
TMK: 1-1-002: 012

We have reviewed your letter dated March 23, 2011 and the summary information regarding the subject project, and wish to thank you for providing us the opportunity to comment.

Our review of the information provided, indicates that the proposed project will have no adverse impacts on any Department of Community Services' activities or projects in the area at this time.

Thank you again for providing this opportunity to comment on this matter.

Sincerely,

for Samuel E. H. Moku
Director

SEHM:sk

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
Hitoshi Hida AIA
Roy H. Nihei AIA, CSI, LEED AP
Ralph E. Portmore AICP
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Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Samuel E. H. Moku
Director
City and County of Honolulu
Department of Community Services
715 South King Street, Suite 311
Honolulu, HI 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Mr. Moku:

Thank you for your Pre-Consultation comment letter dated March 30, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that the Department of Community Services (DCS) finds no adverse impacts on any DCS activities or projects in the area at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

PETER B. CARLISLE
MAYOR

COLLINS D LAM, P.E.
ACTING DIRECTOR

LORITA M. KAHIKINA, P.E.
DEPUTY DIRECTOR

April 27, 2011

RECEIVED
MAY - 2 2011
GROUP 70 INT'L

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307
Attention: Christine Ruotola

Dear Ms. Ruotola:

Subject: Pre- Consultation for Draft Environmental Assessment
Honolulu Fire Department Regional Training Center
(Honolulu, Hawaii) TMK: 1-1-002:012

Thank you for inviting us to review the Draft Environmental Assessment for the Honolulu Fire Department Regional Training Center. The Department of Design and Construction does not have any comments to offer at this time.

Should you have any questions, please contact me at 768-8480.

Very truly yours,

Collins D. Lam, P.E.
Director

CL:pg(409591)

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INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
Hitoshi Hida AIA
Roy H. Nihei AIA, CSI, LEED AP
Ralph E. Portmore AICP
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Linda C. Miki AIA
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Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Lori M. K. Kahikina, P.E.
Director
City and County of Honolulu
Department of Design and Construction
650 South King Street, 11th Floor
Honolulu, HI 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Ms. Kahikina:

Thank you for your Pre-Consultation comment letter dated April 27, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that the Department of Design and Construction has no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola, AICP
Principal

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

Barbara Natale

From: Christine Ruotola
Sent: Wednesday, April 13, 2011 2:35 PM
To: Barbara Natale
Subject: FW: Pre-Consultaion for Draft Environmental Assessment Honolulu Fire Department Regional Training Center (Honolulu, Hawaii) TMP: 1-1-002:012

From: Araki, Sandra [mailto:SAraki@honolulu.gov]
Sent: Wednesday, April 13, 2011 2:32 PM
To: Christine Ruotola
Subject: Pre-Consultaion for Draft Environmental Assessment Honolulu Fire Department Regional Training Center (Honolulu, Hawaii) TMP: 1-1-002:012

Ms. Ruotola,

The City & County of Honolulu, Department of Emergency Management has no comment on the above subject matter. We thank you for the opportunity to provide input.

Sandra Araki
Clerk Typist, DEM
650 South King Street
Honolulu, Hawaii 96813
saraki@honolulu.gov

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
Hitoshi Hida AIA
Roy H. Nihei AIA, CSI, LEED AP
Ralph E. Portmore AICP
James I. Nishimoto AIA
Stephen Yuen AIA
Linda C. Miki AIA
George I. Atta AICP, LEED AP
Charles Y. Kaneshiro AIA, LEED AP
Jeffrey H. Overton AICP, LEED AP
Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Melvin N. Kaku, Director
City and County of Honolulu
Department of Emergency Management
650 South King Street, Basement
Honolulu, HI 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Mr. Kaku:

Thank you for your Pre-Consultation comment email dated April 13, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that the Department of Emergency Management has no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

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

DEPARTMENT OF PARKS & RECREATION
CITY AND COUNTY OF HONOLULU
1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

PETER B. CARLISLE
MAYOR

GARY B. CABATO
DIRECTOR

ALBERT TUFONO
DEPUTY DIRECTOR

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APR 13 2011
GROUP 70 INT'L

April86, 2011

Ms. Christine Mendes Ruotola
Group 70 International Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Ruotola:

Subject: Pre-Consultation for Draft Environmental Assessment
Honolulu Fire Department Regional Training Center
Honolulu, Hawaii
TMK: 1-1-002:012

Thank you for the opportunity to review and comment at the Pre-Consultation stage of the Draft Environmental Assessment for the Honolulu Fire Department's Regional Training Center.

The Department of Parks and Recreation has no comment as the proposed project will not impact any program or facility of the department. You may remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner, at 768-3017.

Sincerely,

Gary B. Cabato
GARY B. CABATO
Director

GBC:jr
(409659)

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
Hitoshi Hida AIA
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Ralph E. Portmore AICP
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James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Gary B. Cabato, Director
City and County of Honolulu
Department of Parks & Recreation
1000 Uluohia Street, Suite 309
Kapolei, Hawaii 96707

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Mr. Cabato:

Thank you for your Pre-Consultation comment letter dated April 6, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that the Department of Parks & Recreation (DPR) has no comments on the subject matter at this time.

We appreciate your input and participation in the pre-consultation process. At your request, we will remove DPR from the remainder of the EA process

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

PETER B. CARLISLE
MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

KAI NANI KRAUT, P.E.
DEPUTY DIRECTOR

KENNETH TORU HAMAYASU, P.E.
DEPUTY DIRECTOR

TP3/11-410170R

April 20, 2011

APR 22 2011

Ms. Christine Mendes Ruotola
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Ruotola:

Subject: Pre-Consultation for Draft Environmental Assessment (DEA) Honolulu Fire Department Regional Training Center; Honolulu, Oahu, Hawaii

This responds to your letter of March 23, 2011, requesting our comments concerning this proposed project.

We have the following comments:

- The DEA should contain a Traffic Impact Assessment Report (TIAR) for the area. The TIAR should discuss traffic and parking impacts of the project on regional and local roadways and proposed mitigative measures.

- The short-term traffic impacts and possible mitigation measures during construction should also be discussed. Should any proposed construction activities require the temporary closure of a traffic lane, parking, etc., on a local street, a street usage permit from the Department of Transportation Services will be required.

Our Public Transit Division (PTD) has the following comment. Any traffic study should contain a description of area public transit services and operations, any expected impacts the project will have on them, and proposed mitigative measures.

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at 768-8359.

Very truly yours,

WAYNE Y. YOSHIOKA
Director

GROUP 70
INTERNATIONAL

August 1, 2012

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
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James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

Wayne Y. Yoshioka, Director
City and County of Honolulu
Department of Transportation Services
650 S. King Street, 3rd Floor
Honolulu, HI 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Mr. Yoshioka:

Thank you for your Pre-Consultation comment letter dated April 20, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

In response to your comments:

1. Traffic and parking impacts of the project on regional and local roadways and proposed mitigative measures will be discussed and evaluated in the Draft EA, and the full Traffic Impact Assessment Report (TIAR) will be included in the appendix.
2. Short-term traffic impacts and possible mitigation measures during construction will also be discussed. We acknowledge your comment that a street usage permit from the Department of Transportation Services will be required should any proposed construction activities require the temporary closure of a traffic lane, parking, etc., on a local street.
3. A description of public transit services and operations and the impact of the project on public transit during construction with proposed mitigative measures will be included in the Draft EA.

We will provide your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola, AICP
Principal

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

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

PETER B. CARLISLE
MAYOR

KENNETH G. SILVA
FIRE CHIEF

ROLLAND J. HARVEST
DEPUTY FIRE CHIEF

April 8, 2011

RECEIVED
APR 11 2011
GROUP 70 INT'L

Ms. Christine Mendes Ruotola
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Ruotola:

Subject: Preconsultation for Draft Environmental Assessment
Honolulu Fire Department Regional Training Center
Tax Map Key: 1-1-002: 012

In response to your letter of March 23, 2011, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) reviewed the material provided and requires that the following requirements 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 a fire apparatus access road 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 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.

4. Paragraph 1.2 Project Site states that the existing facility has a 24/7 fire investigation section. This function will not be housed at this facility.

We are pleased to see the commencement of this long-awaited project and look forward to actively participating in the environmental assessment process.

Should you have any questions, please call Acting Battalion Chief Gary Lum of our Fire Prevention Bureau at 723-7152.

Sincerely,

KENNETH G. SILVA
Fire Chief

KGS/SY:bh

cc: The Honorable Peter B. Carlisle, Mayor

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
Sheryl B. Seaman AIA, ASID, LEED AP
Hitoshi Hida AIA
Roy H. Nihei AIA, CSI, LEED AP
Ralph E. Portmore AICP
James I. Nishimoto AIA
Stephen Yuen AIA
Linda C. Miki AIA
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Charles Y. Kaneshiro AIA, LEED AP
Jeffrey H. Overton AICP, LEED AP
Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

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

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Chief Silva:

Thank you for your Pre-Consultation comment letter dated April 8, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

In response to your comments:

1. The proposed project will comply with the applicable National Fire Protection Association (NFPA) 1; Uniform Fire Code (UFC), 2009 Edition, including necessary fire apparatus access roads and fire hydrants.
2. A water supply is expected to be provided by the Navy, with 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. The existing water system cannot provide adequate fire protection per Board of Water Supply standards; therefore a new water main will be constructed to meet fire protection demands for the proposed HFD site. Should use of the Navy system not be available in the future, the property will need to connect with City and County of Honolulu facilities off-site.
3. Civil drawings will be submitted to the Honolulu Fire Department for review and approval during building permitting period.
4. In addition, the correction has been made in regards to the inaccurate reference of the 24/7 fire investigation section housed at the facility.

We will provide your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

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

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

PETER B. CARLISLE
MAYOR

LOUIS M. KEALOHA
CHIEF

DELBERT T. TATSUYAMA
RANDAL K. MACADANGDANG
DEPUTY CHIEFS

OUR REFERENCE DMK-LS

April 14, 2011

GROUP 70 INT'L
APR 19 2011
RECEIVED

Ms. Christine M. Ruotola, Principal Planner
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Ruotola:

This is in response to your letter of March 23, 2011, requesting comments on a Pre-Consultation, Draft Environmental Assessment, for the Honolulu Fire Department Regional Training Center.

During the construction phase, this project will have a negative impact on the services provided by the Honolulu Police Department. In spite of mitigation measures, construction-related dust, noise, traffic, and odors would likely cause an increase in calls for police service to the area. However, once completed, there should be no impact on the facilities or operations of the Honolulu Police Department.

If there are any questions, please call Major William Chur of District 5 (Kalihi) at 723-8200.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
DAVE M. KAJIHIRO
Assistant Chief of Police
Support Services Bureau

Serving and Protecting With Aloha

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
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Christine Mendes Ruotola AICP, LEED AP
James L. Stone, Arch.D., AIA, LEED AP
Katherine M. MacNeil AIA, LEED AP
Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Louis M. Kealoha
Chief of Police
City and County of Honolulu
Honolulu Police Department
801 South Beretania Street
Honolulu, HI 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Chief Kealoha:

Thank you for your Pre-Consultation comment letter dated April 14, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center.

We acknowledge your comments that there may be construction period impacts; however, after the construction period, the proposed project should not impact the facilities or operations of the Honolulu Police Department.

We will provide your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

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

CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII 96813-3065 / TELEPHONE 547-7000

ROMY M. CACHOLA
COUNCILMEMBER
(808) 768-5007
(808) 768-5011 (fax)
e-mail: rcachola@honolulu.gov

April 21, 2011

Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307
Attn: Christine Ruotola

Dear Ms. Ruotola:

SUBJECT: Draft Environmental Assessment for Honolulu Fire Department Regional Training Center

I am writing this letter in strong support of the proposed Honolulu Fire Department (HFD) Regional Training Center, located at 890 Valkenburgh Street, Honolulu, HI 96818.

The proposed training center is of great importance to the City and County of Honolulu by ensuring that our firefighters are well-trained to provide aid to our citizens. The training center will enhance the quality of HFD's training program and will create a modern and well-equipped training environment for new recruits, as well as for incumbent firefighters. The facility will provide a critical training to firefighters and other first responders. For these reasons I am in support of this much-needed project.

Thank you for the opportunity to provide comments.

Very truly yours,

Romy M. Cachola

ROMY M. CACHOLA
Councilmember
Council District VII

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda, Arch.D., FAIA, AICP, LEED AP
Norman G.Y. Hong AIA
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Tom Young, MBA AIA
Paul T. Matsuda PE, LEED AP

August 1, 2012

Romy M. Cachola, Councilmember
Honolulu City Council District 7
City and County of Honolulu
530 South King Street, Room 202
Honolulu, HI 96813

Subject: Pre-Consultation for Draft Environmental Assessment (Draft EA)
Honolulu Fire Department Regional Fire Training Center
(Honolulu, Oahu, Hawai'i)

Dear Councilmember Cachola:

Thank you for your Pre-Consultation comment letter dated April 21, 2011 concerning the Draft EA for the Honolulu Fire Department Regional Fire Training Center. We appreciate your support of improvements to the Honolulu Fire Department Regional Fire Training Center.

We acknowledge that you have no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Christine Mendes Ruotola

Christine Mendes Ruotola, AICP
Principal

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

Appendix A
Air Quality Impact Report

AIR QUALITY IMPACT REPORT (AQIR)

HONOLULU FIRE DEPARTMENT
REGIONAL FIRE TRAINING CENTER
HONOLULU, HAWAII

2 JANUARY 2012

PREPARED FOR:

Group 70 International, Inc.
and
Honolulu Fire Department

PREPARED BY:

J. W. MORROW
Environmental Management Consultant
1481 South King Street, Suite 548
Honolulu, Hawaii 96814

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1. INTRODUCTION

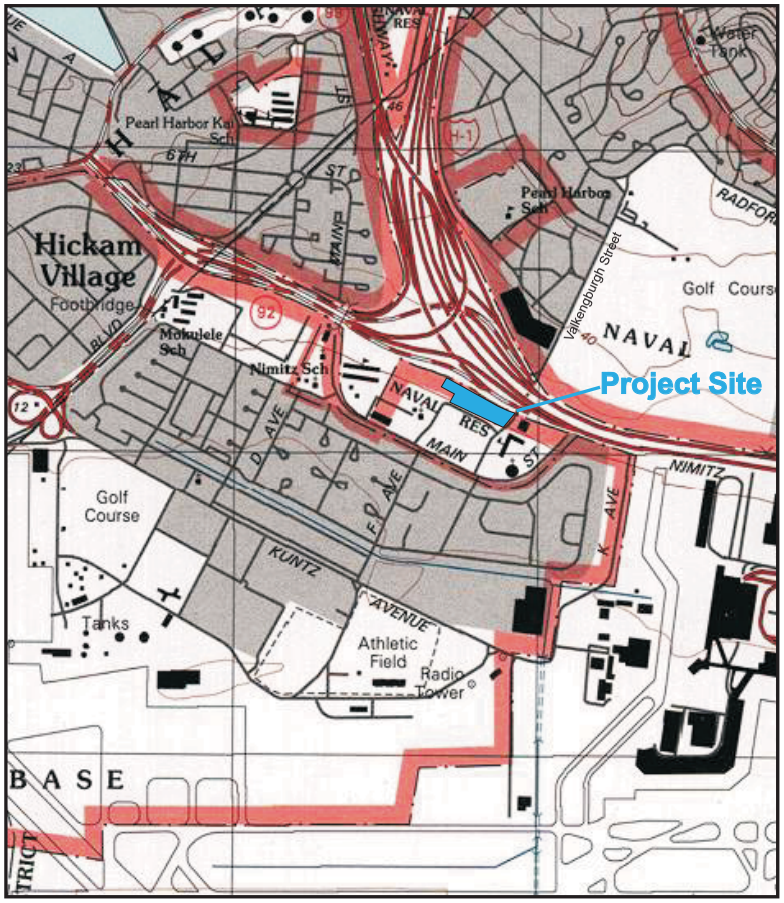
The Honolulu Fire Department (HFD) is proposing to construct a new regional fire training center and fire station at the site of the existing Charles H. Thurston Fire Training Center and Mokulele Fire Station on the island of Oahu in Hawaii (Figure 1). Primary access to the site is from Nimitz Highway and Valkenburgh Street (Figure 2). The existing training facilities will be replaced, and the existing fire station will be reconstructed. The new center will include:

- Recruit Training Academy with classrooms, administrative offices, and support facilities
- Multipurpose High Bay Building with mobile asset storage and training facilities
- Support Services Facility with administrative offices, support facilities, and classrooms for incumbent firefighter training
- Fire station

The purpose of this report is to assess the short and long-term impacts of the proposed facility on air quality. The project can be considered an "indirect source" of air pollution as defined in the federal Clean Air Act[1] since its primary association with air quality is its inherent attraction for mobile sources, i.e., motor vehicles. Much of the focus of this analysis, therefore, is on the project's ability to generate additional traffic in the project area with its resultant impact on air quality. Air quality impact was evaluated for existing (2011) and future (2025) conditions with and without the proposed facility.

Finally, during construction of the building and parking facilities air pollutant emissions will be generated onsite and offsite due to vehicular movement, grading, concrete and asphalt batching, and general dust-generating construction activities. These impacts have also been addressed.

FIGURE 1
PROJECT LOCATION



USGS Quad Pearl Harbor (1999)
1:24,000 (NAD-83)

FIGURE 2
EXISTING CONDITIONS

Existing Training Facility

Valkenburgh Street at Nimitz Highway (facing N)

2. AIR QUALITY STANDARDS

A summary of State of Hawaii and national ambient air quality standards (NAAQS) is presented in Table 1.[2, 3, 4] Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values [5].

Some of Hawaii's standards (CO, NO_2, and O_3) are clearly more stringent than their federal counterparts and like their federal counterparts in the case of short-term standards, they may be exceeded once per year.

3. EXISTING AIR QUALITY

3.1 General. The state Department of Health (DOH) maintains a network of air monitoring stations around the state to gather data on the following regulated pollutants:

- particulate matter ≤ 10 microns (PM_{10})
- particulate matter ≤ 2.5 microns ($PM_{2.5}$)
- sulfur dioxide (SO_2)

TABLE 1

SUMMARY OF STATE OF HAWAII AND FEDERAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING PERIOD	NAAQS PRIMARY	NAAQS SECONDARY	HAWAII STANDARDS
PM_{10}	Annual 24-hr	--- 150	--- 150	50 150
$PM_{2.5}$	Annual 24-hr	15 35	15 35	15 35
SO_2	Annual 24-hr 3-hr 1-hr	--- --- --- 0.075	--- --- 0.5 --	0.03 0.14 0.5 --
NO_2	Annual 1-hr	0.053 0.100	0.053 ---	0.04 ---
CO	8-hr 1-hr	9 35	--- ---	4.4 9
O_3	8-hr	0.075	0.075	0.08
H_2S	1-hr	---	---	35
Pb	Calendar Quarter	0.15	0.15	1.5

KEY: PM_{10} - particulate matter ≤ 10 microns
$PM_{2.5}$ - particulate matter ≤ 2.5 microns
SO_2 - sulfur dioxide
NO_2 - nitrogen dioxide
CO - carbon monoxide
O_3 - ozone
H_2S - hydrogen sulfide
Pb - lead

All concentrations in parts per million (ppm) except PM_{10}, $PM_{2.5}$ and Pb which are in micrograms per cubic meter ($\mu g/m^3$).

- nitrogen dioxide (NO_2)
- carbon monoxide (CO)
- ozone (O_3)

In the case of PM_{10} and $PM_{2.5}$, measurements are made on a 24-hour basis to correspond with the averaging period specified in state and federal standards. Depending on the sampling equipment and site, samples are collected either continuously or once every six days in accordance with U. S. Environmental Protection Agency (EPA) guidelines. Carbon monoxide, sulfur dioxide, nitrogen dioxide, and ozone, however, are measured on a continuous basis due to their short-term (1- and 3-, and 8-hour) standards. Lead sampling was discontinued in October 1997 with EPA approval. This was largely due to the elimination of lead in gasoline and the resulting reduction of ambient lead levels in Hawaii to almost non-detectable levels.

3.2 Department of Health Monitoring. There are no DOH monitoring stations in the immediate vicinity of the project site. . A summary of the most recent published air quality data [6] from the nearest sites at Honolulu (Department of Health building) and Sand Island (the only ozone monitoring site), is presented in Table 2. These data are indicative of the generally good air quality in Honolulu County and may be considered representative of existing air quality in the project area. They also indicate compliance with federal and state ambient standards

3.3 Onsite Carbon Monoxide Sampling. In conjunction with this project, air sampling was conducted in December 2011, at the Nimitz Highway - Valkenburgh Street intersection adjacent to the existing HFD training center. A continuous carbon monoxide (CO) instrument was set up and operated during the a.m. and p.m. peak traffic hours. An anemometer and vane were also installed

TABLE 2

AIR QUALITY DATA
DEPARTMENT OF HEALTH MONITORING SITES
2010

Pollutant	Concentration[1]
Particulate matter (≤ 10 microns) (PM_{10}) 24-hr	57
Annual	12
Particulate matter (≤ 2.5 microns) ($PM_{2.5}$) 24-hr	12.2
Annual	4.7
Sulfur dioxide (SO_2) 1-hr	n/d
3-hr	0.010
24-hr	0.004
Annual	0.001
Carbon monoxide (CO) 1-hr	1.8
8-hr	0.8
Ozone (O_3) 8-hr	0.052
Annual	0.026
Nitrogen Dioxide (NO_2) 1-hr	0.033
Annual	0.003

Notes: 1. Concentrations in parts per million (ppm) except for PM_{10}, $PM_{2.5}$ in micrograms per cubic meter ($\mu g/m^3$).
2. NO_2 data from Kapolei site.
3. PM_{10} , $PM_{2.5}$,SO_2 and CO data from Honolulu DOH site.
4. O_3 data are from the Sand Island site.

Source: Hawaii Department of Health (Reference 6)

to record onsite surface winds during the sampling period. A simultaneous manual count of traffic was performed. The variability of each of the parameters measured during the peak hours is clearly seen in Figures 3 and 4.

On the morning of Tuesday, 13 December 2011, sampling equipment was set up in the existing HFD facility parking lot on the southwest side of the aforementioned intersection. Weather conditions during the morning peak hour were characterized by partly cloudy skies and calm to very light northerly winds. Carbon monoxide concentrations measured were low, averaging 1.0 ppm for the 1-hour period and comparable to the model results discussed later in this report. Traffic volume entering the intersection was 2,662 vehicles between 7:00 and 8:00 Hawaiian Standard Time (HST).

On the afternoon of 13 December 2011, the equipment was set up at the same location. Sky conditions were partly cloudy to overcast with intermittent light showers. Winds were low speed (< 1 mph) and predominantly from the north to northeast. The hourly traffic entering the intersection was 1,837 vehicles. The hourly mean CO level of 1.3 ppm was slightly higher than during the morning peak hour despite the lower traffic volume and again well below the state and federal standards.

FIGURE 3

A.M. PEAK HOUR CONDITIONS
VALKENBURGH STREET AT NIMITZ HIGHWAY
13 DECEMBER 2011

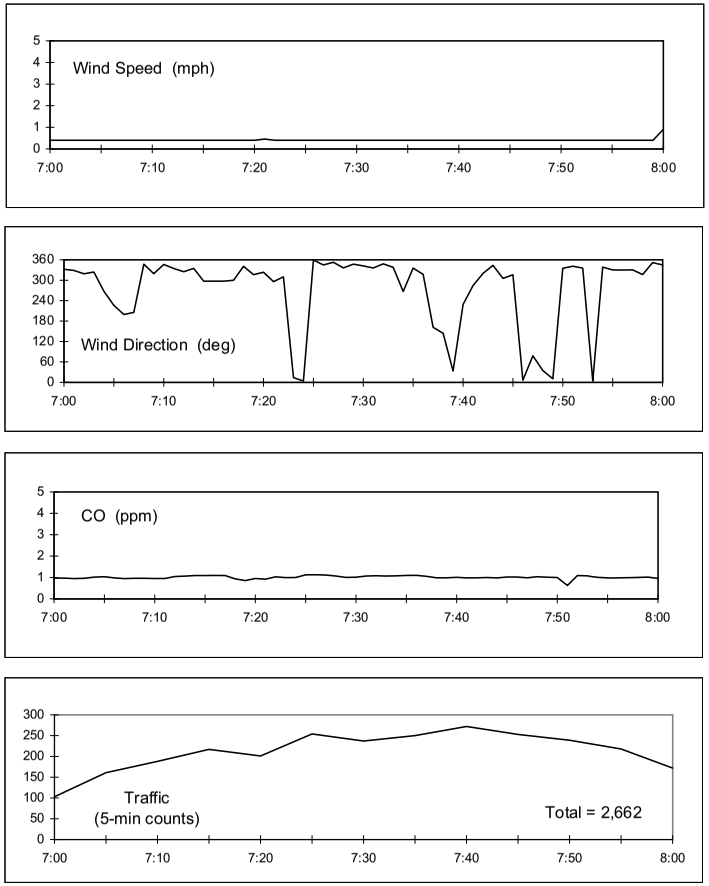
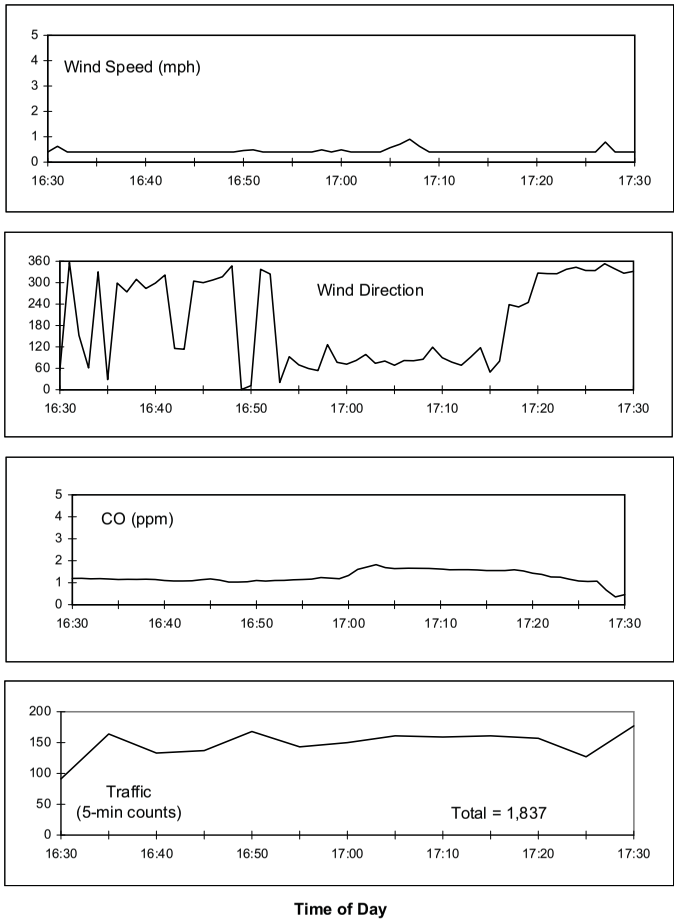


FIGURE 4

P.M. PEAK HOUR CONDITIONS
VALKENBURGH STREET AT NIMITZ HIGHWAY
13 DECEMBER 2011



4. CLIMATE AND METEOROLOGY

4.1 Climate. Climatic norms, means and extremes for Honolulu [7] are presented in Table 3. Analysis of the monthly temperature and rainfall data for the National Weather Service station at Honolulu International Airport in accordance with Thornwaite's scheme for climatic classification, yields a precipitation/evaporation (P/E) index of 26.6 which classifies the area as "semi-arid". [8]

4.2 Surface Winds. Meteorological data records were reviewed from the Honolulu International Airport and Hickam Air Force Base. The annual prevalence of northeast trade winds is clearly shown in Table 4. A closer examination of the data, however, indicates that low velocities (less than 10 mph) occur frequently and that the normal northeasterly trade winds tend to break down in the Fall giving way to more light, variable wind conditions through the Winter and on into early Spring. It is during these times that Honolulu generally experiences elevated pollutant levels. This seasonal difference in wind conditions can be easily contrasted by comparing August and January wind roses (Figures 5 and 6). Of particular interest from an air pollution standpoint were the stability wind roses prepared for Hickam Air Force Base [9]. These data indicated that stable conditions, i.e., Pasquill-Gifford stability categories E and F [10], occur about 28% of the time on an annual basis and 36% of the time during the peak winter month (January). It is under such conditions that the greatest potential for air pollutant buildup from groundlevel sources, e.g., motor vehicles, exists.

TABLE 3

CLIMATIC NORMS, MEANS AND EXTREMES
HONOLULU INTERNATIONAL AIRPORT (HIA)

Parameter	Descriptor	Honolulu International Airport
Temperature (deg F)	Daily maximum Daily minimum Annual mean	84.7 70.2 77.5
Precipitation (inches)	Maximum monthly Minimum monthly Annual mean	20.79 trace 18.29
Humidity (%)	8:00 a.m. 2:00 p.m.	72 56
Wind Speed (mph)	Mean	10.4
Sunshine	Percent of possible	71
Sky cover (# of days)	Clear Cloudy	90 92

Source: National Climatic Data Center (NCDC) (Reference 7)

TABLE 4

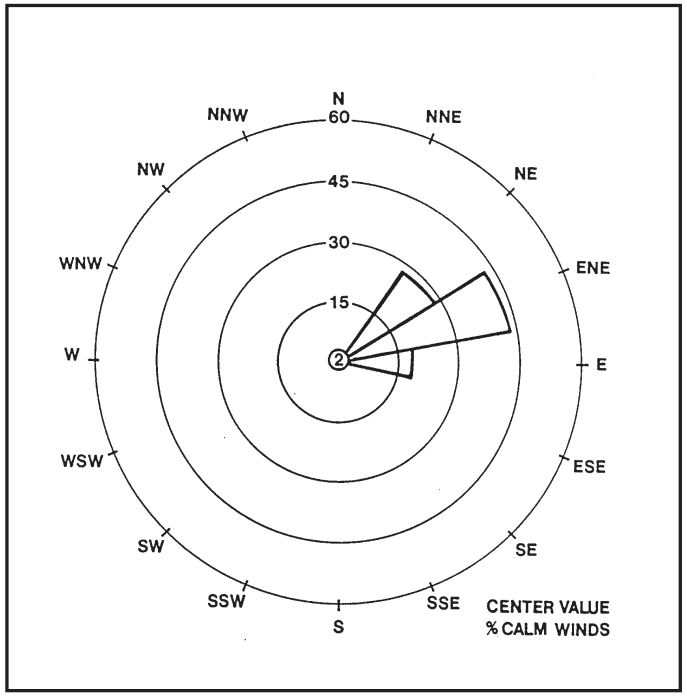
ANNUAL JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION HONOLULU INTERNATIONAL AIRPORT

	Wind Speed (mph)						
Dir (deg)	< 7	< 10	< 13	< 16	< 19	>/= 19	All
10	0.0065	0.0038	0.0023	0.0016	0.0009	0.0001	0.0151
20	0.0082	0.0041	0.0025	0.0023	0.0011	0.0001	**0.0183**
30	0.0100	0.0061	0.0051	0.0038	0.0028	0.0007	**0.0286**
40	0.0188	0.0157	0.0258	0.0222	0.0174	0.0040	**0.1039**
50	0.0268	0.0290	0.0449	0.0385	0.0307	0.0054	**0.1752**
60	0.0344	0.0289	0.0436	0.0273	0.0238	0.0041	**0.1621**
70	0.0250	0.0181	0.0197	0.0122	0.0096	0.0009	**0.0855**
80	0.0113	0.0081	0.0065	0.0039	0.0009	0.0003	0.0310
90	0.0073	0.0049	0.0040	0.0009	0.0008	0.0000	0.0179
100	0.0031	0.0016	0.0014	0.0006	0.0002	0.0000	0.0068
110	0.0027	0.0019	0.0010	0.0007	0.0005	0.0001	0.0069
120	0.0027	0.0013	0.0019	0.0009	0.0003	0.0003	0.0075
130	0.0022	0.0032	0.0018	0.0015	0.0007	0.0002	0.0096
140	0.0034	0.0033	0.0039	0.0018	0.0011	0.0006	0.0141
150	0.0022	0.0030	0.0019	0.0003	0.0002	0.0005	0.0081
160	0.0024	0.0033	0.0023	0.0010	0.0005	0.0000	0.0094
170	0.0031	0.0046	0.0023	0.0007	0.0003	0.0000	0.0109
180	0.0055	0.0042	0.0018	0.0008	0.0005	0.0000	0.0128
190	0.0065	0.0038	0.0013	0.0002	0.0000	0.0000	0.0117
200	0.0057	0.0032	0.0011	0.0001	0.0000	0.0000	0.0101
210	0.0076	0.0038	0.0016	0.0001	0.0000	0.0000	0.0131
220	0.0083	0.0077	0.0016	0.0001	0.0001	0.0000	0.0179
230	0.0076	0.0049	0.0014	0.0001	0.0001	0.0000	0.0141
240	0.0042	0.0016	0.0013	0.0000	0.0000	0.0000	0.0071
250	0.0040	0.0010	0.0003	0.0000	0.0000	0.0000	0.0054
260	0.0064	0.0023	0.0005	0.0000	0.0000	0.0000	0.0091
270	0.0065	0.0010	0.0005	0.0002	0.0000	0.0000	0.0082
280	0.0099	0.0005	0.0002	0.0000	0.0000	0.0000	0.0106
290	0.0123	0.0003	0.0002	0.0001	0.0000	0.0000	0.0130
300	0.0167	0.0018	0.0011	0.0000	0.0000	0.0000	0.0197
310	0.0235	0.0022	0.0015	0.0001	0.0000	0.0000	0.0272
320	0.0200	0.0022	0.0013	0.0006	0.0001	0.0000	0.0241
330	0.0121	0.0023	0.0011	0.0005	0.0000	0.0000	0.0159
340	0.0094	0.0010	0.0003	0.0001	0.0000	0.0000	0.0109
350	0.0082	0.0025	0.0016	0.0002	0.0000	0.0000	0.0125
360	0.0093	0.0027	0.0022	0.0006	0.0005	0.0001	0.0154
All	**0.3537**	**0.1898**	0.1917	0.1240	0.0932	0.0174	0.9698
						Calms:	0.0302

SOURCE: National Weather Service, 1992

FIGURE 4

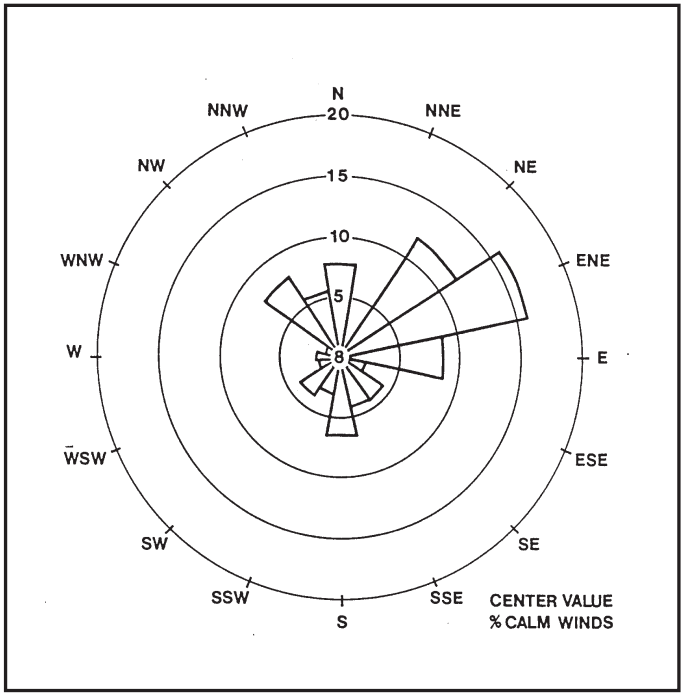
AUGUST WIND ROSE HONOLULU INTENATIONAL AIRPORT



SOURCE: National Weather Service

FIGURE 5

JANUARY WIND ROSE
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service

5. SHORT-TERM IMPACTS

5.1 Onsite Impacts. The principal source of short-term air quality impact will be construction-related activity. Construction vehicle activity can at times increase automotive pollutant concentrations along adjoining existing streets as well as on the project site itself. Construction vehicle traffic on the existing roadway may at times cause a temporary reduction in average travel speeds with a concomitant increase in vehicle emissions due to the "stop and go" traffic conditions. The site preparation and earth moving will create particulate matter (PM) emissions as will construction of new buildings and roadways themselves. Construction vehicle movement on unpaved on-site areas will also generate PM emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/ evaporation (P/E) index of 50 [8, 10].

5.2 Offsite Impacts. In addition to the onsite impacts attributable to construction activity, there will also be offsite impacts due to the operation of concrete and asphalt batching plants needed for construction of buildings and parking areas. Such plants routinely emit particulate matter and other gaseous pollutants; however, it is too early to identify the specific facilities that will be providing these materials and thus the discussion of air quality impacts is necessarily generic. The batch plants which will be producing this concrete and asphalt must be permitted by the Department of Health Clean Air Branch pursuant to state regulations [12]. In order to obtain these permits they must demonstrate their ability to continuously comply with both emission [12] and ambient air quality [4] standards. Under the federal Title V operating permit requirements [12], now incorporated in Hawaii's

rules [12], air pollution sources must regularly attest to their compliance with all applicable requirements. A typical concrete batch plant in Hawaii is equipped with fabric filters, i.e., "baghouses" for particulate matter (PM) control. Similarly, a typical asphalt plant is equipped with either a wet venturi scrubber or fabric filters. The efficiency of such controls is normally 95 - 99%.

6. LONG-TERM IMPACTS

6.1 Mobile Source Impacts

6.1.1 Mobile Source Activity. The traffic analysis report [14] prepared for the proposed project served as the basis for this mobile source impact analysis. Existing and projected future peak-hour traffic volumes for the principal road serving the project site were obtained from that report.

6.1.2 Emission Factors. Automotive emission factors for carbon monoxide (CO) were generated for calendar years 2011 and 2025 using EPA's Mobile Source Emissions Model (MOBILE-6.2)[15]. To localize the emission factors as much as possible, an age distribution for registered vehicles in the City & County of Honolulu [16] was used in lieu of national statistics. That same age distribution was the basis for the distribution of vehicle miles traveled as well.

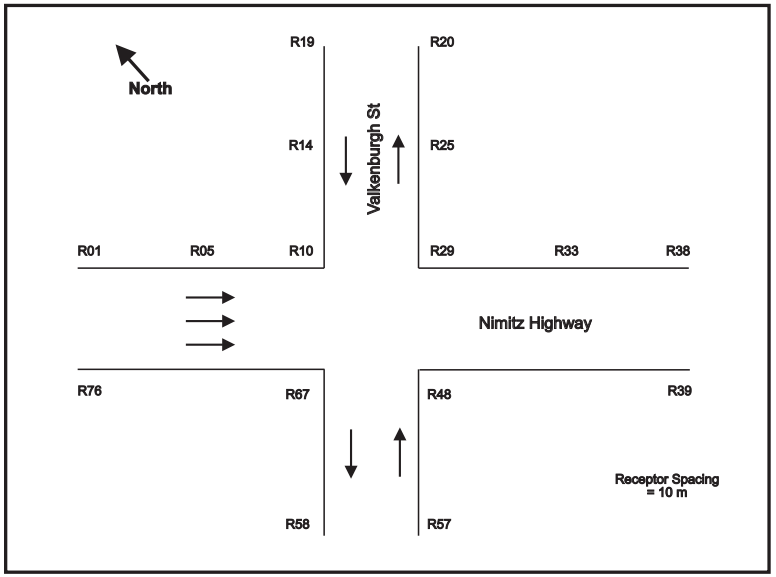
6.1.3 Modeling Methodology. Mobile source air quality modeling has historically focused on estimating concentrations of non-reactive pollutants, primarily carbon monoxide (CO). This has been the case because CO is relatively stable in the atmosphere having a half-life on the order of about one (1) month,[17] and it comprises the largest fraction of automotive emissions. [15]

Using the traffic data provided, modeling was performed for the years 2011 and 2025 with and without the project. The EPA guideline model CAL3QHC [18, 19] as revised to allow for use of hourly meteorological data files [20] was employed to estimate near-intersection carbon monoxide concentrations. CO concentrations were estimated at an array of 76 receptor sites, spaced at a distance of 10 meters along each leg of the Valkenburgh Street - Nimitz Highway intersection. A background concentration of 0.4 ppm from the Department of Health's 2010 monitoring data was also used as the background concentration in the modeling. Hourly meteorological data for a.m. and p.m. peak traffic hours used in the model were extracted from National Weather service data collected at the Honolulu International Airport [21] and preprocessed with EPA's PCRAMMET program. [22]

6.1.4 Results: 1-Hour CO Concentrations. The results of this modeling are summarized in Figure 7. Maximum estimated 1-hour CO concentrations in milligrams per cubic meter (mg/m^3) for each of the evaluated scenarios are presented along with the particular receptor location at which they were predicted. The results suggest that, under *worst case* conditions of meteorology and traffic, both the federal and state 1-hour CO standards would be met at receptor locations 10 meters and beyond the edge of roadways expected to be affected by project-related traffic. The changes in CO levels are insignificant due to the relatively small increase in projected traffic and also the offsetting effect of the federal motor vehicle emissions control program. Vehicle emissions standards for motor vehicles get progressively more stringent over time; thus, older, higher emitting vehicles lost by attrition, are replaced by newer, lower-emitting vehicles which comply with the more stringent standards. Model results for all receptor locations are listed in Appendix A.

FIGURE 7

ESTIMATES OF MAXIMUM 1- AND 8-HOUR CARBON MONOXIDE CONCENTRATIONS
Valkenburgh Street at Nimitz Highway
Peak Traffic Hours
2011 - 2025



Estimated Maximum CO Concentrations (ppm)

Period	Existing	2025 w/o Project	2025 w/Project	Receptors
A.M.	2.8	2.3	2.3	67, 48
P.M.	1.2	1.1	1.1	67,68
8-Hr	1.9	1.6	2.2	n/a

6.1.5 Results: 8-Hour CO Concentrations. The 8-hour values presented in Figure 7 are very conservative estimates because they are based on averages of the worst case 1-hour values during a.m. and p.m. peak hour traffic and meteorology. Nevertheless, the results are similar to the 1-hour findings in that compliance with state and federal standards is indicated. Model results for all receptor locations are listed in Appendix A, but it should be noted that receptor locations are not relevant because the 8-hour concentrations were based on peak hour values rather than all hours of the day.

6.2 Training Impacts.

6.2.1 Training Fires. Training fires are conducted once per month with a trailer using approximately 40 gallons of propane and twice per year with a car prop using approximately 124 gallons of propane.[23] These training fires are exempt from air pollution control permitting.[12] Estimates of annual emissions from this activity are presented in Table 5.

6.2.2 Training Tower. Training is also conducted periodically in the onsite tower with the same type of fog/smoke generator used in the theatrical industry. The material used is a dilute water-based mixture of glycols or glycerin. These are low toxicity alcohols with a time weighted average (TWA) inhalation standard not to exceed 10,000 micrograms per cubic meter ($\mu g/m^3$) for the exposed workers (or audience). This standard applies to the alcohols alone and not the total aqueous mixture. See Appendix B for the fog/smoke generator specification, material safety data sheet (MSDS) and American National Standards Institute (ANSI) standard for the alcohol mixtures. Use of this material presents no significant impact to ambient air quality.

TABLE 5

ESTIMATED ANNUAL EMISSIONS FROM TRAINING FIRES

Pollutant	Emission Factor ($lb/10^3gal$)	Propane Usage (gal/yr)	Emissions (T/yr)
Oxides of nitrogen (NOx)	13	728	0.0047
Carbon monoxide (CO)	7.5	728.	0.0027
Sulfur dioxide (SO_2)	1.5	728	0.0005
Total particulate matter (PM)	0.7	728	0.0003
Total organic compounds (TOC)	1.0	728	0.0004

Reference: Reference 11, Table 1-5.1

7. CONCLUSIONS AND MITIGATION

7.1 Short-Term Impacts. Since, as noted in Section 4, the project area is considered to be "semi-arid" by Thornwaite's climatic classification system with a P/E index lower than that associated with the EPA fugitive dust emission factor, there appears to be an increased potential for fugitive dust. It will therefore be important to employ adequate dust control measures during the construction period, particularly during the drier summer months. Dust control could be accomplished through frequent watering of unpaved roadways and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50% [11]. The soonest possible paving of roadways and parking areas and landscaping of bare areas will also help.

Short-term air quality impacts due to offsite activities supporting the proposed development, i.e., concrete and asphalt production, appear to be *de minimus* due in large part to the high removal of control devices typically found on such production facilities. Furthermore, any emissions will be strictly regulated by the Department of Health permit which each batch plant must have in order to operate.

7.2 Long-Term Impacts

7.2.1 Mobile Source Impacts. As reported in Section 6, compliance with federal and state carbon monoxide standards is demonstrated under *worst case* conditions of meteorology and peak hour traffic; thus, no special mitigative measures are required.

7.2.2 Training Impacts. As noted in Section 6, training fires are categorically exempted from air pollution control permitting. Emissions resulting from propane combustion during such fires are also well below the one (1) ton per year exemption level specified in State rules[12] and thus present an insignificant impact on air quality. No mitigation required.

The materials used to generate smoke during periodic training tower exercises also present no significant impact on air quality due to their low toxicity nature and limited usage. No mitigation required.

REFERENCES

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APPENDIX A

MODELING RESULTS
(All Receptors)

TABLE A-1

MODELING RESULTS
ESTIMATES OF MAXIMUM 1-HOUR CO CONCENTRATIONS

	Concentration (ppm)					
	2011		2025 w/o project		2025 w/project	
Receptor	AM	PM	AM	PM	AM	PM
1	0.90	0.60	0.80	0.50	0.90	0.50
2	1.00	0.60	0.80	0.50	0.90	0.50
3	1.00	0.60	0.90	0.60	0.90	0.60
4	1.10	0.70	1.00	0.60	1.00	0.60
5	1.20	0.70	1.00	0.60	1.00	0.60
6	1.20	0.70	1.10	0.60	1.10	0.60
7	1.40	0.70	1.10	0.70	1.30	0.70
8	1.50	0.80	1.20	0.80	1.30	0.80
9	1.60	0.80	1.30	0.80	1.30	0.80
10	1.70	1.00	1.40	0.90	1.40	0.90
11	1.40	0.80	1.20	0.80	1.20	0.80
12	1.30	0.70	1.10	0.70	1.20	0.70
13	1.20	0.70	1.00	0.60	1.00	0.60
14	1.20	0.70	0.90	0.60	0.90	0.60
15	1.10	0.70	1.00	0.60	1.10	0.60
16	1.00	0.60	0.90	0.50	0.90	0.60
17	1.00	0.60	0.90	0.50	0.90	0.60
18	1.00	0.60	0.70	0.60	0.80	0.60
19	0.90	0.60	0.70	0.60	0.70	0.60
20	0.70	0.60	0.70	0.50	0.70	0.50
21	0.70	0.70	0.70	0.50	0.70	0.50
22	0.80	0.60	0.70	0.50	0.70	0.50
23	0.90	0.60	0.80	0.60	0.80	0.60
24	0.90	0.60	0.80	0.60	0.90	0.60
25	0.90	0.70	0.90	0.60	0.90	0.60
26	1.10	0.80	1.00	0.80	1.00	0.80
27	1.50	0.80	1.30	0.80	1.30	0.80
28	1.80	0.90	1.60	0.80	1.60	0.80
29	1.90	0.90	1.60	0.70	1.60	0.80
30	1.70	0.70	1.50	0.70	1.50	0.70
31	1.70	0.70	1.50	0.70	1.50	0.70
32	1.50	0.70	1.30	0.60	1.30	0.60
33	1.50	0.60	1.30	0.60	1.30	0.60
34	1.40	0.60	1.10	0.60	1.10	0.60
35	1.30	0.60	1.10	0.60	1.10	0.60
36	1.30	0.60	1.10	0.60	1.10	0.60
37	1.30	0.60	1.20	0.60	1.10	0.60
38	1.30	0.50	1.10	0.50	1.10	0.50

TABLE A-1 (Con't)

MODELING RESULTS
ESTIMATES OF MAXIMUM 1-HOUR CO CONCENTRATIONS

	Concentration (ppm)					
	2011		2025 w/o project		2025 w/project	
Receptor	AM	PM	AM	PM	AM	PM
39	1.80	0.70	1.50	0.70	1.50	0.70
40	1.70	0.70	1.50	0.60	1.50	0.70
41	1.90	0.70	1.40	0.60	1.40	0.60
42	1.80	0.70	1.50	0.60	1.50	0.60
43	1.70	0.60	1.50	0.60	1.50	0.60
44	1.90	0.70	1.60	0.60	1.60	0.60
45	2.00	0.80	1.70	0.70	1.70	0.80
46	2.10	0.90	2.00	0.70	1.90	0.80
47	2.40	0.80	2.00	0.80	2.00	0.80
48	2.70	0.90	**2.30**	0.80	**2.30**	1.00
49	1.70	0.70	1.40	0.60	1.60	0.70
50	1.40	0.60	1.20	0.50	1.20	0.50
51	1.30	0.50	1.10	0.50	1.10	0.50
52	1.30	0.50	1.10	0.50	1.10	0.50
53	1.10	0.50	1.10	0.50	1.10	0.50
54	1.30	0.50	1.10	0.40	1.20	0.50
55	1.30	0.50	1.20	0.40	1.20	0.50
56	1.30	0.40	1.10	0.40	1.10	0.40
57	1.20	0.40	1.10	0.40	1.10	0.40
58	1.00	0.40	0.80	0.40	0.90	0.40
59	1.00	0.40	0.90	0.40	1.00	0.40
60	1.10	0.50	1.00	0.40	1.10	0.40
61	1.06	0.50	1.00	0.50	1.10	0.50
62	1.20	0.50	1.00	0.50	1.10	0.50
63	1.30	0.50	1.20	0.50	1.20	0.50
64	1.50	0.60	1.20	0.60	1.20	0.60
65	1.40	0.70	1.30	0.60	1.30	0.60
66	2.00	0.70	1.50	0.70	1.50	0.70
67	**2.80**	**1.20**	2.20	1.00	2.20	**1.10**
68	2.40	1.20	2.10	**1.10**	2.10	1.10
69	1.70	1.10	1.50	0.90	1.60	1.00
70	1.30	1.00	1.10	0.70	1.20	0.70
71	1.20	0.70	1.10	0.60	1.10	0.60
72	1.10	0.70	1.00	0.60	1.00	0.60
73	1.00	0.70	1.00	0.60	1.00	0.60
74	1.00	0.70	0.90	0.60	0.90	0.60
75	1.00	0.70	0.90	0.60	0.90	0.60
76	0.80	0.60	0.70	0.60	0.70	0.60

TABLE A-2

MODELING RESULTS
ESTIMATES OF MAXIMUM 8-HOUR CO CONCENTRATIONS

	Concentration (mg/m^3)		
Receptor	2011	2025 w/o project	2025 w/project
1	0.48	0.47	0.47
2	0.54	0.50	0.50
3	0.55	0.51	0.51
4	0.57	0.56	0.56
5	0.62	0.57	0.57
6	0.66	0.60	0.60
7	0.68	0.60	0.62
8	0.73	0.64	0.66
9	0.80	0.72	0.72
10	0.86	0.74	0.75
11	0.73	0.64	0.64
12	0.64	0.60	0.60
13	0.58	0.54	0.55
14	0.58	0.50	0.51
15	0.55	0.51	0.53
16	0.51	0.49	0.49
17	0.51	0.49	0.49
18	0.51	0.46	0.48
19	0.49	0.46	0.46
20	0.50	0.46	0.48
21	0.57	0.53	0.56
22	0.67	0.61	0.61
23	0.67	0.63	0.63
24	0.67	0.63	0.63
25	0.69	0.64	0.64
26	0.71	0.66	0.66
27	0.77	0.73	0.74
28	0.91	0.81	0.85
29	1.23	1.03	1.08
30	1.10	0.95	0.98
31	1.01	0.90	0.90
32	0.93	0.82	0.84
33	0.90	0.77	0.80
34	0.87	0.74	0.76
35	0.81	0.72	0.74
36	0.83	0.68	0.70
37	0.75	0.69	0.69
38	0.74	0.69	0.69
39	1.06	0.93	0.93

TABLE A-2 (Con't)

MODELING RESULTS
ESTIMATES OF MAXIMUM 8-HOUR CO CONCENTRATIONS

Receptor	Concentration (mg/m^3)		
	2011	2025 w/o project	2025 w/project
40	1.09	0.94	0.94
41	1.20	1.03	1.03
42	1.21	1.04	1.04
43	1.24	1.07	1.11
44	1.30	1.09	1.16
45	1.37	1.14	1.19
46	1.44	1.31	1.29
47	1.67	1.33	1.36
48	**1.93**	**1.61**	1.67
49	1.20	1.06	1.10
50	0.89	0.80	0.83
51	0.80	0.71	0.71
52	0.70	0.67	0.67
53	0.66	0.64	0.64
54	0.64	0.60	0.60
55	0.63	0.60	0.60
56	0.62	0.57	0.59
57	0.57	0.50	0.50
58	0.56	0.52	0.54
59	0.59	0.54	0.55
60	0.60	0.56	0.57
61	0.61	0.56	1.10
62	0.61	0.56	1.10
63	0.61	0.58	1.20
64	0.67	0.59	1.20
65	0.77	0.66	1.30
66	0.91	0.80	1.50
67	1.27	1.07	**2.20**
68	1.19	1.06	2.10
69	1.01	0.89	1.60
70	0.89	0.83	1.20
71	0.80	0.73	1.10
72	0.70	0.61	1.00
73	0.65	0.60	1.00
74	0.65	0.57	0.90
75	0.60	0.56	0.90
76	0.54	0.50	0.70

APPENDIX B

SMOKE/FOG GENERATOR SPECIFICATIONS

FQ-100 Performance Fog Generator

Technical Data Sheet
Revised 01/22/10

MECHANICAL SPECIFICATIONS

FIXTURE Dimensions:
mm: 646 x 301 x 168
in: 25.4 x 11.9 x 6.6

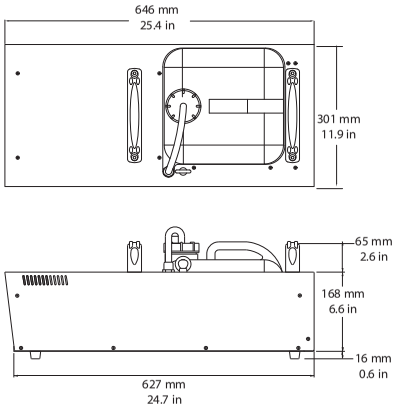
BOXED FOR SHIPPING Dimensions:
mm: 740 x 410 x 602
in: 29.0 x 16.1 x 23.7

Fixture Weight: 15.5 kg (34 lb)

Shipping Weight: 19 kg (42 lb)

Construction and Mounting Information: This product is constructed with a low-maintenance, corrosion-resistant vaporizing chamber and dual carrying handles. A safety cable mounting point can be used in securing the unit when strapped to a truss.

Colors Available: Black



ELECTRICAL SPECIFICATIONS

Power Consumption: 100 - 120 VAC 50/60 Hz or 200-240 VAC 50/60 HZ

Rated Power: 1500 W maximum

OUTPUT

Fluid capacity: 9.5 liter (2.5 gal) fluid reservoir

Minimum Output: 566 m^3 (20,000 ft^3)

Warm-up Time: 11 min

Liquid Sensor: Optoelectronic with auto shutoff

Fluid Type: Water-based Atmospheres ® fine particulate fog generating fluid. HQ, Stage

OPERATION

Menu Interface: Timer to set interval and duration
DMX Channel setting
Continuous fogging setting
Volume control
Manual ON/OFF
LCD Display

Compliance: ROHS, TUV 499 (UL standard)

Environmental Specifications: Minimum ambient temperature -5° C (23°F)
Maximum ambient temperature 50°C (122°F)

DMX CONTROL

DMX Control: DMX-512

DMX Channel Requirement: One

Address Methods: Menu Display

DMX/RDM Data Connectors: 3-pin and 5-pin male and female XLR connectors

PART NUMBERS

15010014: FOGGER, FQ-100 110V
15010015: FOGGER, FQ-100 230V

05040001: Atmospheres Liquid, 2.11 Gal HQ
05040002: Atmospheres, 5 Gal HQ
05040004: Atmospheres, 2.11 Gal Stage

05040005: Atmospheres, 5 Gal Stage
05040018: Atmospheres, 55 Gal Stage
05040019: Atmospheres, 55 Gal HQ

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Barco Lighting Systms, Inc.
2105 Gracy Farms Lan
Austin, TX 78758 USA
voice:512.836.2242
fax:512.837.5290
Toll Free: 800.890.8989

Customer Service
2105 Gracy Farms Lane
Austin, TX 78758 USA
voice:800.890.8989
fax: 512.834.9195
Toll free: 800.890.8989

www.highend.com

High End Systems
2105 Gracy Farms Lane
Austin, Texas U.S.A.78758
Phone: 512.836.2242
Fax: 512.837.5290
www.highend.com

HIGH END SYSTEMS

Material Safety Data Sheet

Effective Date: 07/18/07

High End Systems urges each customer or recipient of this MSDS to study it carefully to become aware of and understand the hazards associated with the product. The reader should consider consulting reference works or individuals who are experts in ventilation, toxicology, and fire prevention, as necessary or appropriate to use and understand the data contained in this MSDS.

To promote safe handling, each customer or recipient should: (1) notify its employees, agents, contractors and others whom it knows or believes will use this material of the information in this MSDS and any other information regarding hazards or safety; (2) furnish this same information to each of its customers for the products; and (3) request its customers to notify their employees, customers, and other users of the product of this information.

I. IDENTIFICATION

PRODUCT NAME: "Atmospheres" HQ Light Enhancement Fluid ("Stage" and "Coldflow" formulas contain different percentages of the CAS#'s and a higher percentage of water)

FORMULA: Food grade or high purity grade propylene glycol, triethylene glycol and de-ionized water

II. PHYSICAL DATA

CAS# 57-55-6 and 112-27-6

BOILING POINT (760 mm Hg): 212-470×F

MELTING POINT: Not applicable

SPECIFIC GRAVITY (H20=1) : 1.082 AT 20×C

VAPOR PRESSURE AT 20×C: <.025mm Hg

VAPOR DENSITY (air=1): 3.9

SOLUBILITY IN WATER: Complete @ 70×F

EVAPORATION RATE(Butyl Acetate=1): .003

APPEARANCE AND ODOR: Water-white liquid, mild odor

III. INGREDIENTS

This product is a mixture of very low toxicity ingredients which are of high purity or food grade. According to OSHA this product is non-hazardous under (1910.1200). The largest single component of this product is de-ionized water.

			ACGIH TLV		OSHA PEL	
Ingredients	CAS #	% (weight)	TWA	STEL	PEL	STEL
Triethylene glycol	112-27-6	N/Av	N/Av	N/Av	N/Av	N/Av
Propylene glycol	57-55-6	N/Av	10 mg/m3	N/Av	50 ppm(total); 10 mg/m3 (aerosol)	N/Av
Deionized water	N/Av	N/Av	N/Av	N/Av	N/Av	N/Av

Note: The ACGIH TLV listed above for the following ingredient(s) is an AIHA WEEL: Propylene glycol.

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: No flash point by Cleveland Open Cup and Penskey-Martin Closed Cup due to the fact that this is primarily a water based formula

AUTOIGNITION TEMP: Not Determined

FLAMMABLE LIMITS IN AIR % BY VOLUME: Not Determined

EXTINGUISHING MEDIA: Water spray or all purpose foams by manufacturers' recommended techniques for large fires. Use CO2 or dry chemical media for small fires.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

V. HEALTH HAZARD DATA

EFFECTS OF SINGLE OVEREXPOSURE:

SWALLOWING: No evidence of adverse effect for low dose. May cause nausea and vomiting in higher dosage.

INHALATION: No evidence of adverse effects from exposure to recommended levels. Should continuous exposure to high concentrations of fog be required professionally (i.e. fire training), a canister type particle mask designed for 10 to 20 micron filtration should be used.

SKIN CONTACT: May cause minimal irritation of areas exposed to liquid.

EYE CONTACT: If splashed in eyes, may cause minimal irritation seen as slight excess redness of the conjunctiva.

EFFECTS OF REPEATED OVEREXPOSURE: No evidence of adverse effects from available information.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: A knowledge of the available toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

EYES: Flush with water.

NOTES TO PHYSICIAN: Treatment of overexposure should be directed at the control of symptoms and the clinical condition.

VI. REACTIVITY DATA

This material is known to be stable and does not react violently with any of the following: Air, Water, Heat, Strong Oxidizers.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS: Burning under certain conditions can produce aldehydes, ketones, carbon dioxide and / or carbon monoxide.

HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur.

CONDITIONS TO AVOID: None

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Small spills should be flushed with large quantities of water. Larger spills should be collected for disposal.

WASTE DISPOSAL METHOD: Dispense as permitted under appropriate Federal and State regulations.

VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type): None required under normal conditions of use.* For repeated professional usage, see V (inhalation)

VENTILATION: General (mechanical) room ventilation

PROTECTIVE GLOVES: Rubber or polyvinyl chloride coated.

EYE PROTECTION: Protect eyes from liquid with safety glasses

IX. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Normal precautions common to good manufacturing practice should be followed in handling and storage. Avoid repeated contact with skin and clothing. This product is intended for professional use only and should be kept out of the reach of children.

X. REGULATORY INFORMATION

The criteria for listing components in the composition section is as follows:

Carcinogens are listed when present at 0.1% or greater; components which are otherwise hazardous according to OSHA are listed when present at 1.0% or greater; non-hazardous components are listed at 3.0% or greater.

Product and/or Component(s) Carcinogenic According to:

OSHA	IARC	NTP	OTHER	NONE
____	____	____	____	__X__

PRODUCT IS NON-HAZARDOUS ACCORDING TO OSHA (1910.1200)

Federal Regulations:

SARA Title III:

Section 302/304 Extremely Hazardous Substances

Seq.	Chemical Name	CAS Number	Range in %
None			

Section 311 Hazardous Categorization:

Acute	Chronic	Fire	Pressure	Reactive	N/A
____	_____	____	_____	_____	_X_

Section 313 Toxic Chemical

Chemical Name	CAS Number	Concentration in %
None		

CERCLA 102 (a) / DOT Hazardous Substances: (+ indicates DOT Hazardous Substance)

Seq.	Chemical Name	CAS Number	Range in %
None			

CERCLA / DOT Hazardous Substances (Sequence Numbers and RQ's):

Seq.	Chemical Name	CAS Number	Range in %
None			

TSCA Inventory Status: This product is listed on the Toxic Substance Control Act (TSCA) Chemical Substance inventory.

State Regulations:

California Proposition 65: The following detectable components of this product are substances, or belong to classes or substances, known to the State of California to cause cancer and/or reproductive toxicity.

Chemical Name	CAS Number
None	

States Right-to-know Regulations:

Chemical State Right-to-know

CAS # 57-55-6, 112-27-6 PA, RI

State list:

CT (Connecticut), FL (Florida), IL (Illinois), MI (Michigan), LA (Louisiana), MA (Massachusetts), NJ (New Jersey), PA (Pennsylvania), RI (Rhode Island

Note: The ACGIH TLV listed above for the following ingredient(s) is an AIHA WEEL: Propylene glycol.

International Regulations

WHMIS Classification: Not Regulated

Canada Inventory Status: All components are listed on the Canadian Domestic Substance List (DSL).

EINECS Inventory Status: All components are listed on the European Inventory of Existing Chemical Substances (EINECS).

Australia Inventory Status: All components are listed on the Australian Inventory of Chemical Substances (ACIS).

Japan Inventory Status: All components are listed on the Japanese MITI inventory.

Note: The opinions expressed herein are those of qualified experts within the field of Toxicology, Chemistry, and Information Specialists. These include results of independent scientific studies and Toxicology reports. We believe that the information contained herein is current as of the date of the Material Safety Sheet. Since the use of this information and of these opinions and the conditions of the use of the product are not within the control of High End Systems, it is the user's obligation to determine the conditions of safe use of the product.

Entertainment Services and Technology Association

ESTA

American National Standard E1.5 - 2009 Entertainment Technology — Theatrical Fog Made With Aqueous Solutions Of Di- And Trihydric Alcohols

F&S/1997-3017r9

This standard was approved as an American National Standard on 14 September 2009 by the American National Standards Institute's Board of Standards Review.

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1 Scope

This standard describes the composition of theatrical fogs or artificial mists that are not likely to be harmful to otherwise healthy performers, technicians, or audience members of normal working age, which is 18 to 64 years of age, inclusive. This standard makes no statement about appropriate exposure limits for theatrical fogs or artificial mists with other populations, and no limits, higher, lower, or the same as these limits, for other populations should be inferred from it. This standard is limited to those fogs and mists made from a solution of water and one or more dihydric or trihydric alcohols. These fogs are commonly called "glycol fogs," although only those that use dihydric alcohols are technically made with glycol.

This standard is intended to be applied in theatres, arenas, and other places of entertainment or public assembly where theatrical fogs and mists are often used as visual effects or to enhance lighting effects in live performances such as dramatic productions, musicals, and popular music concerts. It may be used as a guidance document in other venues where the exposed population is similar to that defined in this scope and where the respiratory and vocal demands on the population are not greater than those placed on performers, technicians, or audience members participating in dramatic productions, musicals, or popular music concerts.

2 Definitions

2.1 aerosol: a suspension of small particles in a gas or air.

2.2 CAS number (CAS #): a Chemical Abstracts Service number that identifies a specific chemical or mixture of chemicals.

2.3 dihydric alcohol: an alcohol that has two hydroxyl groups.

2.4 fog: a liquid aerosol in air that reduces visibility and reflects light.

2.5 glycerin: a trihydric alcohol composed of a chain of three carbon atoms linked by single covalent bonds, with each carbon atom linked to one hydroxyl group and one or more hydrogen atoms. Also called "glycerol."

2.6 glycol: a dihydric alcohol, an organic compound with a molecular structure having two hydroxyl groups.

2.7 hydroxyl group: a molecular group containing one hydrogen and one oxygen atom.

2.8 mist: a liquid aerosol, not as optically dense as fog, but with larger droplets.

2.9 STEL: Short Term Exposure Limit. The maximum exposure level averaged over a short term, generally 15 minutes.

2.10 trihydric alcohol: an alcohol that has three hydroxyl groups.

2.11 TWA: Time Weighted Average. Exposure level averaged over an 8-hour period.

3 Requirements

3.1 Components

The following dihydric and trihydric alcohols are components that may be used with water in a fog or mist that meets the requirements of this standard:

Name	CAS #
triethylene glycol	112-27-6
monopropylene glycol (propylene glycol; 1,2-propanediol)	57-55-6
diethylene glycol	111-46-6
dipropylene glycol	25265-71-8, 106-62-7, 110-98-5, 108-61-2
1,2-butylene glycol (1,2-butanediol)	584-03-2
1,3-butylene glycol (1,3-butanediol)	107-88-0
glycerin (glycerol; 1,2,3- propanetriol)	56-81-5

Fogs produced with chemicals not on the above list, including coloring agents, scents, and bactericide additives, are not necessarily considered a health risk, but do not meet the requirements of this standard.

3.2 Concentrations

3.2.1 Long-term exposure

A theatrical fog produced with a mixture of deionized water and one or more dihydric or trihydric alcohols shall be considered to meet the requirements of this standard if the concentration of alcohols breathed by a worker or audience member is no greater than 10 milligrams per cubic meter, time weighted average (TWA), and if the alcohols used are from the list in Section 3.1. This maximum TWA concentration level applies to the total alcohol concentration, whether one or several alcohols are used.

3.2.2 Peak exposure

A theatrical fog produced with a mixture of deionized water and one or more dihydric or trihydric alcohols shall be considered to meet the requirements of this standard if the concentration of alcohols in the air breathed by a worker or audience member is never higher than 40 milligrams per cubic meter, and if the alcohols used are from the list in Section 3.1. This maximum concentration level applies to the total alcohol concentration, whether one or several alcohols are used.

A theatrical fog produced with a mixture of deionized water and trihydric alcohol (glycerin) alone shall be considered to meet the requirements of this standard if the concentration of alcohol in the air breathed by a worker or audience member is never higher than 50 milligrams per cubic meter.

3.3 Decomposition products

The maximum TWA and STEL of formaldehyde, acrolein, acetaldehyde and other possible hazardous products of thermal degradation of the above compounds shall be present only at levels below the lowest permissible level set by governing occupational health and safety authority, such as the Occupational Safety and Health Administration in the United States of America or the Health and Safety Executive in the United Kingdom.

3.4 Contaminants

Contaminants, such as acetone and ethylene glycol, which may be present in bulk alcohol stock and thus may be in fog fluid, shall be present in fog only at levels below the lowest permissible level set by governing occupational health and safety authority, such as the Occupational Safety and Health Administration in the United States of America or the Health and Safety Executive in the United Kingdom.

Appendix B
Acoustic Study

LETTER OF TRANSMITTAL

Y. EBISU & ASSOCIATES
Acoustical and Electronic Engineers
1126 12th Avenue, Room 305
Honolulu, Hawaii 96816
Ph. (808) 735-1634

TO: GROUP 70 INTERNATIONAL
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813

DATE: August 26, 2011 | JOB NO: YEA #48-015
ATTENTION: Barbara Natale
RE: HFD Regional Fire Training Facility

WE ARE SENDING YOU:

X Attached __ Under separate cover via _____ the following items:
__ Shop drawings __ Prints __ Plans __ Samples __ Specifications
__ Copy of letter __ Change order

ITEM #	DATE	QNTY.	DESCRIPTION
#1	August 2011	35 shts	August 2011 Noise Study Report

THESE ARE TRANSMITTED AS CHECKED BELOW:

__ For approval __ Approved as submitted __ Resubmit __ copies for approval
x For your use __ Approved as noted __ Submit __ copies for distribution
x As requested __ Returned for corrections __ Return __ corrected prints
__ For review and comment

REMARKS:

COPY TO:

SIGNED:
Yoichi Ebisu, P.E.

ACOUSTIC STUDY FOR THE HONOLULU FIRE DEPARTMENT (HFD) REGIONAL FIRE TRAINING CENTER HONOLULU, HAWAII

Prepared for:

GROUP 70 INTERNATIONAL

Prepared by:

Y. EBISU & ASSOCIATES
1126 12th Avenue, Room 305
Honolulu, Hawaii 96816

AUGUST 2011

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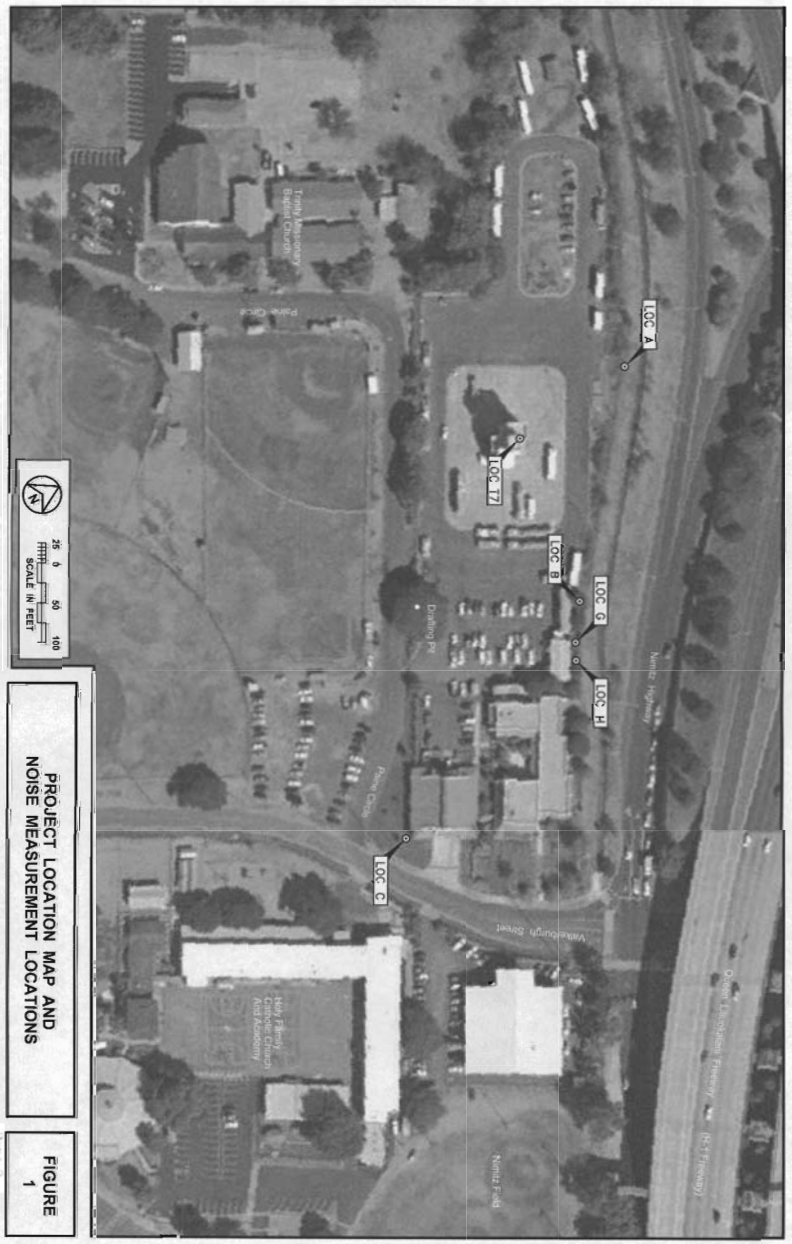
CHAPTER I. SUMMARY

The existing and future traffic noise levels in the vicinity of the proposed Honolulu Fire Department (HFD) Regional Fire Training Center Project in Honolulu (see Figure 1) were evaluated for their potential noise impacts and their relationship to current FHA/HUD (Federal Housing Administration/Housing and Urban Development) noise standards. The traffic noise level increases along the major access roadways to and from the project site were calculated. No significant increases in traffic noise are predicted to occur along the high volume streets servicing the project site as a result of project traffic following project build-out by CY 2025. Traffic noise from H-1 Freeway and Nimitz Highway will continue to control background ambient noise levels in the project environs, with traffic noise levels exceeding 65 DNL (Day-Night Average Sound Level) at the Rights-of-Way along these roadways.

Project traffic will not change the existing background noise levels along the roadways which are expected to service project traffic, such as Nimitz Highway, Valkenburgh Street, or Paine Circle. The increases in future traffic noise levels resulting from project generated traffic are expected to be greatest along the east end of Paine Circle and along the short section of Valkenburgh Street between Nimitz Highway and Paine Circle. These increases are relatively small when compared to the levels of project traffic noise required to alter the existing high levels of traffic noise associated with H-1 Freeway and Nimitz Highway. Risks of adverse noise impacts from project traffic are considered to be low.

The noise levels from training activities at the project site are not expected to be significantly different from existing noise levels, and are not expected to generate noise complaints. Noise levels from drafting operations are predicted to be similar to existing traffic noise levels at neighboring noise sensitive properties, and are not expected to be overly intrusive. However, sound attenuation measures will need to be incorporated into the new buildings of the facility which are expected to be located near the site of the drafting operations.

Unavoidable, but temporary, noise impacts may occur during the construction activities within the project area, and particularly during any excavation activities on the project site. Because construction activities are predicted to be audible within the project site and at adjoining properties, the quality of the acoustic environment may be degraded to unacceptable levels during periods of construction. Mitigation measures to reduce construction noise to inaudible levels will not be practical in all cases, but the use of quiet equipment is recommended as a standard mitigation measure. The implementation of Hawaii State Department of Health permit procedures and curfew periods for construction activities is also expected for this project.



PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

FIGURE 1

CHAPTER II. PURPOSE

The primary objective of this study was to describe the existing and future noise environment in the environs of the proposed Honolulu Fire Department (HFD) Regional Fire Training Center Project in Honolulu on the island of Oahu. Traffic noise level increases and impacts associated with the proposed project were to be determined along the public roadways which are expected to service the project's traffic. A specific objective was to determine future traffic noise level increases associated with both project and non-project traffic, and the potential noise impacts associated with these increases.

Potential noise impacts from the training activities at the HFD Regional Fire Training Center were also evaluated. Potential noise impacts associated with future traffic noise levels at the new classroom and administrative buildings were also evaluated. Assessments of possible future impacts from short term construction noise at the project site were also included as noise study objectives. Recommendations for minimizing identified noise impacts were also to be provided as required.

CHAPTER III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

The noise descriptor currently used by federal agencies (such as FHA/HUD) to assess environmental noise is the Day-Night Average Sound Level (Ldn or DNL). This descriptor incorporates a 24-hour average of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. By definition, the minimum averaging period for the DNL descriptor is 24 hours. Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the DNL descriptor. A more complete list of noise descriptors is provided in Appendix B to this report.

Table 1, derived from Reference 1, presents current federal noise standards and acceptability criteria for residential land uses. Land use compatibility guidelines for various levels of environmental noise as measured by the DNL descriptor system are shown in Figure 2. As a general rule, noise levels of 55 DNL or less occur in rural areas, or in areas which are removed from high volume roadways. In urbanized areas which are shielded from high volume streets, DNL levels generally range from 55 to 65 DNL, and are usually controlled by motor vehicle traffic noise. Residences which front major roadways are generally exposed to levels of 65 DNL, and as high as 75 DNL when the roadway is a high speed freeway.

For purposes of determining noise acceptability for funding assistance from federal agencies [FHA/HUD and VA (Veterans Administration)], an exterior noise level of 65 DNL or less is considered acceptable for residences. This standard is applied nationally (Reference 2), including Hawaii. Because of our open-living conditions, the predominant use of naturally ventilated dwellings, and the relatively low exterior-to-interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 DNL does not eliminate all risks of noise impacts. Because of these factors, and as recommended in Reference 3, a lower level of 55 DNL is considered as the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise. However, after considering the cost and feasibility of applying the lower level of 55 DNL, government agencies such as FHA/HUD and VA have selected 65 DNL as a more appropriate regulatory standard.

For commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 75 DNL are generally considered acceptable. Exceptions to this occur when naturally ventilated office, classroom, and other commercial establishments are exposed to exterior levels which exceed 65 DNL. Typically, closure and air conditioning of such spaces are employed as noise mitigation measures for high levels of traffic noise.

On the island of Oahu, the State Department of Health (DOH) regulates noise from fixed equipment and construction activities. State DOH noise regulations are

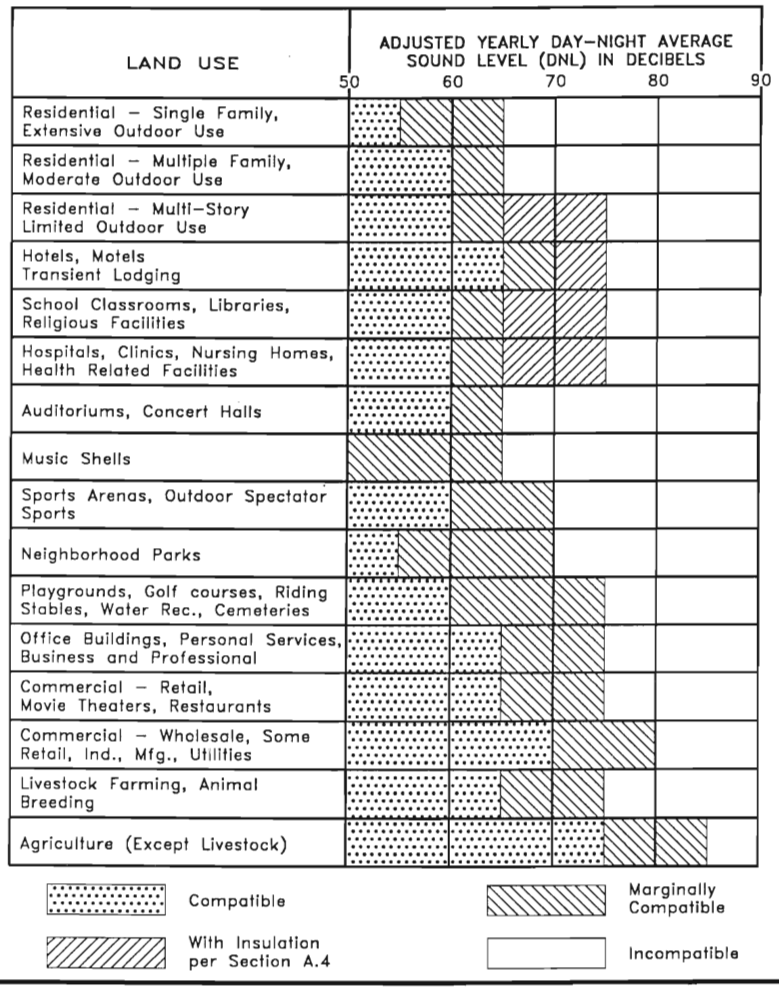
TABLE 1

EXTERIOR NOISE EXPOSURE CLASSIFICATION (RESIDENTIAL LAND USE)

NOISE EXPOSURE CLASS	DAY–NIGHT SOUND LEVEL	EQUIVALENT SOUND LEVEL	FEDERAL (1) STANDARD
Minimal Exposure	Not Exceeding 55 DNL	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 DNL But Not Above 65 DNL	Above 55 Leq But Not Above 65 Leq	Acceptable(2)
Significant Exposure	Above 65 DNL But Not Above 75 DNL	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 DNL	Above 75 Leq	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 Leq.



LAND USE COMPATIBILITY WITH YEARLY AVERAGE DAY-NIGHT AVERAGE SOUND LEVEL (DNL) AT A SITE FOR BUILDINGS AS COMMONLY CONSTRUCTED.
(Source: American National Standards Institute S12.9-1998/Part 5)

FIGURE 2

expressed in maximum allowable noise limits rather than DNL (see Reference 4). Although they are not directly comparable to noise criteria expressed in DNL, State DOH noise limits for single family residential lands equate to approximately 55 DNL. For multifamily residential, commercial, and resort lands, the State DOH noise limits equate to approximately 60 DNL. For light and heavy industrial lands, the State DOH noise limits equate to approximately 76 DNL, respectively. Construction activities, which are typically noisier than the State DOH noise limits, are regulated through the issuance of permits for allowing excessive construction noise during limited time periods.

CHAPTER IV. GENERAL STUDY METHODOLOGY

Existing traffic and background ambient noise levels were measured in the project environs during August 2011 to provide a basis for describing the existing noise environment in the project environs. Traffic noise measurements along Nimitz Highway and Valkenburgh Street were obtained at Locations A, B, C, G, H, and T7 as shown in Table 2. The locations of these measurement sites are shown in Figure 1. Location T7 was on the upper level (7th floor) of the existing Training Tower (approximately 62 feet above ground level), where background noise measurements were obtained continuously from 6:24 AM to 5:45 PM. Additional traffic noise spectrum measurements were obtained at the 5th, 4th, 3rd, and ground level at the Training Tower in order to provide recommendations for the sound attenuation treatments to the new buildings of the facility planned along the north boundary line. Traffic noise measurements along Nimitz Highway were obtained at Locations A, B, G, and H at ground level. Traffic noise measurements along Valkenburgh Street were obtained at Location C.

Traffic noise calculations for the existing conditions as well as noise predictions for CY 2025 were performed using the Federal Highway Administration (FHWA) Traffic Noise Model Version 2.5 (Reference 5). Traffic data entered into the noise prediction model were: roadway and receiver locations; hourly traffic volumes, average vehicle speeds; estimates of traffic mix; and "Loose Soil" propagation loss factor. The traffic data and forecasts for the project (References 6 and 7) were the primary sources of data inputs to the model. Appendix C summarizes the AM and PM peak hour traffic volumes for CY 2011 and 2025 from Reference 6 which were used to model existing and future traffic noise along the streets surrounding the project site. For existing and future traffic along the streets surrounding the project site, it was assumed that the average noise levels, or Leq(h), during the AM Peak traffic hour were approximately 1 dB less than the 24-hour DNL along those roadways.

Traffic noise calculations for both the existing and future conditions in the project environs were developed for ground level and elevated receptors. Traffic noise levels were also calculated for future conditions with (Build Alternative) and without (No Build Alternative) the proposed project. The forecasted changes in traffic noise levels over existing levels were calculated with and without the project, and noise impact risks evaluated. The relative contributions of non-project and project traffic to the total noise levels were also calculated, and an evaluation of possible traffic noise impacts was made.

Measurements of noise from an HFD pump truck during drafting operations were obtained in order to predict the noise levels from these activities at the closest noise sensitive properties. These drafting activities are expected to continue at the Drafting Pit (see Figure 1), and represent one of the loudest outdoor activity at the facility.

The amount of exterior-to-interior traffic noise reduction required at the new classroom and administrative buildings of the new training center were determined from

TABLE 2

TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
T7. At 7th Floor Level of Training Tower (8/18/11)	0624 TO 0724	65	17,971	134	410	72.3	72.4
C. 50 FT from the center-line of Valkenburgh St. (8/18/11)	0606 TO 0706	30	333	0	3	63.6	70.2
A. 150 FT from the center-line of Nimitz Hwy. (8/18/11)	0730 TO 0830	N/A	N/A	N/A	N/A	65.5	63.8
B. 124 FT from the center-line of Nimitz Hwy. (8/18/11)	0834 TO 0934	N/A	N/A	N/A	N/A	68.1	66.0
G. 119 FT from the center-line of Nimitz Hwy. (8/18/11)	1350 TO 1450	N/A	N/A	N/A	N/A	67.1	66.4
H. 120 FT from the center-line of Nimitz Hwy. (8/18/11)	1452 TO 1552	45	1,304	22	17	66.2	67.3
A. 150 FT from the center-line of Nimitz Hwy. (8/18/11)	1604 TO 1704	45	1,156	10	10	64.1	62.9
T7. At 7th Floor Level of Training Tower (8/18/11)	0730 TO 1745	N/A	N/A	N/A	N/A	71.1	N/A

the August 2011 traffic noise measurements at the project site and from the projected increases in traffic noise levels by 2025. Recommendations for exterior construction materials required to achieve these exterior-to-interior noise reduction goal were also provided.

Calculations of average exterior and interior noise levels from construction activities were performed for typical naturally ventilated and air conditioned buildings. Predicted noise levels were compared with existing background ambient noise levels, and the potential for noise impacts was assessed. Potential noise impacts from construction operations were also discussed, and mitigation measures recommended.

V. EXISTING ACOUSTICAL ENVIRONMENT

Major contributors to the existing background ambient noise levels within the project area are traffic along H-1 Freeway and along Nimitz Highway. Based on hourly noise measurements obtained at Location T7, traffic noise levels at the project site are controlled by traffic on H-1 Freeway. Traffic noise levels are highest during the AM peak hour, and remain relatively constant thereafter through the PM peak hour.

Traffic noise modeling during the AM peak hour was performed using the FHWA Traffic Noise Model Version 2.5. The existing traffic volumes and assumed average speeds and vehicle mixes during the AM peak hour are shown in Table 3. The results of the traffic noise modeling for the existing condition are shown in Table 4, where the AM peak hour noise levels have been converted to DNL values. The receptor locations listed in Table 4 are shown in Figure 3. In the table, Locations A, B, G, and H are located at the mauka sides of the future New Recruit Academy and Incumbent Training & HFD Offices buildings. Location I is at the neighboring Trinity Missionary Baptist Church, and Location J is at the neighboring Holy Family Catholic Church and Academy.

Ground level receptor locations are partially shielded from H-1 Freeway noise, but noise levels at those locations are still relatively high due to the high traffic volumes and speeds along the freeway. Noise reductions of 5 to 20 dBA can be expected from these noise shielding effects. At the elevated receptor location T7, where noise shielding effects are minimal, existing traffic noise levels are highest and are controlled entirely by traffic noise from H-1 Freeway. Based on the results shown in Table 4, it is clear that existing traffic noise levels exceed the land use compatibility guidelines (see Figure 2) for classroom and office buildings at Locations A, B, G, and H.

TABLE 3

EXISTING (CY 2011) TRAFFIC VOLUMES ALONG ROADWAYS IN PROJECT AREA (AM PEAK HOUR)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS
H-1 Freeway Westbound	65	2,071	1,876	49	146
H-1 Freeway Eastbound	65	11,733	11,523	50	160
Nimitz Hwy. Westbound, W. of Valkenburgh	45	1,383	1,350	18	15
Nimitz Hwy. Westbound, E. of Valkenburgh	45	1,413	1,379	18	16
Nimitz Hwy.Eastbound, W. of Valkenburgh	45	1,672	1,632	22	18
Nimitz Hwy.Eastbound, E. of Valkenburgh	45	1,316	1,285	17	14
Valkenburgh St. N. of Nimitz	35	1,409	1,367	21	21
Valkenburgh St. S. of Nimitz	30	843	827	8	8
Valkenburgh St. S. of Paine Circle	30	486	479	2	5
Paine Circle W. of Valkenburgh	30	266	262	1	3

TABLE 4
EXISTING AND FUTURE TRAFFIC NOISE LEVELS AT VARIOUS LOCATIONS

LOCATION	EXISTING (2011) DNL	FUTURE (2025) DNL	CHANGE IN DNL
A (1st Flr.)	65	66	1
A (2nd Flr.)	N/A	67	N/A
A (3rd Flr.)	N/A	69	N/A
B	68	69	1
C	68	68	0
G (1st Flr.)	68	69	1
G (2nd Flr.)	N/A	70	N/A
G (3rd Flr.)	N/A	71	N/A
H (1st Flr.)	68	69	1
H (1st Flr.)	N/A	70	N/A
H (1st Flr.)	N/A	72	N/A
I	63	62	-1
J	64	65	1
T7	73	75	2

RECEPTOR LOCATIONS FOR TRAFFIC NOISE MODELING

FIGURE 3

CHAPTER VI. FUTURE NOISE ENVIRONMENT

Predictions of future traffic noise levels were made using the traffic volume assignments of Reference 6 for CY 2025 with and without the proposed project. The future projections of non-project and project traffic volumes for the No Build and Build Alternatives are shown in Appendix C. Projections for H-1 Freeway traffic volumes for 2029 from Reference 7 were used to model future conditions in 2025 with or without the project.

Table 5 contains the CY 2025 traffic volumes, average vehicle speeds, and vehicle mixes assumed when modeling future traffic noise levels with the project. Table 4 provides the results of the traffic noise modeling at various receptor locations for CY 2025 using the DNL noise metric.

In CY 2025, the dominant traffic noise sources in the project area will continue to be traffic along H-1 Freeway. Future traffic noise level increases are expected to be 2 dB (or DNL) or less at the various receptor locations on and off the project site (see Table 4). Project traffic contributions to the future noise levels shown in Table 4 are near zero, with essentially all of the increases in noise levels at the receptor locations attributable to non-project traffic. This is because traffic noise levels associated with project traffic are significantly lower than the traffic noise contributions for the non-project traffic at the receptor locations shown in Table 4.

Table 6 presents the calculations of traffic noise contributions of project and non-project traffic along the roadways in the project environs. The larger traffic noise contributions from project traffic are expected to occur along Paine Circle at Valkenburgh Street and along Valkenburgh Street south of Nimitz Highway. However, due to the relatively small volumes of project traffic and their relatively low speeds along Valkenburgh Street and Paine Circle, plus the dominating influence of traffic noise from H-1 Freeway, project traffic should not cause a significant increase in the total traffic noise levels along Valkenburgh Street or Paine Circle.

By CY 2025 (or 2029), the largest increases in traffic noise levels of 1.27 to 1.28 dB are expected to occur along H-1 Freeway. Project related traffic should not contribute to those increases. Because of the dominating influence of traffic noise from H-1 Freeway, traffic noise mitigation measures at the project site should be directed toward H-1 Freeway traffic rather than project traffic.

By CY 2025, traffic noise levels will continue to exceed 65 DNL at the two new buildings planned along the mauka side of the project site. Traffic noise levels are predicted to be approximately 2 dB higher at the 3rd floor level than at the ground floor level. Future traffic noise levels at Locations I and J are predicted to be 62 DNL and 65 DNL, respectively. The increase in traffic noise levels at Location J is attributable to the forecasted increases in traffic volumes along H-1 Freeway. The decrease in traffic noise level at Location I is attributable to the construction of the new 3-story buildings on the project site, and the H-1 traffic noise shielding they will provide at Location I.

TABLE 5

FUTURE (CY 2025) TRAFFIC VOLUMES ALONG ROADWAYS IN PROJECT AREA (AM PEAK HOUR, BUILD)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS
H-1 Freeway Westbound	65	2,777	2,515	66	196
H-1 Freeway Eastbound	65	15,738	15,456	68	214
Nimitz Hwy. Westbound, W. of Valkenburgh	55	1,465	1,430	19	16
Nimitz Hwy. Westbound, E. of Valkenburgh	45	1,545	1,508	20	17
Nimitz Hwy.Eastbound, W. of Valkenburgh	45	1,829	1,785	24	20
Nimitz Hwy.Eastbound, E. of Valkenburgh	45	1,403	1,370	18	15
Valkenburgh St. N. of Nimitz	35	1,512	1,466	23	23
Valkenburgh St. S. of Nimitz	30	919	901	9	9
Valkenburgh St. S. of Paine Circle	30	486	479	2	5
Paine Circle W. of Valkenburgh	30	306	301	2	3

TABLE 6

CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (CY 2025) (AM PEAK HOUR)

STREET SECTION	NOISE LEVEL INCREASE DUE TO: NON-PROJECT TRAFFIC	PROJECT TRAFFIC
H-1 Freeway Westbound	1.27	0.00
H-1 Freeway Eastbound	1.28	0.00
Nimitz Hwy. Westbound, W. of Valkenburgh	0.25	0.00
Nimitz Hwy. Westbound, E. of Valkenburgh	0.25	0.14
Nimitz Hwy.Eastbound, W. of Valkenburgh	0.24	0.14
Nimitz Hwy.Eastbound, E. of Valkenburgh	0.28	0.00
Valkenburgh St. N. of Nimitz	0.27	0.03
Valkenburgh St. S. of Nimitz	0.00	0.38
Valkenburgh St. S. of Paine Circle	0.00	0.00
Paine Circle W. of Valkenburgh	0.00	0.61

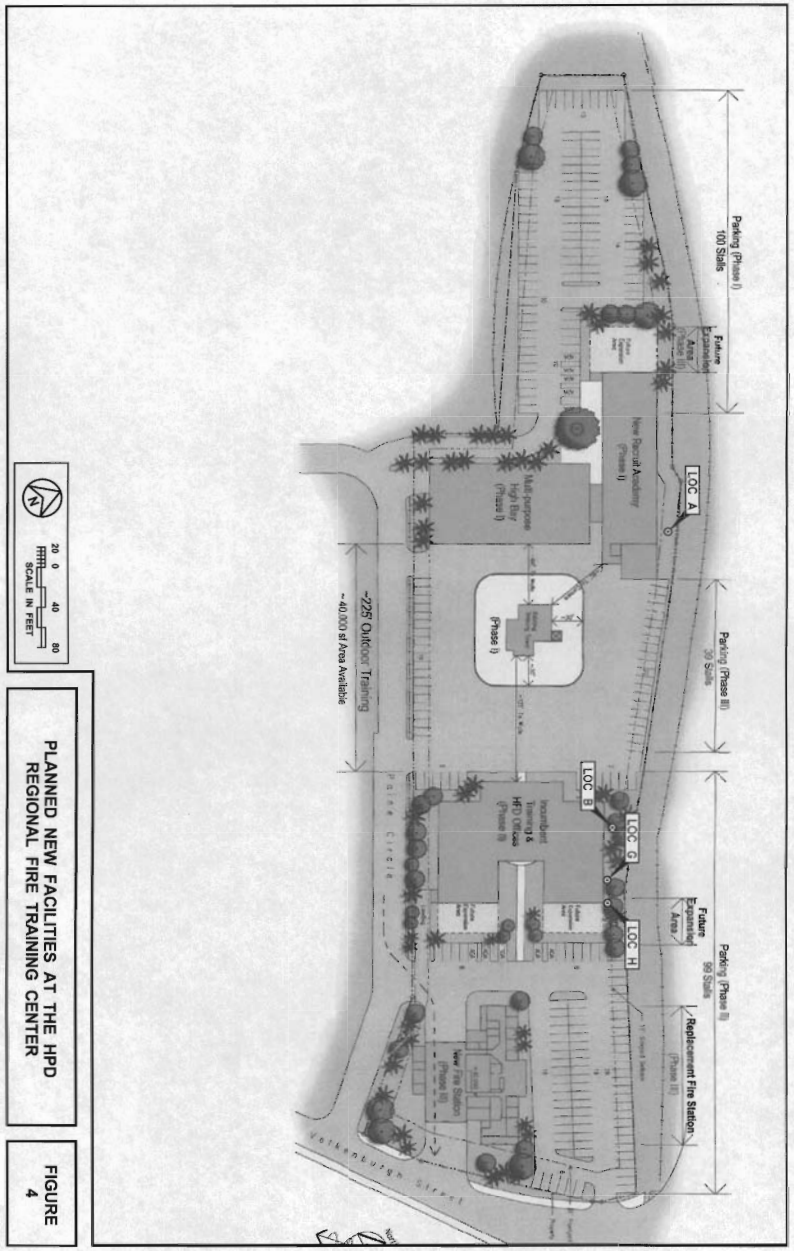
CHAPTER VII. DISCUSSION OF PROJECT-RELATED NOISE IMPACTS AND POSSIBLE MITIGATION MEASURES

Traffic Noise. Noise impacts from project related traffic along the roadways which are expected to service the project traffic are not expected due to the relatively low levels of project related traffic noise when compared to the noise levels of non-project related traffic. East of the project site, where project related traffic noise level increases are expected to be greatest, traffic noise levels from H-1 Freeway are the dominant noise source. The highest traffic noise level increases associated with project traffic are expected to occur along Valkenburgh Street between Nimitz Highway and Paine Circle and along Paine Circle west of the Valkenburgh Street intersection, but these increases will be masked by the high noise levels from H-1 Freeway.

The buildings of the Holy Family Catholic Church and Academy and the Trinity Missionary Baptist Church are not expected to experience a measurable increase in future traffic noise levels as a result of the HFD Regional Fire Training Center's traffic by 2025. These predicted increases are very small due to the concentration of the project traffic to the northwest of the Holy Family Catholic Church and Academy facility's buildings. Existing traffic noise from Nimitz Highway and H-1 Freeway will continue to control the background noise levels in the project environs.

Exterior-To-Interior Noise Reduction Requirements for Training Center Buildings. Figure 4 depicts the locations of the new buildings on the HFD Regional Fire Training Center site. Predicted future traffic noise levels outside the north (mauka) faces of the first, second, and third floors of the Recruit Training Academy and Incumbent Training & HFD Offices buildings were obtained at Locations A, B, G, and H. The predicted worst case traffic noise level spectrums at the 3rd floor level at Locations A and H are shown in Figures 5 and 6. Based on the predicted traffic noise level of 68 dBA and frequency spectrum of the traffic noise at the 3rd floor level at Location A, a minimum exterior-to-interior noise reduction of 28 dBA is required to achieve an interior noise level of 40 dBA in the Recruit Training Academy. Based on the predicted traffic noise level of 71 dBA and frequency spectrum of the traffic noise at the 3rd floor level at Location H, a minimum exterior-to-interior noise reduction of 31 dBA is required to achieve an interior noise level of 40 dBA in the Incumbent Training & HFD Offices. These traffic noise reduction requirements can be satisfied by using exterior walls and roof with minimum STC 45 rating, and by using minimum 1/4 inch thick, laminated glass for the exterior windows. Exterior doors should be avoided if possible along the north, east, and west faces of the two buildings.

Noise from Pump Truck Drafting Operations. Measured noise levels during drafting operations at the HFD Waipio Maintenance Yard were obtained on February 10, 2011 with Engine #35, Makakilo, Pump Truck. Measured noise levels ranged from 82 to 86 dBA at 50 feet distance at 1,500 to 1,700 engine rpm. Total time to complete all drafting operations was approximately 1 hour and 10 minutes.



PLANNED NEW FACILITIES AT THE HPD REGIONAL FIRE TRAINING CENTER

FIGURE 4

FIGURE 5. PREDICTED TRAFFIC NOISE LEVEL SPECTRUM OUTSIDE 3RD FLOOR WINDOWS OF RECRUIT TRAINING ACADEMY BUILDING

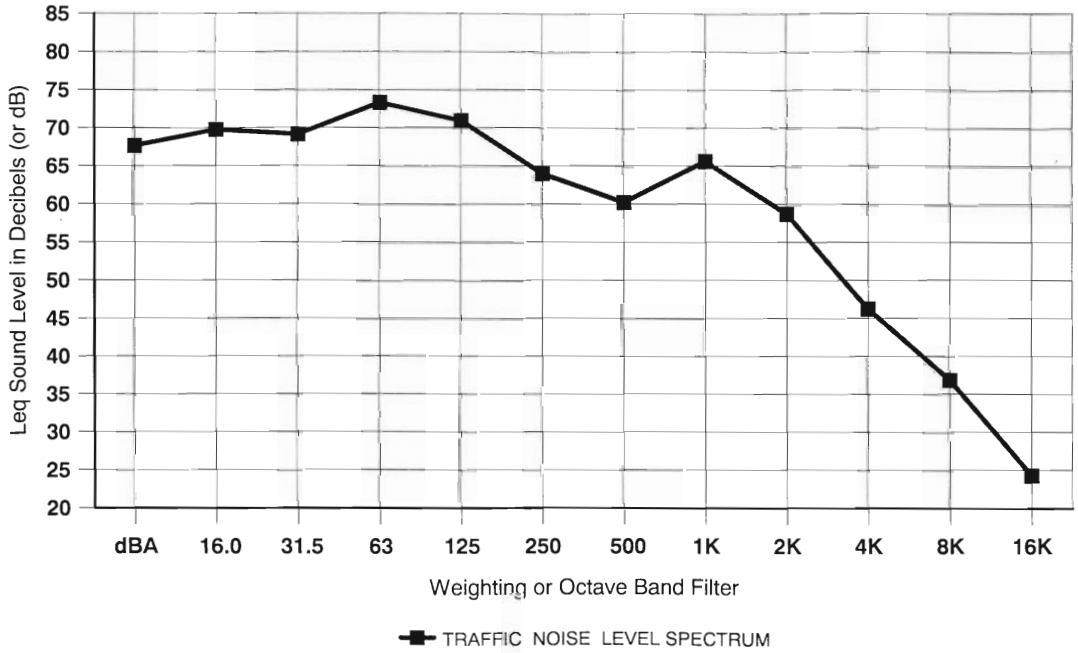
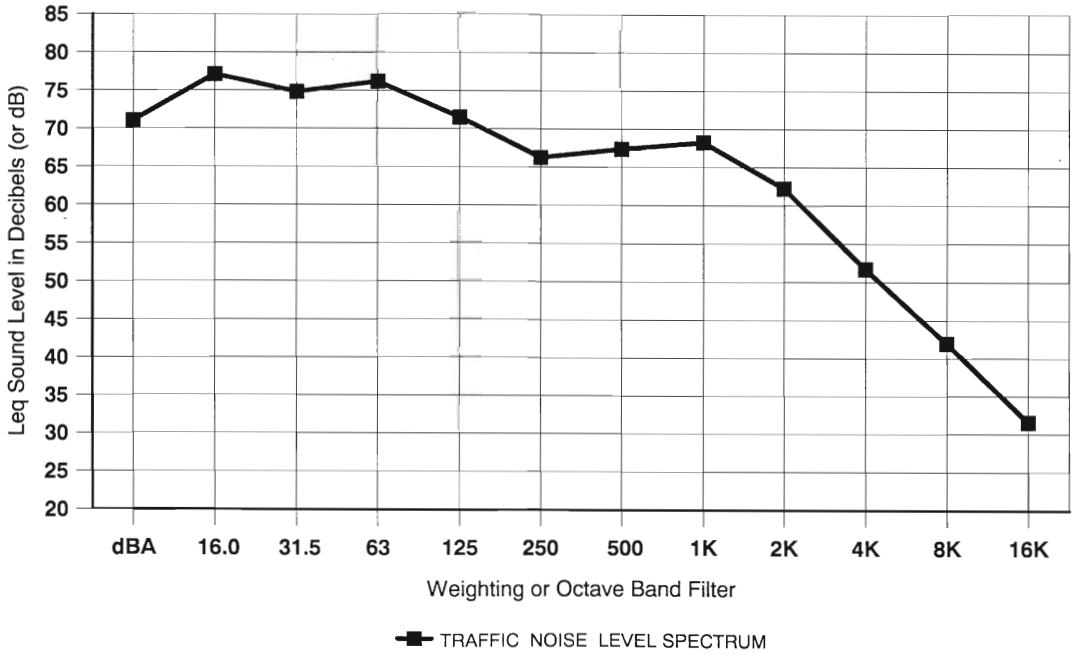


FIGURE 6. PREDICTED TRAFFIC NOISE LEVEL SPECTRUM OUTSIDE 3RD FLOOR WINDOWS OF INCUMBENT TRAINING & HFD OFFICES BUILDING

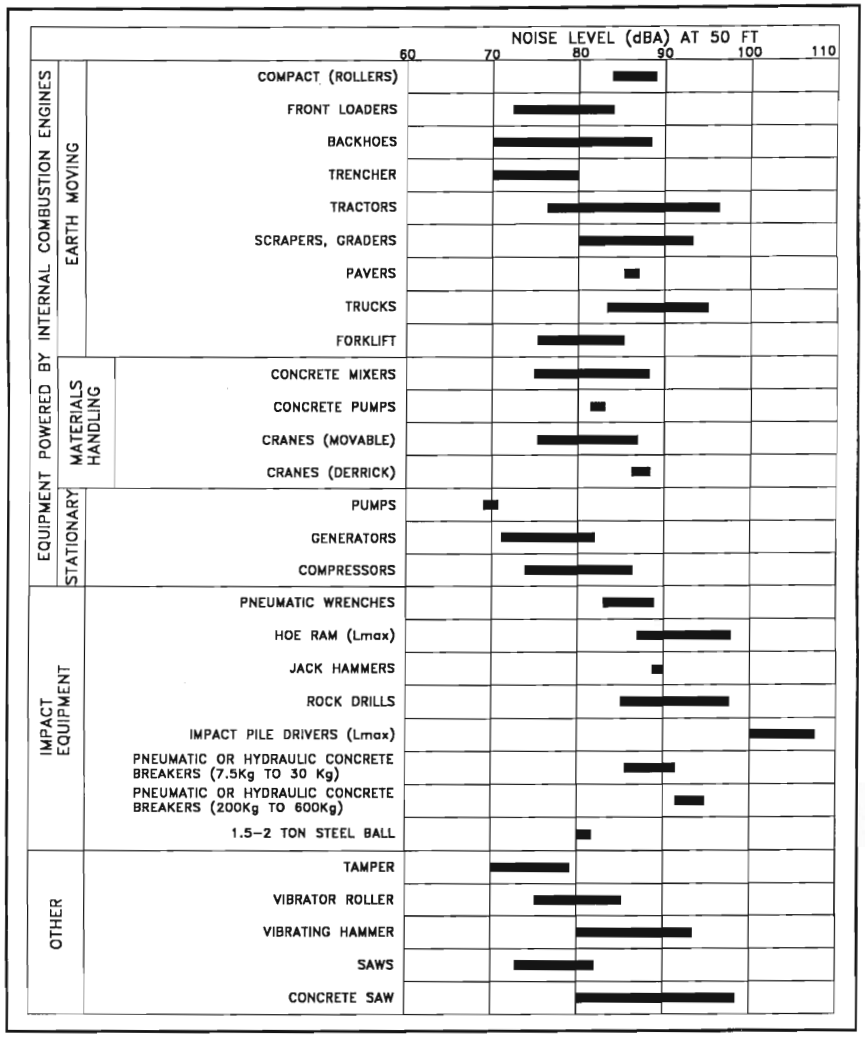


The closest noise sensitive neighbors to the HFD Regional Fire Training Center's Drafting Pit are classrooms of the Holy Family Catholic Church and Academy approximately 450 feet to the east, military housing units approximately 720 feet to the south, and the Trinity Missionary Baptist Church buildings at approximately 420 feet to the west. Predicted noise levels during drafting operations at these three locations range from 60 dBA at the more distant military housing unit to 65 dBA at the two church properties to the east and west. These predicted sound levels are similar to existing traffic noise levels from H-1 Freeway, and are not considered to be overly intrusive.

Predicted noise levels of drafting operations are expected to be higher at the new buildings of the HFD Regional Fire Training Center, which will range from approximately 10 to 300 feet from the drafting operations. The planned Incumbent Training & HPD Offices building is next to the location of the Drafting Pit, and will require special sound attenuation treatments (STC 60) due to the very high noise level of 98 dBA expected along the building's south wall. The Multi-Purpose High-Bay and New Recruit Academy Buildings will require lesser sound attenuation treatments (STC 35) due to the lower drafting noise levels of 68 to 69 dBA predicted along their east facing walls.

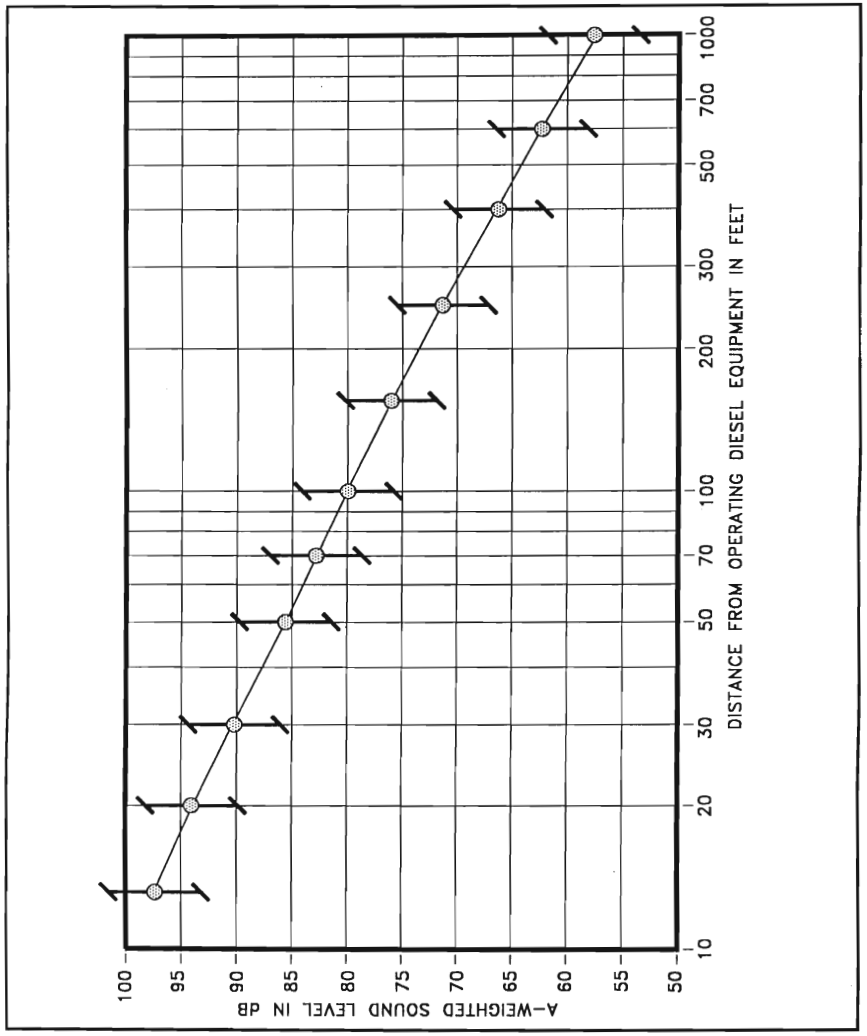
General Construction Noise. Audible construction noise will probably be unavoidable during the entire project construction period. The total time period for demolition and construction is not known. It is anticipated that actual construction work will be moving from one location on the project site to another during that period. Actual length of exposure to construction noise at any receptor location will probably be less than the total construction period for the entire project. Figure 7 depicts the range of noise levels of various types of construction equipment when measured at 50 FT distance from the equipment. Typical levels of exterior noise from construction activity (excluding pile driving activity) at various distances from the job sites are shown in Figure 8. The impulsive noise levels of impact pile drivers are approximately 15 dB higher than the levels shown in Figure 8, while the intermittent noise levels of vibratory pile drivers are at the upper end of the noise level ranges depicted in the figure.

Figure 8 is useful for predicting exterior noise levels at short distances (within 200 FT) from the work when visual line of sight exists between the construction equipment and the receptor. Direct line-of-sight distances from the construction equipment to existing buildings will range from 40 FT to 700+ FT, with corresponding average noise levels of 87 to 61 dBA (plus or minus 5 dBA). For receptors along a cross-street, the construction noise level vs. distance curve of Figure 8 should be reduced by approximately 8 dBA when the work is occurring at the intersection with the cross street, and should be reduced by 15 dBA when work is occurring at least 100 FT from the intersection (and the visual line-of-sight is blocked by intervening buildings). Typical levels of construction noise inside naturally ventilated and air conditioned structures are approximately 10 and 20 dB less, respectively, than the levels shown in Figure 8.



RANGES OF CONSTRUCTION EQUIPMENT NOISE LEVELS

FIGURE 7



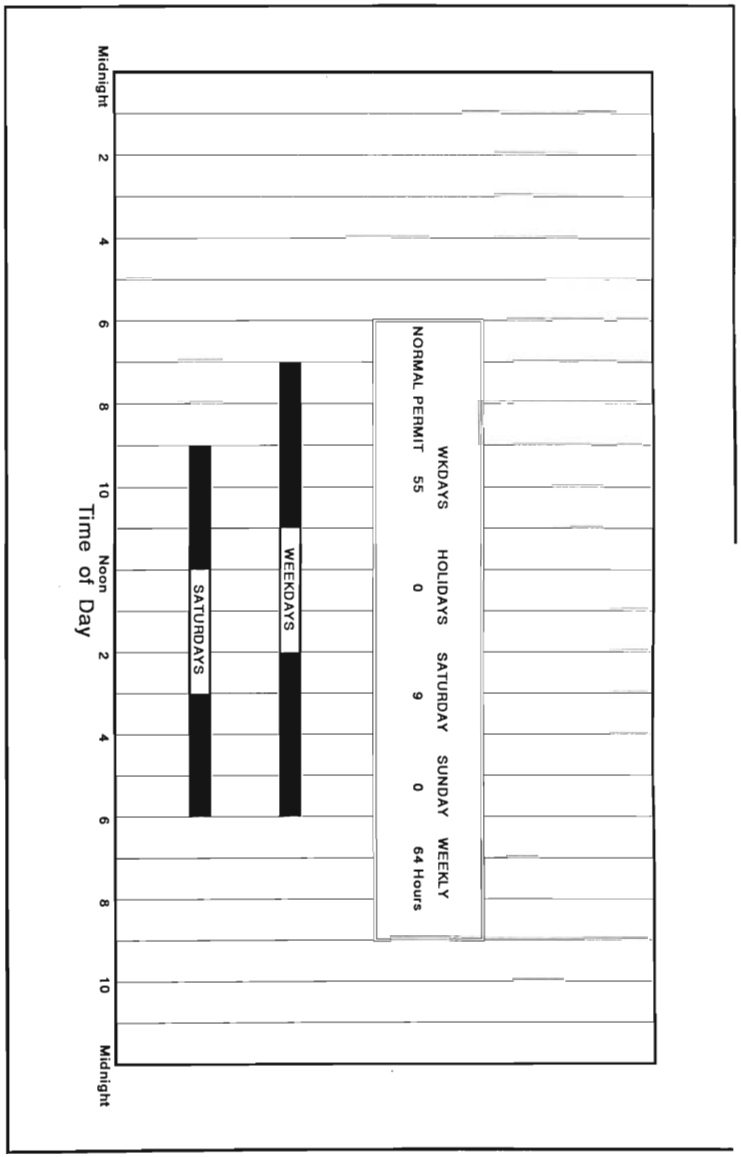
ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 8

The existing fire station building, which is located at the east end of the project site is predicted to experience the highest noise levels during construction activities due to its close proximity to the construction sites. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work, the availability of closure and air conditioning for noise mitigation in the project area, and due to the administrative controls available for regulation of construction noise. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

Mitigation of construction noise to inaudible levels will not be practical in all cases due to the intensity of construction noise sources (80 to 90+ dB at 50 FT distance), and due to the exterior nature of the work (demolition, excavation, grading, trenching, concrete pouring, hammering, etc.). The use of properly muffled construction equipment should be required on the job site.

The incorporation of State Department of Health construction noise limits and curfew times, which are applicable throughout the State of Hawaii (Reference 4), is another noise mitigation measure which is normally applied to construction activities. Figure 9 depicts the normally permitted hours of construction. Noisy construction activities are not allowed on Sundays and holidays, during the early morning, and during the late evening and nighttime periods under the DOH permit procedures.



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 9

APPENDIX A. REFERENCES

(1) "Guidelines for Considering Noise in Land Use Planning and Control;" Federal Interagency Committee on Urban Noise; June 1980.

(2) "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B;" U.S. Department of Housing and Urban Development; July 12, l979.

(3) "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety;" Environmental Protection Agency (EPA 550/9-74-004); March 1974.

(4) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.

(5) "FHWA Traffic Noise Model User's Guide;" FHWA-PD-96-009, DOT-VNTSC-FHWA-98-1, Federal Highway Administration; Washington, D.C.; January 1998 and Version 2.5 Upgrade (April 14, 2004).

(6) "Traffic Impact Report - HFD Regional Fire Training Facility;" Wilson Okamoto Corporation; June 2011.

(7) CY 2009 and 2029 Traffic Volumes Along H-1 Freeway at Pearl Harbor Interchange; Hawaii State Department of Transportation; May 27, 2009.

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LAdn.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq, is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

TERM	SYMBOL
1. A-Weighted Sound Level	L_A
2. A-Weighted Sound Power Level	L_{WA}
3. Maximum A-Weighted Sound Level	L_{max}
4. Peak A-Weighted Sound Level	L_{Apk}
5. Level Exceeded x% of the Time	L_x
6. Equivalent Sound Level	L_{eq}
7. Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8. Day Sound Level	L_d
9. Night Sound Level	L_n
10. Day-Night Sound Level	L_{dn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$
12. Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

APPENDIX B (CONTINUED)

TABLE II

RECOMMENDED DESCRIPTOR LIST

TERM	A-WEIGHTING	ALTERNATIVE[1] A-WEIGHTING	OTHER[2] WEIGHTING	UNWEIGHTED
1. Sound (Pressure)[3] Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2. Sound Power Level	L_{WA}		L_{WB}	L_W
3. Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4. Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5. Level Exceeded x% of the Time	L_x	L_{Ax}	L_{Bx}	L_{px}
6. Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7. Equivalent Sound Level[4] Over Time(T)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8. Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9. Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10. Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12. Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13. Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14. Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15. Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

APPENDIX C

SUMMARY OF BASE YEAR AND YEAR 2025 TRAFFIC VOLUMES

ROADWAY LANES	**** CY 2011 ***** AM VPH	PM VPH	CY 2025 (NO BUILD) AM VPH	PM VPH	CY 2025 (BUILD) AM VPH	PM VPH
Nimitz Hwy. W. of Valkenburgh (EB)	N/A	N/A	N/A	N/A	N/A	N/A
Nimitz Hwy. W. of Valkenburgh (WB)	1,383	1,690	1,465	1,800	1,465	1,863
Two-Way	1,383	1,690	1,465	1,800	1,465	1,863
Nimitz Hwy. E. of Valkenburgh (EB)	N/A	N/A	N/A	N/A	N/A	N/A
Nimitz Hwy. E. of Valkenburgh (WB)	1,413	1,779	1,496	1,897	1,545	1,897
Two-Way	1,413	1,779	1,496	1,897	1,545	1,897
Nimitz Hwy. W. of Valkenburgh (EB)	1,672	1,207	1,769	1,286	1,829	1,286
Nimitz Hwy. W. of Valkenburgh (WB)	N/A	N/A	N/A	N/A	N/A	N/A
Two-Way	1,672	1,207	1,769	1,286	1,829	1,286
Nimitz Hwy. E. of Valkenburgh (EB)	1,316	1,098	1,403	1,171	1,403	1,197
Nimitz Hwy. E. of Valkenburgh (WB)	N/A	N/A	N/A	N/A	N/A	N/A
Two-Way	1,316	1,098	1,403	1,171	1,403	1,197
Paine Circle. W. of Valkenburgh (EB)	19	77	19	77	19	202
Paine Circle. W. of Valkenburgh (WB)	247	77	247	77	287	77
Two-Way	266	154	266	154	306	279
Valkenburgh St. North of Nimitz Westbound (NB)	790	1,031	841	1,099	841	1,131
Valkenburgh St. North of Nimitz Westbound (SB)	619	776	659	830	671	830
Two-Way	1,409	1,807	1,500	1,929	1,512	1,961
Valkenburgh St. South of Nimitz Eastbound (NB)	308	200	308	200	306	323
Valkenburgh St. South of Nimitz Eastbound (SB)	535	148	535	148	614	148
Two-Way	843	348	843	348	919	471
Valkenburgh St. South of Paine Circle (NB)	237	105	237	105	237	105
Valkenburgh St. South of Paine Circle (SB)	249	59	249	59	249	59
Two-Way	486	164	486	164	486	164

Appendix C

Water, Wastewater and Drainage Report

Honolulu Fire Department
Regional Training Center

Water, Wastewater, & Drainage Report

TMK: 1-1-02: 012
80 Valkenburgh Street
Honolulu, HI 96819

December 05, 2011

Prepared for:
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813

Prepared by:

SAM O. HIROTA, INC.
Engineers and Surveyors
864 South Beretania Street
Honolulu, Hawaii 96813
(808)537-9971

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1. Background

The Honolulu Fire Department (HFD) Regional Training Center was built in 1987, and is located at the intersection of Valkenburgh Street and Nimitz Highway. The site used to be owned by the Navy, but ownership was conveyed at one point to the City & County of Honolulu. The site consists of an existing fire station (Mokulele Fire Station), facilities for classroom training and outdoor tactical training, and other administrative buildings. The Regional Training Center was originally planned for a more spacious site in Kapolei, but those plans did not materialize. Due to growing use of the site by local, neighbor island, and federal fire departments, 80-90 proposed HFD recruits, and the planned merger with emergency services operations & administrations, the need for expansion (in three phases) is warranted.

The project consists of 3 phases of construction, which include rehabilitation of the existing fire tower with relocation of fire hydrants and storm drains, a 'New Academy Building', a 'Multi-Purpose High Bay', a new administrative & classroom building, a new fire station, new parking spaces, and associated infrastructure.

The following is general information pulled from the City & County of Honolulu's GIS site:

-TMK: 1-1-2: 12

- Tax Bill Owner: City & County of Honolulu

-Realtor Neighborhood: Military

-Area: 5.16 Acres, 224,770 Square feet

-Abutting Roads:

- Nimitz HWY - Mauka
- Valkenburgh St - Diamond Head
- Paine Circle - Makai

- Zoning(LUO): F-1

- FEMA Flood Designation: D

- Tsunami Evacuation Zone: No

2. Purpose

The purpose of this report is to analyze the water, wastewater, & drainage systems that would be needed for the proposed 3-phase expansion, and provide recommendations and other considerations for the proposed utilities.

3. Executive Summary

The following systems were analyzed for the site: Water, Wastewater, & Drainage, and the results of the analyses are presented below. See sections 4 through 6 for more detailed descriptions of each system and the appendices for detailed calculations and information.

Water

The existing water system is feasible for the master plan. No new or upgraded water system is required for this development. There is a daily (weekday) increase in demand from 455.1 gallons (existing) to 575.7 gallons (Phase III), which is an increase of 120.4 gallons or 1.26 times the existing demand. Phase I of the future development could be sustained with the current water use. Phases II & III would require additional water demands on the Navy's system. Based on inquiries with the Navy, the existing system can accommodate the increase in demand.

Wastewater

The existing wastewater system is feasible for the master plan. More specifically, the existing wastewater system will be utilized in conjunction with an on-site holding tank. After considering several options to handle the wastewater increase, the most feasible option (aside from the Navy improving their system) is to construct an on-site holding tank to release increase wastewater flows at night during off-peak hours into the existing system. No new or upgraded wastewater system is required for this development as long as the holding tank is used.

There is a daily increase in demand from 2,100 gallons (existing) to 5,960 gallons (Phase III), which is an increase of 3,860 gallons or 2.84 times the existing demand. Based on our inquiries with the Navy, the existing wastewater collection system is overcapacity downstream of the project site. Redevelopment of the site will be limited to existing wastewater flows until the downstream collection system is improved. Phase I of the project can be completed without an increase in wastewater flows to the Navy systems. Phase II and III of the project can be accommodated once the downstream system is improved or with the use of holding tanks that will detain wastewater flows for discharge during off peak hours. Holding tanks have been allowed for use on other projects and can be considered for the project.

Drainage

The existing drainage system is feasible for the master plan. No new or upgraded drainage system is required for this development. Any increase in peak flows due to redevelopment of the project site will be mitigated by the use of either pervious pavements or detention of runoff or a combination of both. Water quality BMPs are being implemented at the project site as part of a separate project to address compliance to NPDES regulations. These BMPs will be designed and constructed in advance of any masterplan improvements in appropriate locations to minimize future modification. Additional BMPs and water quality treatment systems may be added at a later date as part of the master plan improvements in order to meet sustainable goals for the project including LEED certification.

4. WATER

4.1 Existing Water System

The Honolulu Fire Department's Training Center and Mokulele Fire Station is currently serviced and maintained by the Navy's private water system. Water mains and laterals after the water meter are maintained by the City and County of Honolulu (C&C).

There is an existing 16-inch water main that supplies the HFD Training Center and Mokulele Fire Station as well as the surrounding Ohana Nui neighborhood. The 16-inch water main runs along the northern boundary of the HFD Training Center and Mokulele Fire Station site.

There is an existing 8-inch water main running approximately parallel to Valkenburgh Street along the east side of the project site. The 8-inch water main is connected to the existing 16-inch water main. An existing 2-1/2-inch service lateral and 2-inch water meter services the Mokulele Fire Station and the Locker Room from the existing 8-inch water main. The irrigation system is also connected to the 2-1/2-inch service lateral for landscaping around the Mokulele Fire Station, Administration Classroom Building, Locker Room and the Classroom No. 1 Building. The 2-1/2-inch lateral also has a backflow preventer after the water meter According to record drawings the water system to support the Training Center was constructed in 1982 and the Mokulele Fire Station water system was constructed in 1985. See 'Exhibit 7.4 - Existing Utilities' for more detail.

There is an existing 12-inch water main that runs in a north to southern direction east of the existing training tower. The 12-inch water main is connected to the existing 16-inch water line running along the northern boundary of the project site. A series of 12-inch, 8-inch and 6-inch water lines returns into the project site and are primarily utilized for fire training.

The buildings near the fire station are served off an existing 2-inch water meter. The meter happens to be mounted on the backflow preventer riser pipe. There are two meter boxes that serve the fire protection system surrounding the training tower. One valve box has an 8 inch turbo meter and strainer. The other box does not have a meter and a spool on the line. There is an irrigation service off of the fire line to a 2-inch backflow in the planter near the meters. There is also a 1-1/4-inch backflow at the tower and a bathroom with two lavs, one urinal and two toilets. There are also two dry standpipes located around the training tower which are used during training. See 'Exhibit 7.4 - Existing Utilities' for more detail.

There are no water easements designated in favor of the Navy on the HFD's property. Easements in favor of the Navy should be established for the 16-inch water main running along the north side of the property and the 12-inch water main running between the Training Tower and the Locker Room in a north to south direction.

4.2 Future Water System

Throughout the 7 day week, weekday demands on the water system are the highest out of anytime in the week, so weekday demands were used to compare between existing and future conditions. There is a daily (weekday) increase in demand from 455.1 gallons (existing) to 575.7 gallons (Phase III), which is an increase of 120.4 gallons or 1.26 times the existing demand.

For Phase I the proposed demand is only 230.1 gallons/day; a decrease of 225 gallons/day from existing demand. This is due to using water fixtures with lower gallons per use. This ultimately means that the existing water system will be usable under Phase I development, and for a portion of Phase II development, until the existing 455 value is reached. For the remainder of phase II and the entirety of Phase III, the flows would be increased well over existing demand, as mentioned in the previous paragraph. During investigative inquiries with the Navy no major objections were raised to the increases for development of all 3 phases. The Navy's current program is to support these private parcels within the Ohana Nui neighborhood with sewer, water, drainage and roadways. Further consultation will be undertaken with the Navy as design phases progress.

Although the development does not intend on connecting to C&C's water system, the worst case scenario would be if the Navy discontinued supporting the Ohana Nui neighborhood with the sewer, water, drainage and roadway systems. In this case, the alternative would be to provide potable water from C&C's water system; see 'Appendix 8.5 - BWS Letter (April 1, 2011)'. The new water main would result in approximately 2,600 linear feet of new water line. The table below summarizes the worst case scenario, which is the water main design if a new water main were to be built. See 'Appendix 8.1 - Water Main Design' for more detail and information on the water main calculations.

Water Main Summary		
Size	12.00	inch (I.D.)
Length	2,600	FT (estimate)
TDH	19.90	FT
GPM	2,000.00	GPM

Other considerations include neighboring sites, (church, school, post office, etc...) which may potentially need to be serviced by this new water main. This means their current and future water demands must be take into account somewhere down the road. These neighboring sites would have to work together to coordinate and raise money for improvements.

4.3 Conclusion & Recommendation

The project plan is to continue use of the existing Navy water system. Phase I of the future development could be sustained with the current water use. Phases II & III would require additional water demands on the Navy's system. Based on inquiries with the Navy, the existing system can accommodate the increase in demand. In conclusion, the existing water system is feasible for the master plan.

A further consideration would be to recycle hydrant water or any water used for training. For example, hydrant water that is used at the training building would be drained/channeled into the drafting pit for future reuse. The existing drafting pit may have to be enlarged and the leak it has may have to be repaired if it is to be used this way. Also, modifications in site grading and even a conduit system may be required to channel the hydrant water to the drafting pit.

4.4 Further Discussion

It is important to note that there have been several conservative assumptions used throughout the water analysis that may overstate potential water requirements. For example:

- A LEED ratio of 80% male to 20% female was used for water demand calculations. However, a more realistic user ratio of the HFD site is 99% male to 1% female. Females users require more potable water demand than males, so the realistic ratio will reduce water and wastewater demands.

- Under proposed conditions, the gallons per day per occupant load was reduced by approximately half for fixtures such as toilets (3.62 to 1.8) and showers (8.62 to 4.3). Although these reduced values were taken into consideration for this report, lower flows for fixtures are possible. For example, waterless urinals are desired by the developer, which would reduce the demand from 1.8 to almost 0 gallons per day per occupant.

- Proposed Phases II and III are planned for the future; possible ultimate build out may occur after a decade. Since the Navy is in the process of turning over their utility systems to the public or private sector, the existing water system may be upgraded to account for this turnover process, especially before the ultimate build-out. This means that Option A for the water system may in fact be feasible, if this upgrade takes place before Phase II is completed.

In summary, conservative values were used for the scope of this report, therefore a more detailed analysis is required for actual design purposes. As a result, actual design results may indicate a significantly lower water requirement than the conservative calculation.

5. WASTEWATER

5.1 Existing Wastewater System

The Honolulu Fire Department's Training Center and Mokulele Fire Station is currently serviced by the Navy's private wastewater system. Sewer laterals within the property line are maintained and serviced by the City and County of Honolulu. Currently, the Navy's private wastewater system is being conveyed at one point by a pump station. This pump station acts like a choke point for the entire sewer-shed since the wet well and or pumps are at hydraulic capacity. As a result of the pump station being at capacity, there is a moratorium on development, more specifically the increase in wastewater loads, in the entire sewer-shed.

The existing Fire Station is serviced by 4 inch sewer lateral that flows west. The existing Administration Classroom Building is also serviced by a 4 inch sewer lateral that flows south and connects with the fire station lateral forming a 6 inch sewer main. The 6 inch sewer main flows west and then south along Paine Circle, and becomes an 10 inch sewer main by the time it turns west and runs along Main street. The 6 inch sewer main runs parallel to an 8 inch water main (only 4 feet apart) when they are aligned with south-bound Paine Circle. The sewer system ultimately flows to a Navy-owned waste water treatment plant (wwtp) at Pearl Harbor. According to record drawings the wastewater system to support the Training Center was constructed in 1982 and the Mokulele Fire Station water system was constructed in 1985.

The HFD Site is currently located in an area where the C&C's waste water system splits into two C&C wwtp's: Sand Island WWTP and Honouliuli WWTP.

5.2 Future Wastewater System

The wastewater system was analyzed for the site under ultimate conditions (all three proposed phases built out). There are three options for the future wastewater system for this site:

A) Continue utilizing the existing Navy sewer system without system improvements.

B) Construct holding tank to discharge daily sewage flows at night into Navy's system.

C) Construct new sewer system/force main from site to existing C&C system.

Option A Analysis:

In this case, analysis for the wastewater system is very similar to analysis for the water system in terms of logistical and financial issues. The existing C&C wastewater system is adequate for existing HFD wastewater flows. However, future demands on the wastewater system are more difficult to compute and analyze from the C&C's perspective. Under ultimate conditions, the sewer demand will experience an increase of 2.84 times as much sewage flow as the existing sewer demand. Since the existing downstream pump station is operating at capacity, any increase in wastewater flows on the existing system would not be feasible.

Option B Analysis:

Option B consists of releasing daily sewage flows during nightly off-peak hours to insure that there is no adverse impact on the existing sewer system. This will be accomplished by constructing an underground holding tank which will be adequately sized to store a full day's sewage. The daily sewage will be released at night when sewer loads are low, especially for non-industrial facilities that are served by the existing system. It is important to note that only the increase in sewage flows will be stored. The allowable amount of sewage to be released into the receiving system during normal peak hours would be the existing conditions amount. The increase in sewage would be stored in the tank. See 'Appendix 8.3 - Wastewater Holding Tank Design' for daily flow calculations.

In order for the holding tank to properly discharge the sewage into the existing system, a pump/force main system will be required. Typically, a dual pump system would be required with all the applicable appurtenances (hatches, lifting assembly, power source, etc.) along with an adequately sized force main that would run from the holding tank to the nearest existing sewer manhole that would have to be retrofitted to handle force main discharge. Option B is almost like a cross between Options A and C, in which the existing sewer system would still be used, but pump/force main would still be required.

Preliminary holding tank calculations resulted in the following dimensions to handle a daily volume of 3,860 gallons: 10'L x 10'W x 6'D. The tank has been designed to provide for a total of 4,488 gallons, which results in an excess capacity of 16% to account for any above average flows/freeboard. See 'Appendix 8.3 - Wastewater Holding Tank Design' for more detail. The holding tank should be designed more accurately during actual design process, mainly to take into account peak flow factors, more accurate flow numbers, and room for fixtures like pumps and valves.

Option C Analysis:

Option C consists of constructing an on-site pump station and accompanying force main to convey the proposed wastewater flows from the site to the nearest existing C&C gravity system. Option C for the wastewater system will result in high costs due to utility excavation, trenching, etc. The existing sewer system will most likely not be able to handle the ultimate flows, which means a new sewer system will need to be constructed. This new system would extend from the site to the existing C&C sewer system around the intersection of Aolele Street and Nimitz Highway; a distance of approximately 3,000 feet. Since the surrounding area in general is flat, filled with an array of existing utilities, as well as the sewer having to traverse a long distance, a gravity sewer system will not be feasible. A pump station/force main would be required to adequately handle the sewage under ultimate conditions.

Other considerations include neighboring sites, (churches, schools, post office, etc...) which may potentially need to be serviced by this new sewer system. This means their current and future waste water demands must be take into account in the future. These neighboring sites would have to work together to coordinate and raise money for improvements.

Another pump station along the force main run may be required if neighboring developments wish to connect to the proposed system. This may include an increase in force main size as well. A pump station will typically have 2 pumps running at 460 volts/3 phases, which would need to be taken into account for future electric upgrades.

The table below summarizes the sewer force main design if Option B were to be chosen. See Appendix 8.2 - 'Sewer Force Main Design' for more detail and information on the force main design.

Sewer Force Main Summary		
Size	3.00	inch (I.D.)
Length	3,000	FT (estimate)
TDH	13.98	FT
GPM	50.00	GPM
Pump	Flygt C-3045	or approved equal

A single on-site pump station would be able to convey the peak sewage flow from the site to the C&C system for the entire length of force main without any intermediary pump stations (assuming no downstream or future connections from neighboring sites).

5.3 Conclusion & Recommendation

The project plan is to go with Option B. After analyzing Options A through C, Option B is the most feasible. Due to the increase in wastewater demands and the moratorium on increased wastewater loads within the Navy's sewer-shed, Option B would work since only existing wastewater flows are released during normal peak hours, so there shouldn't be any strain on the downstream Navy pump station. The increased on-site wastewater flows will be stored on site and released during off-peak hours when the demand on the existing system is low. In conclusion, the existing wastewater system is feasible, and there is no need to upgrade or install a new wastewater system as long as the holding tank (Option B) is used.

Option B will require a significant increase in cost compared to Option A, but it is still far less expensive than Option C. Option A is not feasible due to the moratorium, and Option C is far too expensive and unnecessary provided that the Navy's pump station is capable of receiving increased wastewater flows from the HFD site during off-peak hours.

5.4 Further Discussion

It is important to note that there have been several conservative assumptions used throughout the wastewater analysis that may overstate potential wastewater requirements. For example:

- In Appendices 8.2 and 8.3, a unit flow of 20 gallons per day per capita was used to determine wastewater flows as a conservative estimate. However, this results in an average daily flow (ADF) of 5,960 gallons per day (gpd), which is much higher than the water demand ADF of 575.7 gpd. Logically, the wastewater flows cannot exceed the water demands, and according to water demand calculations, approximately 70% of the water demand will be used for fire training. Water used for fire training will drain into the drainage system and not into the wastewater system, resulting in a much lower wastewater flow.

- A LEED ratio of 80% male to 20% female was used for water demand calculations. However, a more realistic user ratio of the HFD site is 99% male to 1% female. Females users require more potable water demand than males, so the realistic ratio will reduce water and wastewater demands.

- Under proposed conditions, the gallons per day per occupant load was reduced by approximately half for fixtures such as toilets (3.62 to 1.8) and showers (8.62 to 4.3). Although these reduced values were taken into consideration for this report, lower flows for fixtures are possible. For example, waterless urinals are desired by the developer, which would reduce the demand from 1.8 to basically 0 gallons per day per occupant.

- Proposed Phases II and III are planned for the future; possible ultimate build out may occur after a decade. Since the Navy is in the process of turning over their utility systems to the public or private sector, the existing sewer system may be upgraded to account for this turnover process, especially before the ultimate build-out. This means that Option A for the wastewater system may in fact be feasible, if this upgrade takes place before Phase II is completed. Even under current conditions, the main issue with using the existing system is an issue of conveyance to the wastewater treatment plant (wwtp), and not an issue of capacity of the wwtp.

In summary, conservative values were used for the scope of this report, therefore a more detailed analysis is required for actual design purposes. As a result, actual design results may indicate a significantly lower wastewater requirement than the conservative calculation.

6. DRAINAGE

6.1 Existing Drainage

Currently, the 5.16 acre site consists of several small administrative buildings, a fire station, training tower, several small parking lots, a large paved area, and several small grass/landscaped areas which result in a 67% impervious surface, and a 33% pervious surface. A weighted 'C' factor of 0.70 and a peak flow rate 'Q' for the site of 21.41 cfs were calculated. The site generally drains to the south, with a minor area north of the site draining into the site. See 'Exhibit 7.6 - Existing Site Conditions' for more detail.

There are currently two main storm sewer systems that drain the site, one for the eastern portion and one for the western portion. The eastern portion of the site drains into a series of grate inlets, catch basins, and a trench drain along the entrance of the fire station. This storm sewer system collects as an 18-inch line that connects to an existing 24-inch line along Valkenburgh Street. The western portion of the site drains into a series of grate inlets & catch basins, which eventually collects as a 24-inch line that connects to an existing 24-inch line along Paine Circle. Eventually, the Paine Circle line ties into the Valkenburgh Street line and continues as a 30-inch drain line.

6.2 Future Drainage

The site under future conditions consists of 2 large administrative buildings, the existing fire station and training tower, two main parking lots, a large paved area, and several small grass/landscaped areas. There are two basic options with regards to site imperviousness:

Option 1: Develop the site without pervious pavement. Under ultimate conditions (Phase III), the resulting 'C' factor and peak flow rates are 0.77 and 23.32 cfs, respectively. The impervious area will be increased from 3.47 acres (67% of site under existing conditions) to 4.01 acres (78% of site under future conditions). Since there is an overall increase in peak flows, a storm water detention system would be required; most likely an underground one due to site constraints. A potential location would be in the open paved area around the existing training tower, close to Paine Circle. See 'Exhibit 7.5 - Proposed Utilities' for more detail. The table below highlights several drainage characteristics. See Appendix 8.4 - 'Drainage Analysis' for more detail.

Drainage Summary - Option 1		
	Peak flow (cfs)	Impervious Area (Ac)
Existing	21.41	3.47
Proposed	23.32	4.01
Change (#)	1.91	0.54
Change (%)	8.90%	15.52%
Total Detention Volume (cf)	17,468	

Option 2: Develop the site with pervious pavement. Under ultimate conditions (Phase III), the resulting 'C' factor and peak flow rates are 0.69 and 21.12 cfs, respectively. The impervious area will be decreased from 3.47 acres (67% of site under existing conditions) to 3.39 acres (66% of site under future conditions). Since there is an overall decrease in peak flows, a storm water detention system would not be required. See 'Exhibit 7.7 - Future Site Conditions' for more detail. The table below highlights several drainage characteristics. See Appendix 8.4 - 'Drainage Analysis' for more detail.

Drainage Summary - Option 2		
	Peak flow (cfs)	Impervious Area (Ac)
Existing	21.41	3.47
Proposed	21.12	3.39
Change (#)	-0.29	-0.08
Change (%)	-1.34%	-2.34%
Total Detention Volume (cf)	N/A	

The site will still generally drain towards the south and most of the existing catch basins and grate inlets will be utilized. The drainage system will still connect to the existing 24-inch lines under Paine Circle and Valkenburgh Street.

The site consists of underlying Makalapa (MdB) type soils which are characterized by having high shrink-swell potential, low permeability, and a 1.5-3.5 depth to bedrock. In terms of drainage, this means that a retention system, in which the increase in runoff was allowed to percolate through the soils, may not be feasible. In terms of pervious pavement, if the underlying soils have very low permeability, then the pervious pavement may not be feasible as well. Further geotechnical analysis may be required for such purposes. See 'Exhibit 7.2 - Soils Map' for more detail.

6.3 Conclusion & Recommendation

The project plan is to go with Option 2. Since there is an overall decrease in impervious area, then there is no need to mitigate for increased runoff, i.e. detention. Although there is less grass and landscaped area under Phase III conditions compared to existing conditions, pervious pavement is a simple way to increase pervious area without increasing grass area. Pervious pavement is arguably more pervious than grass and landscaped surfaces. See Appendix 8.4 - 'Drainage Analysis' for more detail. If pervious pavement is not approved or is deemed not feasible due to geotechnical or other reasons, then Option 1, with underground detention would be required. If only a small area of pavement is allowed to be pervious tot he extent that there is an overall increase in the site 'C' factor, then a combination of both options may be required. In conclusion, the existing drainage system is feasible, and there is no need to upgrade or install a new drainage system.

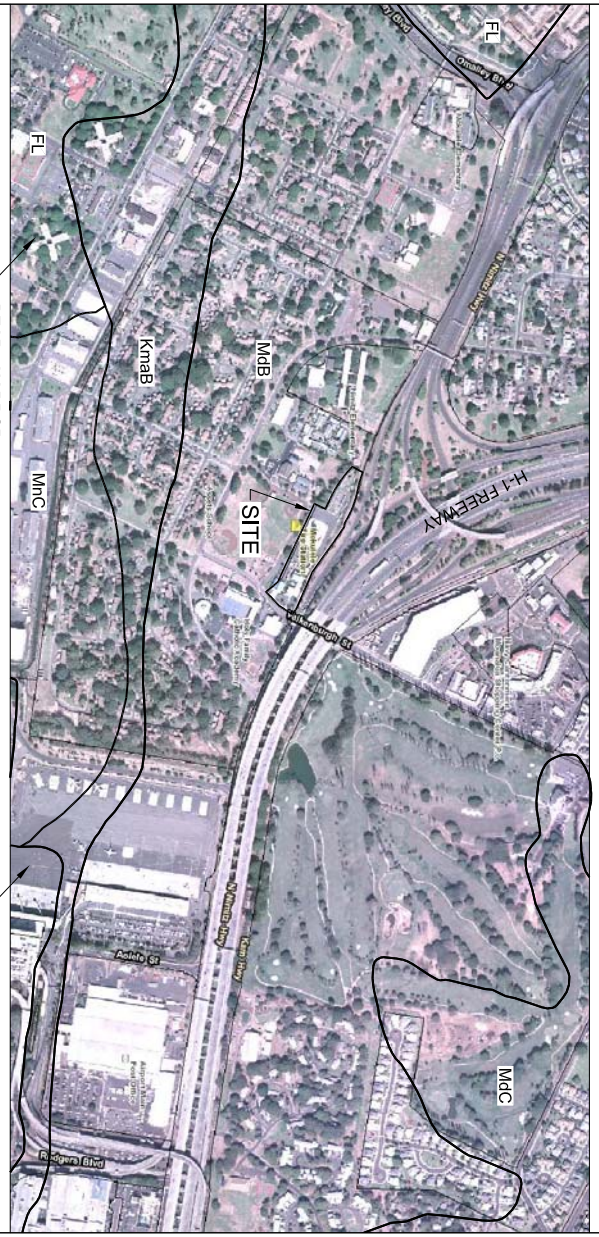
In addition to hydrology and site drainage, best management practices (BMP's) are being implemented as part of another project and will be coordinated with this project. It is likely additional BMP's and possible pretreatment of fire training water will be included in the redevelopment project which is targeted for LEED certification.

HFD REGIONAL FIRE TRAINING CENTER – EXHIBIT 7.1 – LOCATION MAP

City & County of Honolulu Fire Department

SAM O. HIROTA, INC.
ENGINEERS & SURVEYORS
864 So. Beretania Street
Honolulu, Hawaii 96813

Nov 2011



HFD REGIONAL FIRE TRAINING CENTER – EXHIBIT 7.2: SOIL MAP

City & County of Honolulu Fire Department

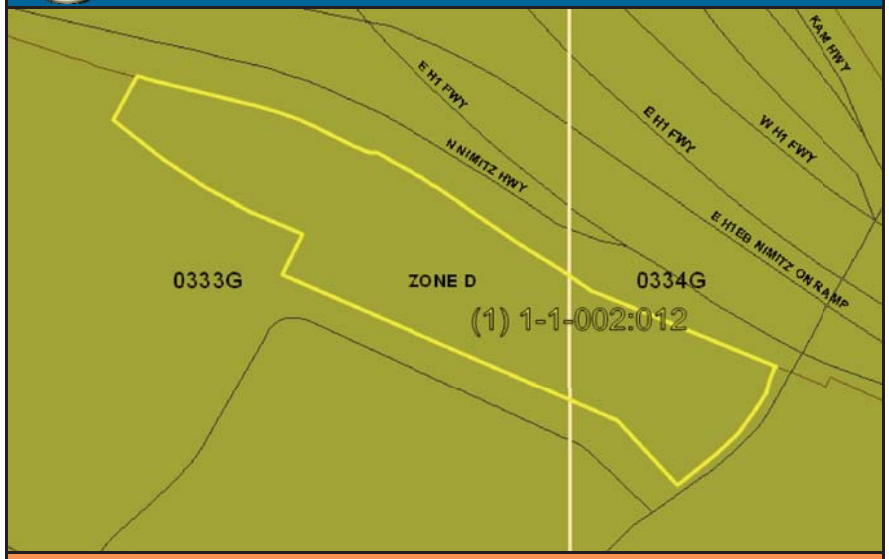
SAM O. HIROTA, INC.
Consulting Civil Engineers
984 Sixth Avenue Street
Honolulu, Hawaii 96813

Nov 2011

EXHIBIT 7.3

State of Hawaii

FLOOD HAZARD ASSESSMENT REPORT



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD ZONE DEFINITIONS

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water-surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- Zone A: No BFE determined.
- Zone AE: BFE determined.
- Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
- Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
- Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA – An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

PROPERTY INFORMATION

COUNTY:	HONOLULU
TMK NO:	(1) 1-1-002-012
PARCEL ADDRESS:	
FIRM INDEX DATE:	JANUARY 19, 2011
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL(S):	15003C0333G-JANUARY 19, 2011 15003C0334G-JANUARY 19, 2011

PARCEL DATA FROM:	JULY 2011
IMAGERY DATA FROM:	MAY 2006

IMPORTANT PHONE NUMBERS

County NFIP Coordinator	
City and County of Honolulu	
Mario Siu-Li, CFM	(808) 768-8098
State NFIP Coordinator	
Carol Tyau-Beam, P.E., CFM	(808) 587-0267

Disclaimer: The Department of Land and Natural Resources assumes no responsibility arising from the use of the information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the Department of Land and Natural Resources from any liability, which may arise from its use.

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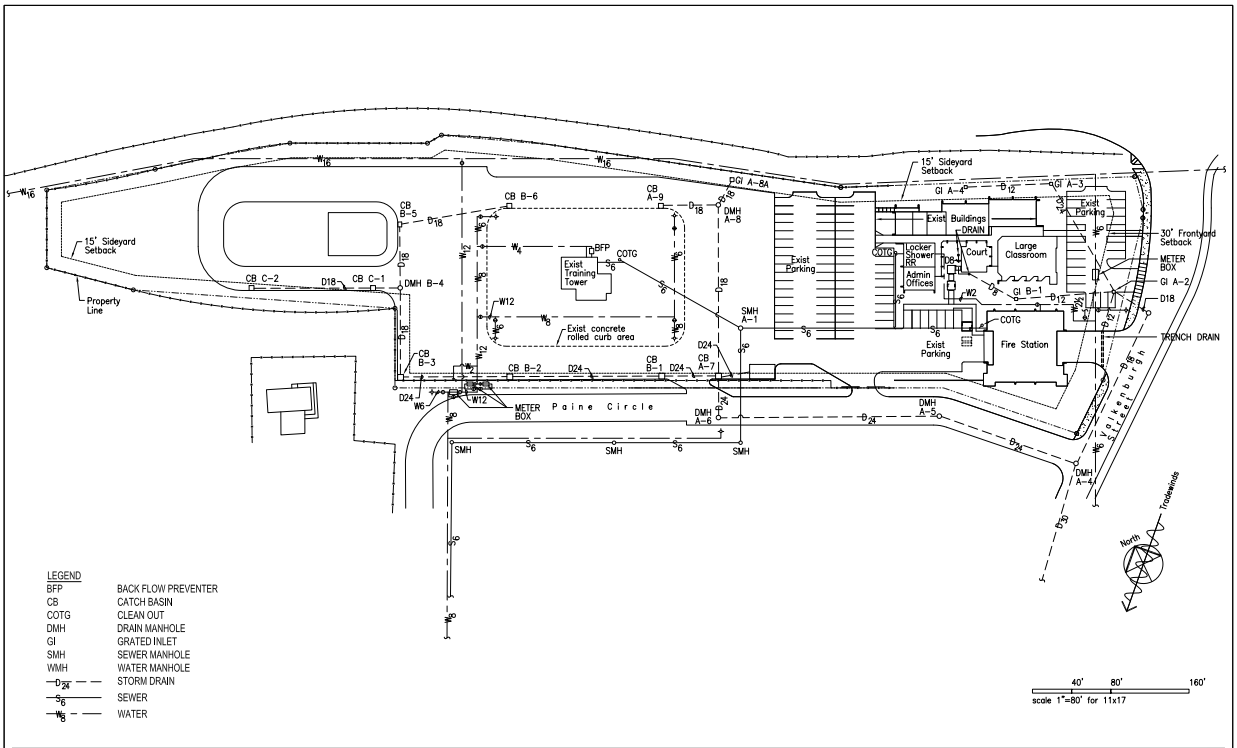


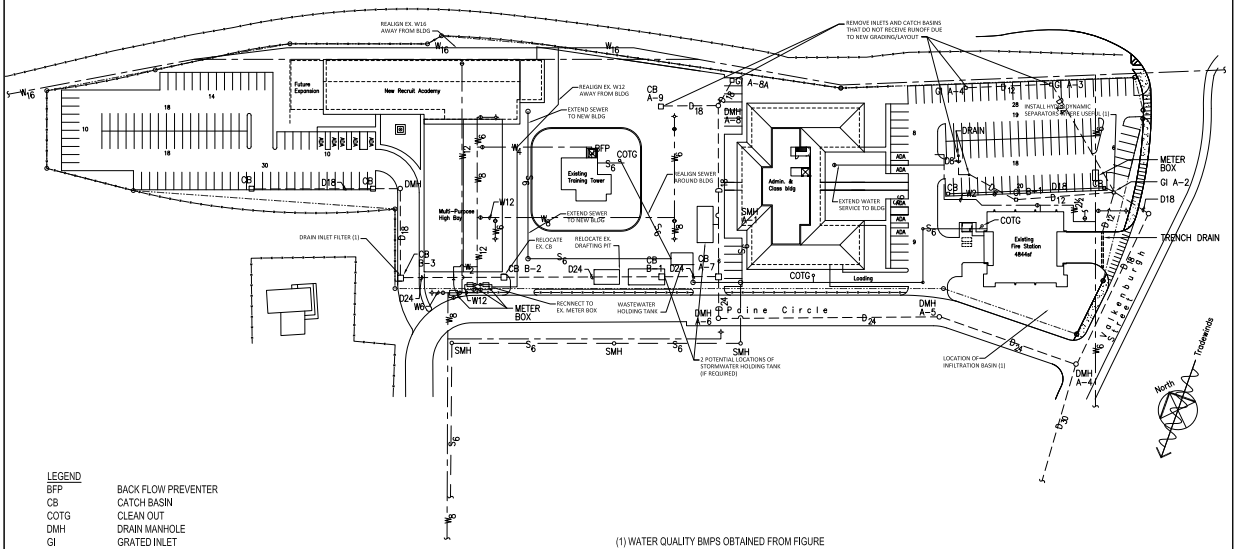
LEGEND

BFP	BACK FLOW PREVENTER
CB	CATCH BASIN
COTG	CLEAN OUT
DMH	DRAIN MANHOLE
GI	GRATED INLET
SMH	SEWER MANHOLE
WMH	WATER MANHOLE
D_{24}	STORM DRAIN
S_6	SEWER
W_8	WATER

40' 80' 160'
scale 1"=80' for 11x17

HFD REGIONAL FIRE TRAINING CENTER – EXHIBIT 7.4 – EXISTING UTILITIES
City & County of Honolulu Fire Department

SAM O. HIROTA, INC.
ENGINEERS & SURVEYORS
864 So. Beretania Street
Honolulu, Hawaii 96813
Nov 2011



LEGEND

BFP	BACK FLOW PREVENTER		
CB	CATCH BASIN		
COTG	CLEAN OUT		
DMH	DRAIN MANHOLE		
GI	GRATED INLET		
SMH	SEWER MANHOLE		
WMH	WATER MANHOLE		
D_{24}	EX. STORM DRAIN	D_{24}	PROP. STORM DRAIN
S_6	EX. SEWER	S_6	PROP. SEWER
W_8	EX. WATER	W_8	PROP. WATER

(1) WATER QUALITY BMPS OBTAINED FROM FIGURE AA-7 OF "STORM WATER ASSESSMENT PLANNING REPORT" BY BELT COLLINS, JUNE, 2011.

40' 80' 160'
scale 1"=80' for 11x17

HFD REGIONAL FIRE TRAINING CENTER EXHIBIT 7.5 – PROPOSED UTILITIES
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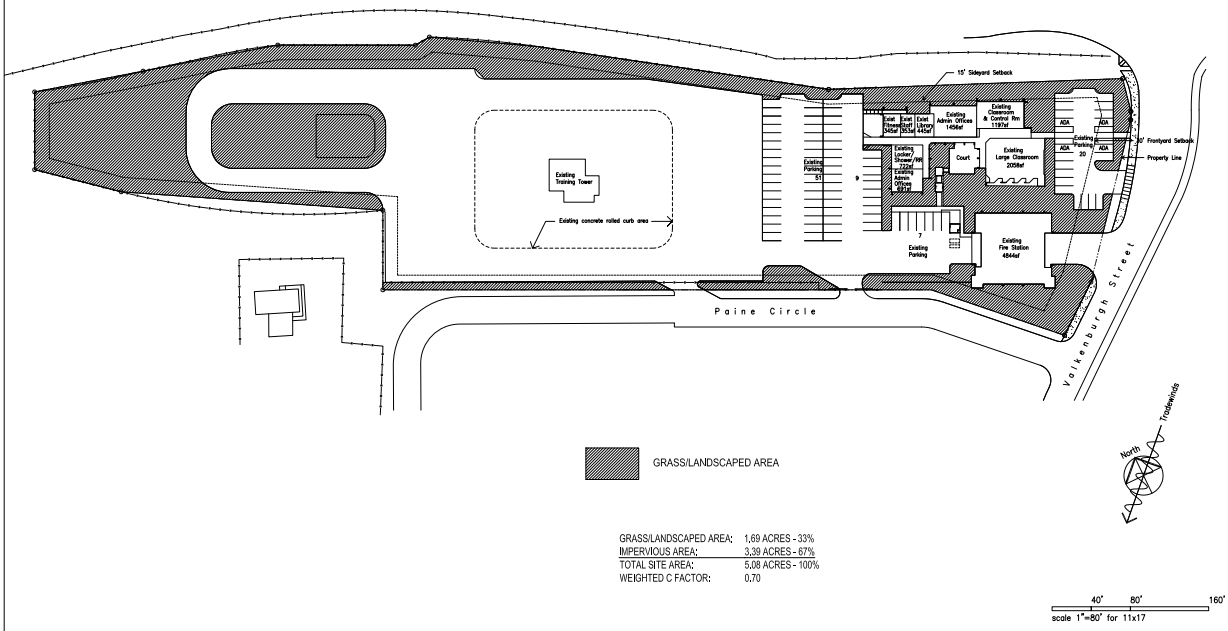

GRASS/LANDSCAPED AREA

GRASS/LANDSCAPED AREA:	1.69 ACRES - 33%
IMPERVIOUS AREA:	3.39 ACRES - 67%
TOTAL SITE AREA:	5.08 ACRES - 100%
WEIGHTED C FACTOR:	0.70

40' 80' 160'
scale 1"=80' for 11x17

HFD REGIONAL FIRE TRAINING CENTER – EXHIBIT 7.6 – EXISTING CONDITIONS
City & County of Honolulu Fire Department

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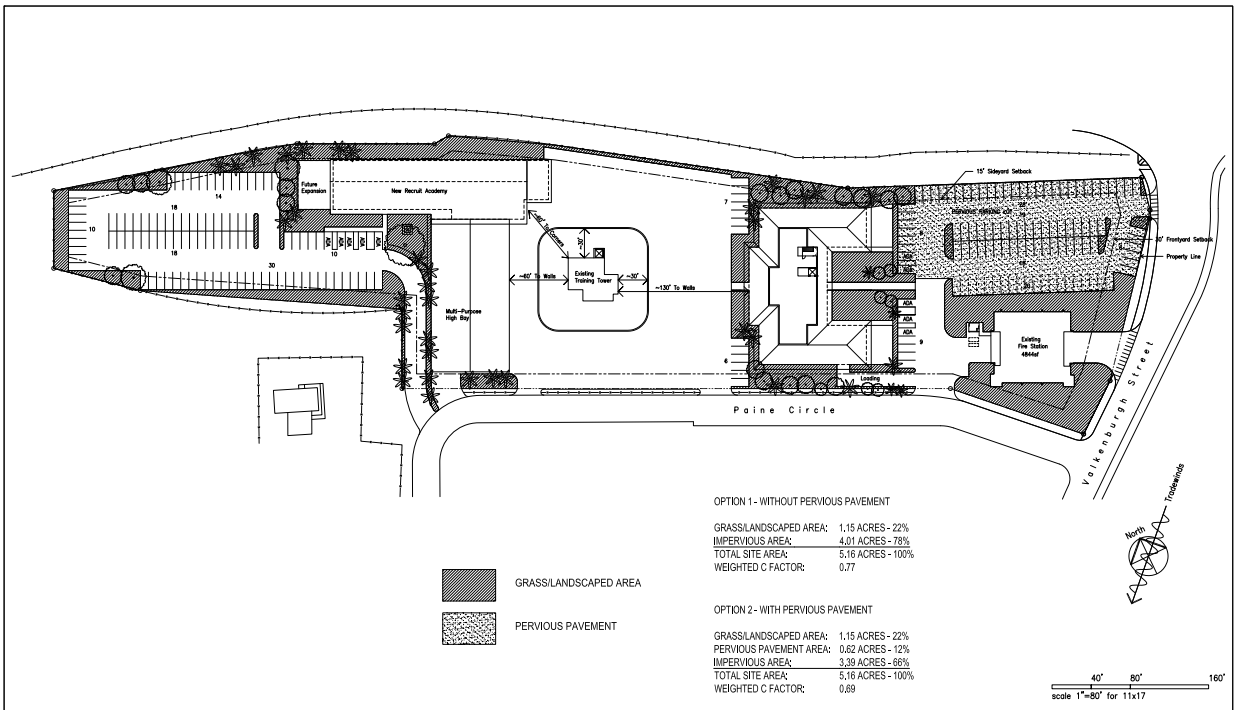

GRASS/LANDSCAPED AREA

PERVIOUS PAVEMENT

OPTION 1 - WITHOUT PERVIOUS PAVEMENT

GRASS/LANDSCAPED AREA:	1.15 ACRES - 22%
IMPERVIOUS AREA:	4.01 ACRES - 78%
TOTAL SITE AREA:	5.16 ACRES - 100%
WEIGHTED C FACTOR:	0.77

OPTION 2 - WITH PERVIOUS PAVEMENT

GRASS/LANDSCAPED AREA:	1.15 ACRES - 22%
PERVIOUS PAVEMENT AREA:	0.62 ACRES - 12%
IMPERVIOUS AREA:	3.39 ACRES - 66%
TOTAL SITE AREA:	5.16 ACRES - 100%
WEIGHTED C FACTOR:	0.89

40' 80' 160'
scale 1"=80' for 11x17

HFD REGIONAL FIRE TRAINING CENTER – EXHIBIT 7.7 – FUTURE CONDITIONS
City & County of Honolulu Fire Department

SAM O. HIROTA, INC.
ENGINEERS & SURVEYORS
864 So. Beretania Street
Honolulu, Hawaii 96813 **Nov 2011**

Appendix 8.1 - Water Main Design

Water Main Data		
Required Flow (gpm) =	2000	Fire flow determined by BWS
Water Main Size (in) =	**12.00**	Inside Diameter
Material =	Ductile Iron	
Hazen-Willams 'C' =	110	Value for 8", 12" WM per BWS
Water Main Length (ft) =	2,600	
Start Elevation =	26.00	Elevation at BWS Source
End Elevation =	25.00	Elevation at Site
Discharge Head (Hd) =	1.00	Ft, (Start elev - End elev)
Velocity (fps) =	5.67	

Friction Head Loss Calculation			
Item	Number of Fittings	L/D Ratio	Equivalent Length
45 bend	15	16	240.00
90 bend	15	30	450.00
22.5 bend	15	9	135.00
Branch Tee Flow	2	60	120.00
Check valve	2	135	270.00
Plug Valve	2	17	34.00
Equivalent Fitting Length (ft) =			1249
Total Equivalent Force Main Length (ft) =			3849
Total Friction Loss (Hf) (ft) =			**20.90**

Transmission Analysis		
Static Pressure at source =	66.00	PSI
Residual Pressure at source =	60.00	PSI
Elevation at source =	26.00	Ft
Flow Rate at source =	2000	GPM
Required Flow at Site (fire flow) =	2000	GPM @ 20 PSI
Residual Pressure at Site =	60.00	
Total Dynamic Head (TDH) =	19.90	= Hf (friction) - Hd (elevation)
Check: Residual Pressure at Site > TDH	**OK**	

NOTES:
- Required Fireflow and watermain length were determined by BWS in a letter from them received on 9-30-2011.
- 'End Invert' was determined from As-Built drawings of the existing fire station
- 'Hazen-Williams C' was determined from BWS Standards, Table 100-21.
- Every other input value was assumed. (Shaded cell = input cell)
- Pressures, flow, and elevation at BWS have been requested, and calculations will be revised once they are received.

Appendix 8.2 - Sewer Force Main Design

Peak Flow Calculation - C&C Method		
Total # of personnel =	298	
Unit flow =	20	GPCD
Total flow (ADF) =	5,960	GPD
Total flow (ADF) =	4.14	GPM
Extreme Peak Factor =	8.95	
Extreme Peak Flow =	53,314	GPD
Design Peak Flow =	60,000	GPD
Design Peak Flow =	41.67	GPM, (min. pump rate req'd)
Design Pump Flow Rate =	50.00	GPM

Force Main Design		
Design Pump Rate (gpm) =	50	
Select Force Main Size (in) =	**3.00**	Inside Diameter
Material =	PVC-80	
Hazen-Willams 'C' =	130	
Line Length (ft) =	3,000	
Start Invert =	15.00	('Lead Pump On' elev.)
End Invert =	20.00	(Inv. In at Ex. Wet Well)
Discharge Head (Hd) =	5.00	Ft, (End elev - Start elev)
Velocity (fps) =	2.27	
Meets Minimum Velocity Requirement?	**OK > 2 FPS**	
Meets Maximum Velocity Requirement?	**OK < 10 FPS**	

Friction Head Loss Calculation			
Design Pump Rate (gpm) =			50
Wet Well & Valve Vault Piping Size (in) =			**3.00**
Velocity (Q/A) (fps) =			2.27
Meets Minimum Velocity Requirement?			**OK > 2 FPS**
Meets Maximum Velocity Requirement?			**OK < 10 FPS**
Item	Number of Fittings	L/D Ratio	Equivalent Length
45 bend	10	16	40.00
90 bend	10	30	75.00
22.5 bend	10	9	22.50
Branch Tee Flow	2	60	30.00
Check valve	2	135	67.50
Plug Valve	2	17	8.50
Equivalent Fitting Length (ft) =			244
Wet Well & Valve Vault Piping Length (ft) =			10
Total Equivalent Pump Station Pipe Length (ft) =			254
Total Equivalent Force Main Length (ft) =			3254
Total Friction Loss (Hf) (ft) =			**11.98**

Transmission Analysis		
Suction Head (Hs) =	3.00	Ft, (assumed)
Discharge Head (Hd) =	5.00	Ft
Friction Head (Hf) =	11.98	Ft
Total Dynamic Head (TDH) =	**13.98**	Ft, (Hd - Hs + Hf)
Recommeded Pump =	Flygt C-3045	(or approved equal)
Pump Operating Pressure =	14.10	Ft
Pump Operating Flow =	50.20	GPM
Check: Pump Operating Pressure > TDH	**OK**	(@ selected duty point)

NOTES:
- ADF determined by mechanical calculations for Monday-Friday loads, all 3 phases.
- Extreme Peak Factor per section UFC 3-240-06A, equation 3-1-b.
- GPM (gallons per minute) = GPD (gallons per day)/24 work hours per day/60 minutes per hour.
- GPCD (Gallons per capita per day)
- Shaded cell = input cell

Appendix 8.3 - Wastewater Holding Tank Design

Daily Flow Calculation		
Existing Conditions No. of personnel =	105	
Proposed Conditions No. of personnel =	298	
Remaining No. of personnel (increase) =	193	
Unit Flow =	20	GPCD
Total Daily Flow (increase) =	3,860	GPD
Resulting Total Daily Flow (increase) =	516	Cu Ft

Holding Tank Dimensions		
Wet Well Length =	10.00	Ft
Wet Well Width =	10.00	Ft
Wet Well Max Height (Depth) =	6.00	Vert. Ft
Total Volume in Wet Well =	4,488.00	Gallons
Total Volume in Wet Well =	600.00	Cu Ft

Over-capacity *16.27%*

Check: Total daily flow < Vol in wet well. = **OK**

NOTES:
- This calculation was performed to analyze an option of holding the daily sewage flows in an underground tank, and then discharging during off-peak late night hours.
- Existing conditoins flows are allowed to discharge at normal time throughout the day, only the increased flows are to be held in the tank.
- The weekday ADF was used to determine the volume by multiplying the gallons per minute rate out to cover a 24 day period. The sewage would presumably be pumped out into the receiving gravity sewer system at the end of the 24 hour period.
- The pump recommended for the wet well/force main would not be applicable here. A separeate pump analysis would need to be performed.
- GPCD (Gallons per capita per day) - GPD (Gallons per day)
- shaded cell = input cell

Appendix 8.4 - Drainage Analysis

10-Year 1-Hour Storm Peak Flow Calculation

Condition	Area (Sq ft)	Area (Ac)	Cw	Tc (min)	I(in)	CF	Total Q (cfs)	
Existing	224,770	5.16	0.70	6.00	2.20	2.68	**21.41**	
Proposed - Option 1	224,770	5.16	0.77	6.00	2.20	2.68	**23.32**	1.91 cfs increase
Proposed - Option 2	224,771	5.16	0.69	6.00	2.20	2.68	**21.12**	0.29 cfs decrease

(Q = Area x Cw x I x CF)

Weighted Average C Factor Calculation (Cw)

Existing	Area (Ac)	% Area	C	Adj. C
Impervious Area =	3.47	67%	0.90	0.61
Grass/Landscaped Area =	1.69	33%	0.30	0.10
			Cw	**0.70**
Proposed - Option 1	Area (Ac)	% Area	C	Adj. C
Impervious Area =	4.01	78%	0.90	0.70
Grass/Landscaped Area =	1.15	22%	0.30	0.07
			Cw	**0.77**
Proposed - Option 2	Area (Ac)	% Area	C	Adj. C
Impervious Area =	3.39	66%	0.90	0.59
Grass/Landscaped Area =	1.15	22%	0.30	0.07
Pervious Pavement Area =	0.62	12%	0.30	0.04
			Cw	**0.69**

= more pervious than existing conditions

Stormwater Quantity & Quality Calculations (Option 1)			
Volume of Runoff (Existing)	38,538	Cu Ft	= Ex Q x (3600/2)
Volume of Runoff (Proposed)	41,969	Cu Ft	= Prop Q x (3600/2)
Increase in Volume	3,431	Cu Ft	= Prop - Ex
Quality Runoff Coefficient C	0.749		= 0.05 + 0.009 x Impervious Area%
Quality Volume (for 1" of rain)	14,037	Cu Ft	= C x 1"x Area x 3630
Drawdown Time	24	hours	
Rate of Drawdown	0.162	cfs	=Qualilty Volume/(Drawdown Time x 60^2)
Total Detention Volume	**17,468**	**Cu Ft**	= Increase in Volume + Quality Volume

NOTES:
- I(in) and CF values from "Rules Relating to Storm Drainage Standards", City & County of Honolulu plates 2 and 3, Updated April 2011
- Tc formula was obtained from UFC 3-230-1, and assumed to be 5 minutes for a more conservative result.
- shaded cell = input cell

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
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Deputy Manager

April 1, 2011

APR - 5 2011

Ms. Christine Mendes Ruotola
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Ruotola:

Subject: Your Letter Dated March 23, 2011 Requesting on the Pre-Consultation for Draft Environmental Assessment, Honolulu Fire Department Regional Training Center, TMK: 1-1-2: 12

Thank you for the opportunity to comment on the proposed HFD training center.

We understand the consultant is inquiring on the possibility of serving the proposed training center with the Navy's water system.

If water service is not available from the Navy and water service is requested from the Honolulu Board of Water Supply (BWS), the applicant will be required to extend approximately 2600 linear feet of water main from the end of the existing BWS water system to the parcel, and install a fire hydrant. However, please be advised that this information is based upon current data and, therefore, the BWS 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.

If water is made available from the BWS, 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.

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

Very truly yours,

PAUL S. KIKUCHI
Chief Financial Officer
Customer Care Division

Appendix D
Traffic Impact Report

Traffic Impact Report

HFD Regional Fire Training Center

Prepared for:
Group 70 International, Inc.

Prepared by:
Wilson Okamoto Corporation

June 2011

TRAFFIC IMPACT REPORT

FOR THE

CITY & COUNTY OF HONOLULU FIRE DEPARTMENT

REGIONAL FIRE TRAINING CENTER

Prepared for:

Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813

Prepared by:

Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOC Ref: 8188-01

June 2011

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I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess the traffic impacts resulting from the proposed City & County of Honolulu Fire Department (HFD) Regional Fire Training Center in Honolulu on the island of Oahu. The proposed project entails the replacement of the existing Charles H. Thurston Fire Training Center with a new Regional Fire Training Center and reconstruction of the existing Mokulele Fire Station adjacent to Valkenburgh Street near the Honolulu International Airport.

B. Scope of Study

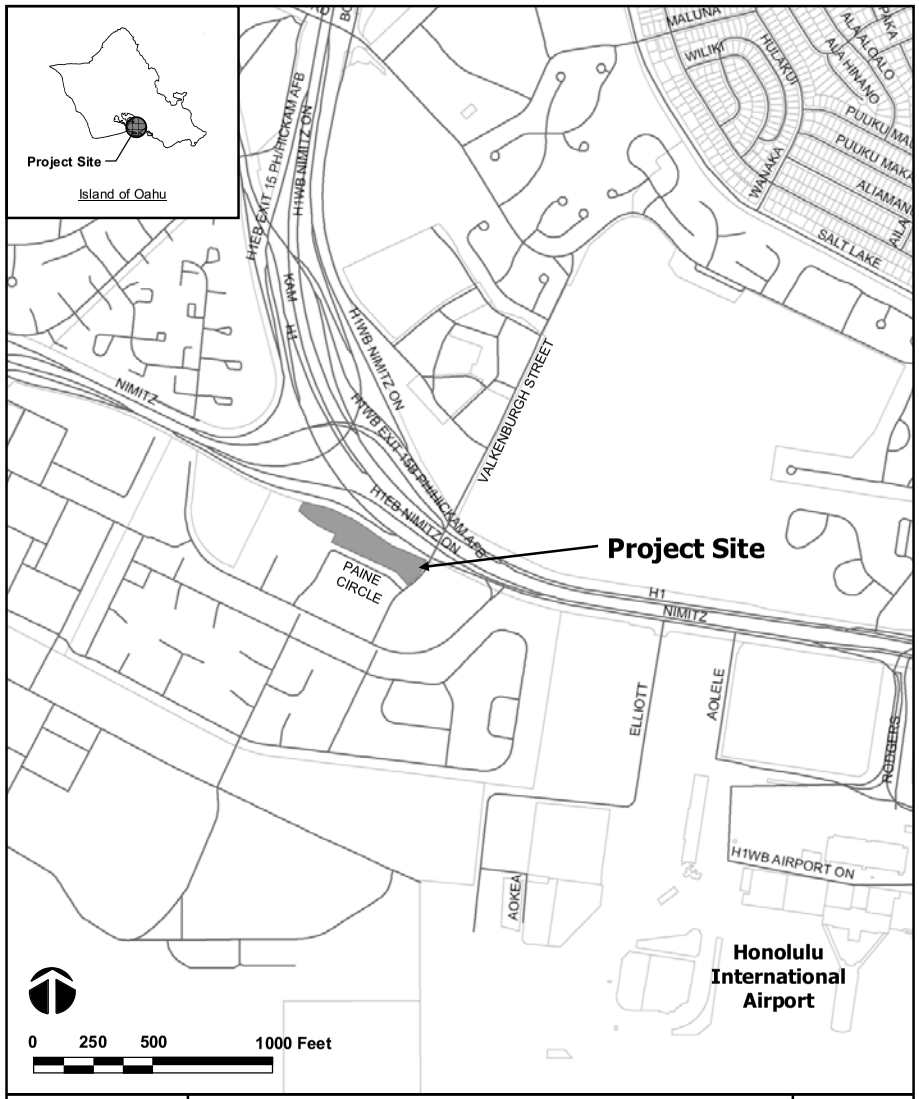
This report presents the findings and conclusions of the traffic study, the scope of which includes:

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

II. PROJECT DESCRIPTION

A. Location

The HFD Regional Fire Training Center will be located near the Honolulu International Airport adjacent to Valkenburgh Street south of Nimitz Highway (see Figure 1). The project site is further identified as Tax Map Key 1-1-002: 012. Access to the proposed training center will be provided via driveways off Valkenburgh Street and Paine Circle.



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HFD REGIONAL FIRE TRAINING CENTER

LOCATION AND VICINITY MAP

FIGURE 1

B. Project Characteristics

The 5.16-acre project site located adjacent to Valkenburgh Street currently houses the Charles H. Thurston Fire Training Center and Mokulele Fire Station (see Figure 2). The existing training center currently houses classrooms, administrative offices, inoperable burn model training tower, library, fitness facility, 24/7 fire investigation section, medical services office, and storage areas. These existing facilities are inadequate to meet the current and future needs of the HFD fire training program and, as such, the HFD plans to replace the existing facility with a Regional Fire Training Center. The new training center is expected to be completed by the Year 2025 and will include:

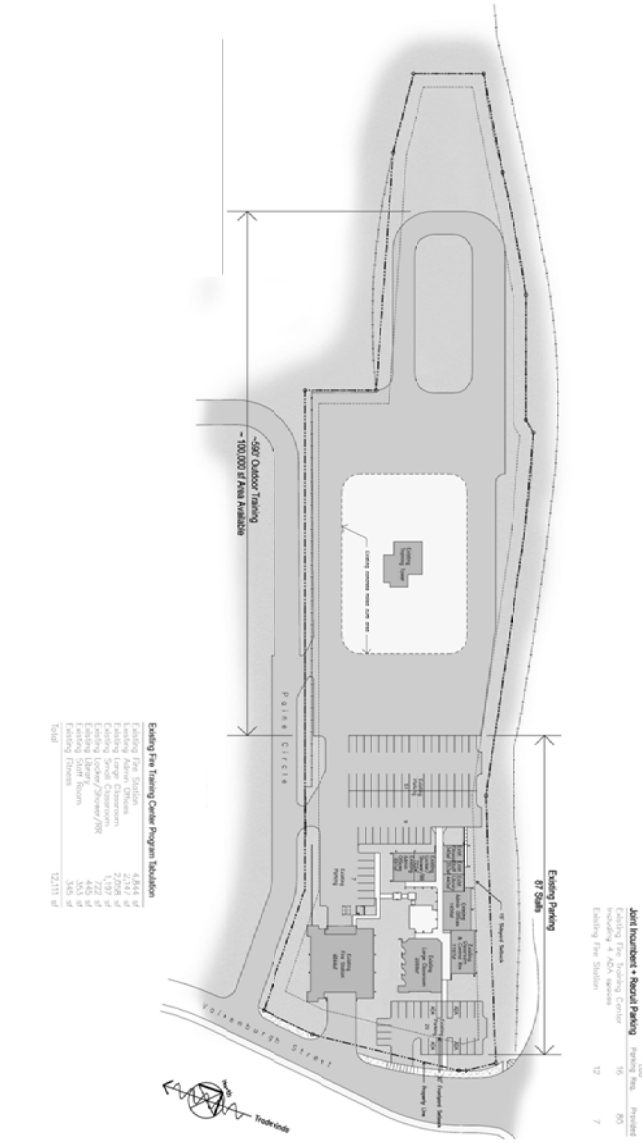
- Recruit Training Academy with classrooms, administrative offices, and support facilities
- Multi-purpose High Bay Building with mobile asset storage and training facilities
- Support Services Facility with administrative offices, support facilities, and classrooms for incumbent firefighter training

In addition, the proposed project includes the reconstruction of the existing Mokulele Fire Station. Access will continue to be provided via driveways off Valkenburgh Street and Paine Circle. Figure 3 includes the proposed project site plan.

III. EXISTING TRAFFIC CONDITIONS

A. Area Roadway System

Adjacent to the project site, Valkenburgh Street is a predominantly two-lane, two-way roadway generally oriented in the north-south direction. Northeast of the project site, Valkenburgh Street intersects the westbound direction of traffic along Nimitz Highway. At this signalized intersection, the northbound approach of Valkenburgh Street has an exclusive left-turn lane and two through lanes while the southbound approach has one through lane and a shared through and right-turn lane. In the vicinity of the project site, Nimitz Highway is a two-way, divided roadway generally oriented in the east-west direction. At the intersection with Valkenburgh Street, the westbound approach of Nimitz Highway has three lanes that serve all traffic movements.



HFD REGIONAL FIRE TRAINING CENTER

EXISTING SITE PLAN

FIGURE 2

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South of the intersection with the westbound direction of traffic along Nimitz Highway, Valkenburgh Street intersects the eastbound direction of traffic along Nimitz Highway. At this signalized intersection, the northbound approach of Valkenburgh Street has two lanes that serve through and right-turn traffic movements while the southbound approach has two lanes that serve left-turn and through traffic movements. The eastbound approach of Nimitz Highway has three lanes at this intersection that serve all traffic movements.

Further south, Valkenburgh Street intersects Paine Circle. At this unsignalized T-intersection, the northbound approach of Valkenburgh Street has one lane that serves left-turn and through traffic movements while the southbound approach has one lane that serves through and right-turn traffic movements. Paine Circle is a two-lane, two-way roadway that provides access to adjacent HFD facility and Holy Family Catholic Academy. At the intersection with Valkenburgh Street, Paine Circle has one stop-controlled lane that serves left-turn and right-turn lanes.

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

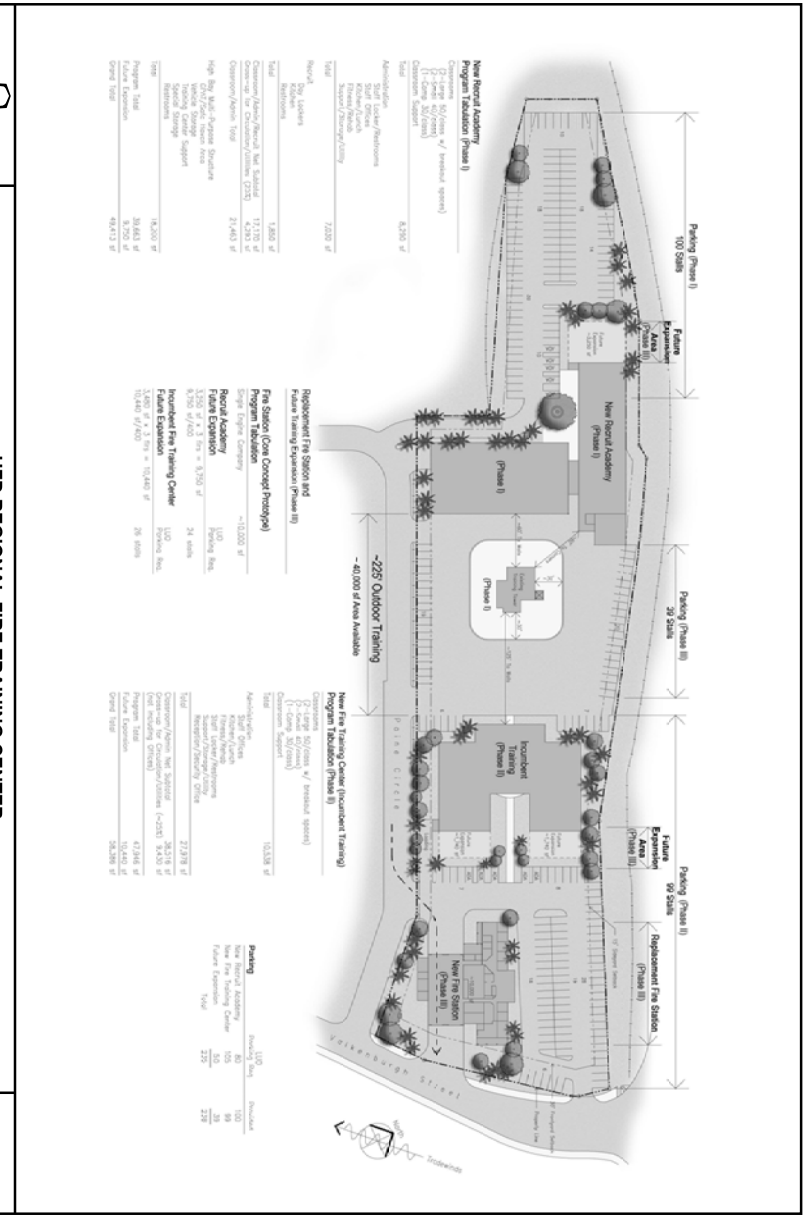
The field investigations were conducted on February 1, 2011, and consisted of manual turning movement count surveys and traffic flow assessments during the morning peak hours of 6:00 AM and 9:00 AM, and between the afternoon peak hours of 3:00 PM and 6:00 PM at the following intersections:

- Valkenburgh Street and Nimitz Highway (Westbound)
- Valkenburgh Street and Nimitz Highway (Eastbound)
- Valkenburgh Street and Paine Circle
- Valkenburgh Street and HFD driveways
- Paine Circle and HFD driveways

Appendix A includes the existing traffic count data.

b. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual",



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HFD REGIONAL FIRE TRAINING CENTER

PROPOSED SITE PLAN

FIGURE 3

Transportation Research Board, 2000, and the "Highway Capacity Software", developed by the Federal Highway Administration. The analysis is based on the concept of Level of Service (LOS).

LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" representing ideal or free-flow traffic operating conditions and LOS "F" representing unacceptable or potentially congested traffic operating conditions.

"Volume-to-Capacity" (v/c) ratio is another measure indicating the relative traffic demand to the roadway carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at or near capacity. A v/c ratio of greater than 1.00 generally indicates that the traffic demand exceeds the road's carrying capacity. The LOS definitions are included in Appendix B.

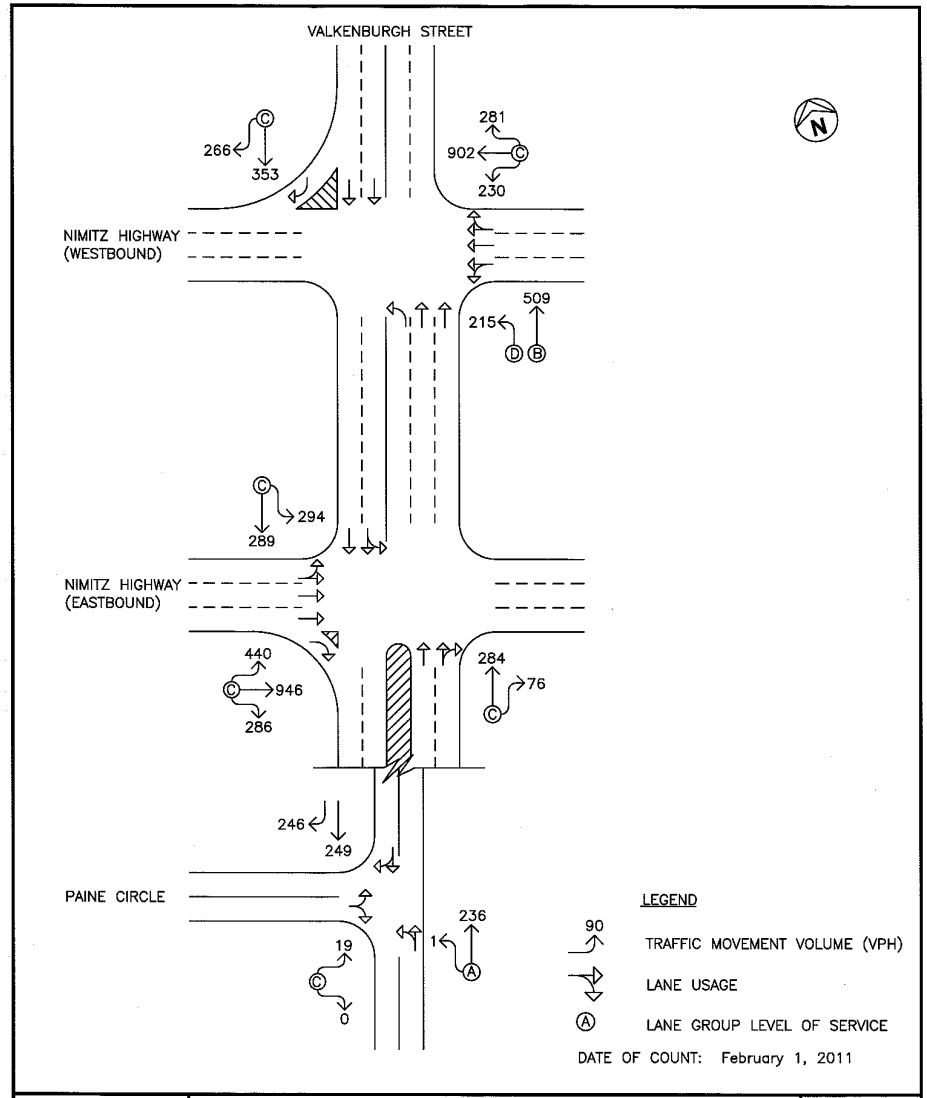
2. Existing Peak Hour Traffic

a. General

Figures 4 and 5 show the existing AM and PM peak period traffic volumes and traffic operating conditions. The AM peak hour of traffic generally occurs between the hours of 7:00 AM and 8:00 AM. During the afternoon, the PM peak hour of traffic generally occurs between the hours of 4:30 PM and 5:30 PM. The analysis is based on these peak hour time periods for each intersection to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix C.

b. Valkenburgh Street and Nimitz Highway (Westbound)

At the intersection with the westbound direction of traffic along Nimitz Highway, Valkenburgh Street carries 724 vehicles northbound and 619 vehicles southbound during the AM peak period. During the PM peak period, the overall traffic volume is slightly higher with 603 vehicles traveling northbound and 776 vehicles traveling southbound.



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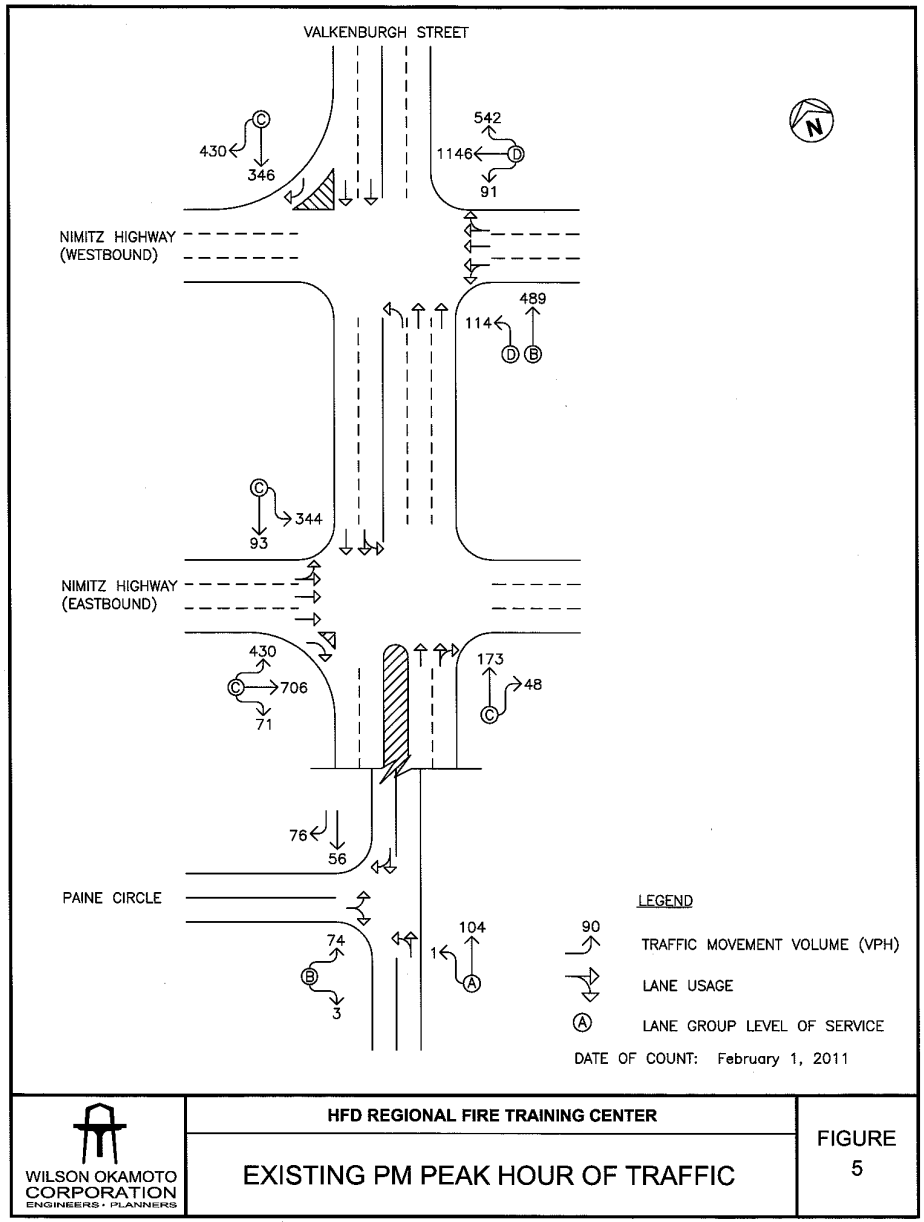
EXISTING AM PEAK HOUR OF TRAFFIC

FIGURE 4



The critical traffic movements on the Valkenburgh Street approaches of the intersection are the northbound left-turn traffic movement which operates at LOS "D" during both peak periods and the southbound approach which operates at LOS "C" during both peak periods. Vehicular queues periodically formed on the Valkenburgh Street approaches with the most significant queuing occurring during the PM peak period. During this period, average queue lengths of 6-8 vehicles were observed on the northbound approach and 10-12 vehicles on the southbound approach. Most of these queues were observed to clear the intersection after each traffic signal cycle change.

The Nimitz Highway approach of the intersection carries 1,413 vehicles and 1,779 vehicles westbound during the AM and PM peak periods, respectively. Vehicular queues periodically formed on the Nimitz Highway approach of the intersection with the most significant queuing occurring during the PM peak period. During this period, average queue lengths of 17-19 vehicles were observed on this approach. Most of these queues were observed to clear the intersection after each traffic signal cycle change.

c. Valkenburgh Street and Nimitz Highway (Eastbound)

At the intersection with the eastbound direction of traffic along Nimitz Highway, Valkenburgh Street carries 360 vehicles northbound and 583 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are less with 221 vehicles traveling northbound and 437 vehicles traveling southbound. Both approaches of Valkenburgh Street operate at LOS "C" during both peak periods. Vehicular queues periodically formed on the Valkenburgh Street approaches with average queue lengths of 3-5 vehicles observed on the northbound approach and 6-8 vehicles on the southbound approach during both peak periods. Most of these queues were observed to clear the intersection after each traffic signal cycle change.

The Nimitz Highway approach of the intersection carries 1,672 vehicles and 1,207 vehicles eastbound during the AM and PM peak periods, respectively. Vehicular queues periodically formed on the Nimitz Highway approach of the intersection with the most significant queuing occurring during the AM peak period. During this period, average queue lengths of 10-12 vehicles were observed on this approach. Most of these queues were observed to clear the intersection after each traffic signal cycle change.

d. Valkenburgh Street and Paine Circle

At the intersection with Paine Circle, Valkenburgh Street carries 237 vehicles northbound and 495 vehicles southbound during the AM peak period, and 105 vehicles northbound and 132 vehicles southbound during the PM peak period. The Paine Circle approach of the intersection carries 19 vehicles and 77 vehicles eastbound during the AM and PM peak periods, respectively. The critical movement at this intersection is the Paine Circle approach which operates at LOS "C" and LOS "B" during the AM and PM peak periods, respectively.

IV. PROJECTED TRAFFIC CONDITIONS

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 8th Edition," 2008. On a typical day, the existing training center and fire station can have up to a total of 100 personnel on-site that arrive during the AM peak period and depart during the PM peak period. With the proposed project, this total number is expected to increase by approximately 121 personnel (see Appendix D for the HFD personnel projections). Table 1 summarizes the project site trip generation characteristics applied to the AM and PM peak periods of traffic.

Table 1: Peak Hour Trip Generation

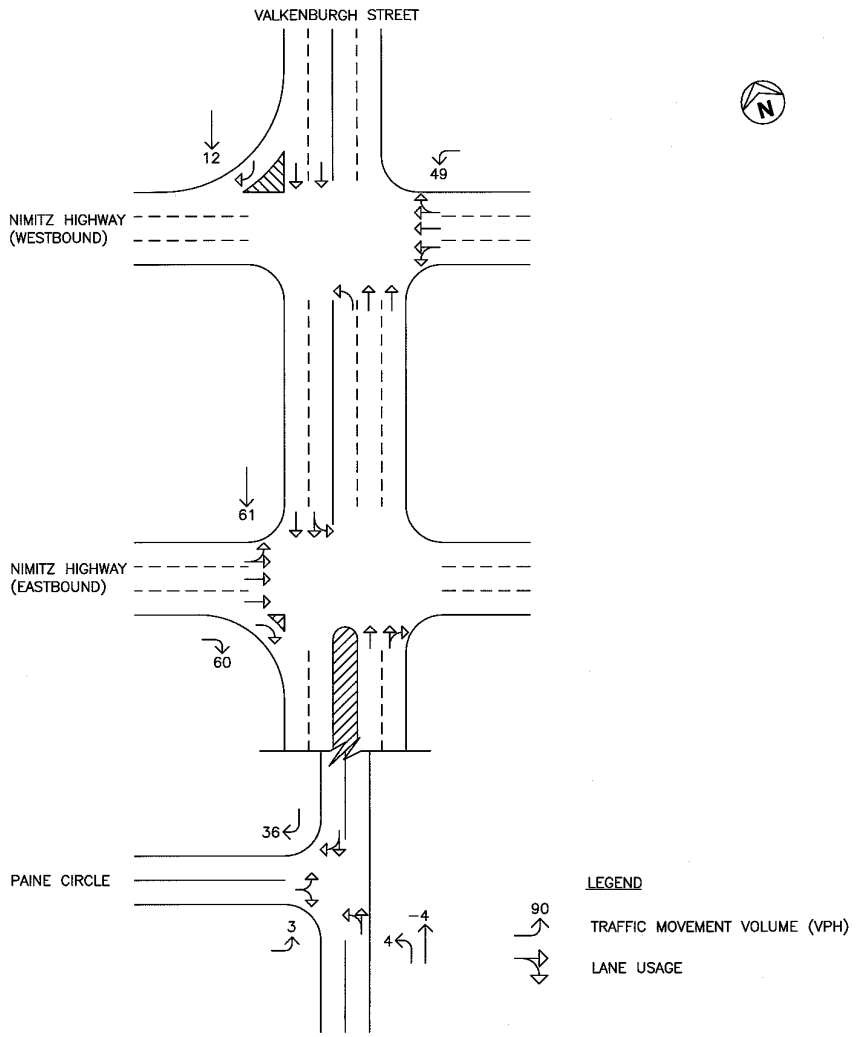
HFD REGIONAL FIRE TRAINING CENTER		
INDEPENDENT VARIABLE:		Personnel = 121 (net increase)
		PROJECTED TRIP ENDS
AM PEAK	ENTER	121
	EXIT	0
	TOTAL	121
PM PEAK	ENTER	0
	EXIT	121
	TOTAL	121

2. Trip Distribution

Figures 6 and 7 show the distribution of site-generated vehicular trips at the study intersections during the AM and PM peak hours of traffic. Access to the proposed training center will be provided via driveways off Valkenburgh Street and Paine Circle. The parking lot adjacent to Valkenburgh Street is expected to be primarily utilized by full-time staff and incumbents with recruits expected to utilize the parking areas adjacent to Paine Circle. Due to the proximity of the northern driveway along Valkenburgh Street to Nimitz Highway, traffic movements at this driveway are assumed to be restricted to right-turn-in and right-turn-out traffic movements only. As such, new and existing site-generated trips were distributed or redistributed between the project driveways based upon their function and the allowable movements at the driveway connections. All of these trips are assumed to be headed to/from Nimitz Highway with the directional distribution at Nimitz Highway expected to remain similar to existing conditions. In addition, the existing left-turn traffic movements at the driveway along Valkenburgh Street were reassigned based upon the proposed driveway connections due to the future turning restrictions at that driveway.

B. Through Traffic Forecasting Methodology

Historical traffic count data obtained from the State Department of Transportation (SDOT), Highway Division survey stations in the vicinity of the



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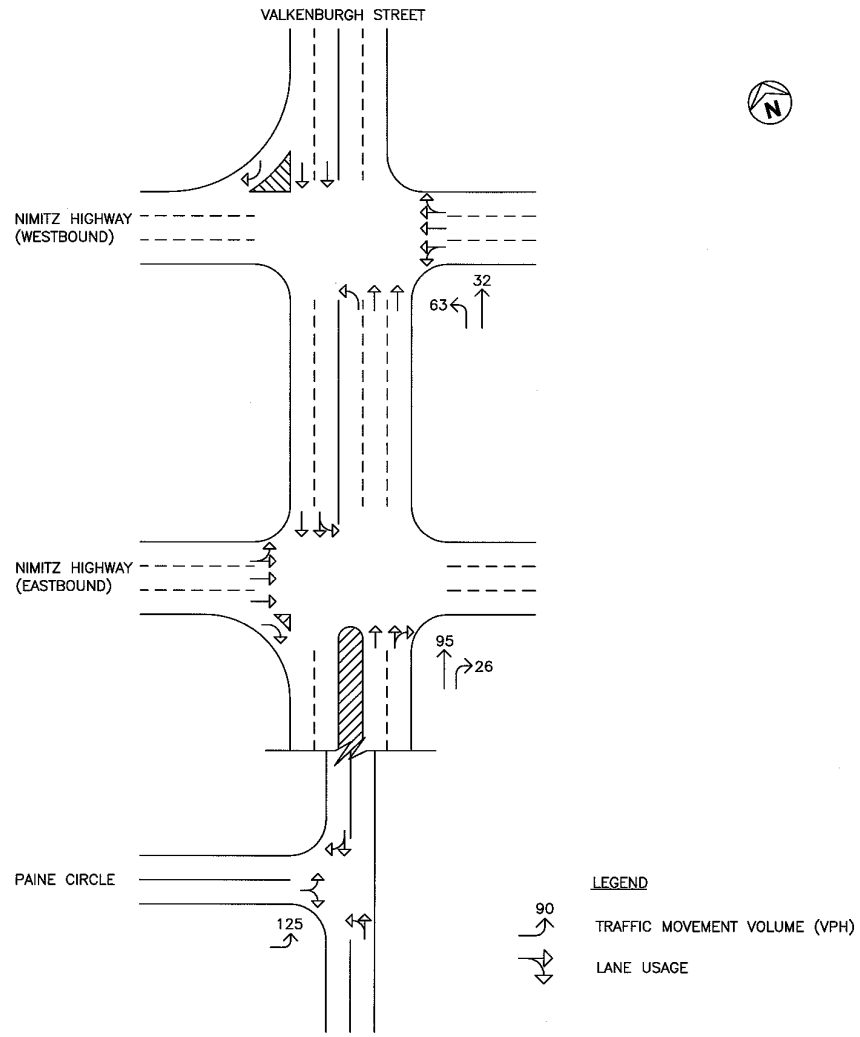
HFD REGIONAL FIRE TRAINING CENTER

DISTRIBUTION OF SITE-GENERATED VEHICLES - AM PEAK HOUR OF TRAFFIC

FIGURE 6



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HFD REGIONAL FIRE TRAINING CENTER

DISTRIBUTION OF SITE-GENERATED VEHICLES - PM PEAK HOUR OF TRAFFIC

FIGURE 7

project site indicates declining or stable growth in traffic along Nimitz Highway. As such, an annual traffic growth rate of approximately 0.5% per year was conservatively assumed in the project vicinity. Using 2011 as the Base Year, a growth factor of 1.07 was applied to the existing traffic demands along Nimitz Highway to achieve the projected Year 2025 traffic demands.

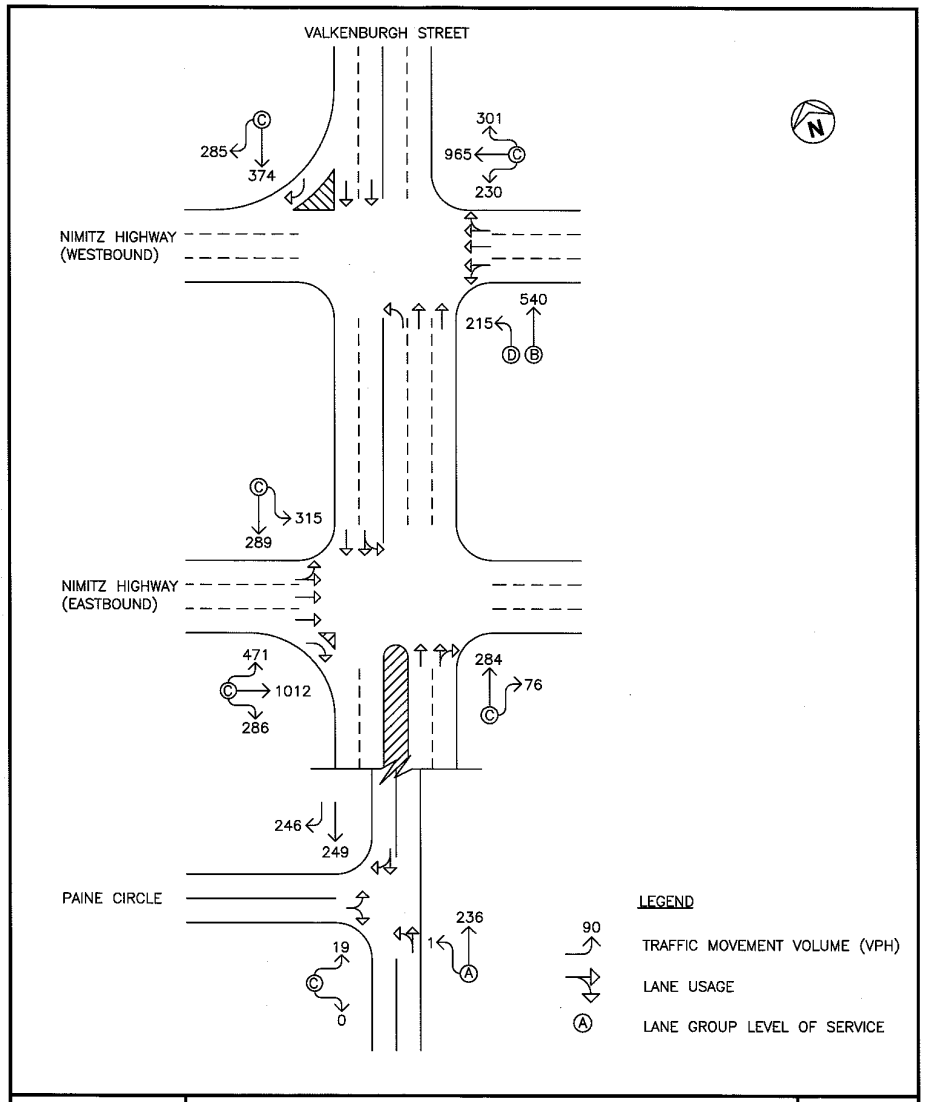
C. Total Traffic Volumes Without Project

The projected year 2025 AM and PM peak period traffic volumes and operating conditions without the proposed HFD Regional Fire Training Center are shown in Figures 8 and 9, and summarized in Table 2. The existing levels of service are included for comparison purposes. LOS calculations are included in Appendix E.

Table 2: Existing and Projected (Without Project) LOS Traffic Operating Conditions

Intersection	Critical Traffic Movement		AM		PM	
			Exist	Year 2025 w/out Proj	Exist	Year 2025 w/out Proj
Valkenburgh St/ Nimitz Hwy (WB)	Westbound	LT-TH-RT	C	D	C	D
	Northbound	LT	D	D	D	D
	Southbound	TH-RT	C	D	D	D
Valkenburgh St/ Nimitz Hwy (EB)	Eastbound	LT-TH-RT	C	C	C	C
	Northbound	TH-RT	C	C	C	C
	Southbound	LT-TH	C	C	C	C
Valkenburgh St/ Paine Cir	Eastbound	LT-RT	C	C	B	B

Under Year 2025 without project conditions, traffic operations are expected, in general, to deteriorate from existing conditions due the anticipated ambient growth in traffic in the project vicinity. The westbound approach of Nimitz Highway is expected to deteriorate from LOS "C" to LOS "D" during both peak periods at the intersection with Valkenburgh Street while the southbound approach of that intersection is expected to deteriorate from LOS "C" to LOS "D" during the AM peak period. The remaining critical movements at this intersection, as well as, the other



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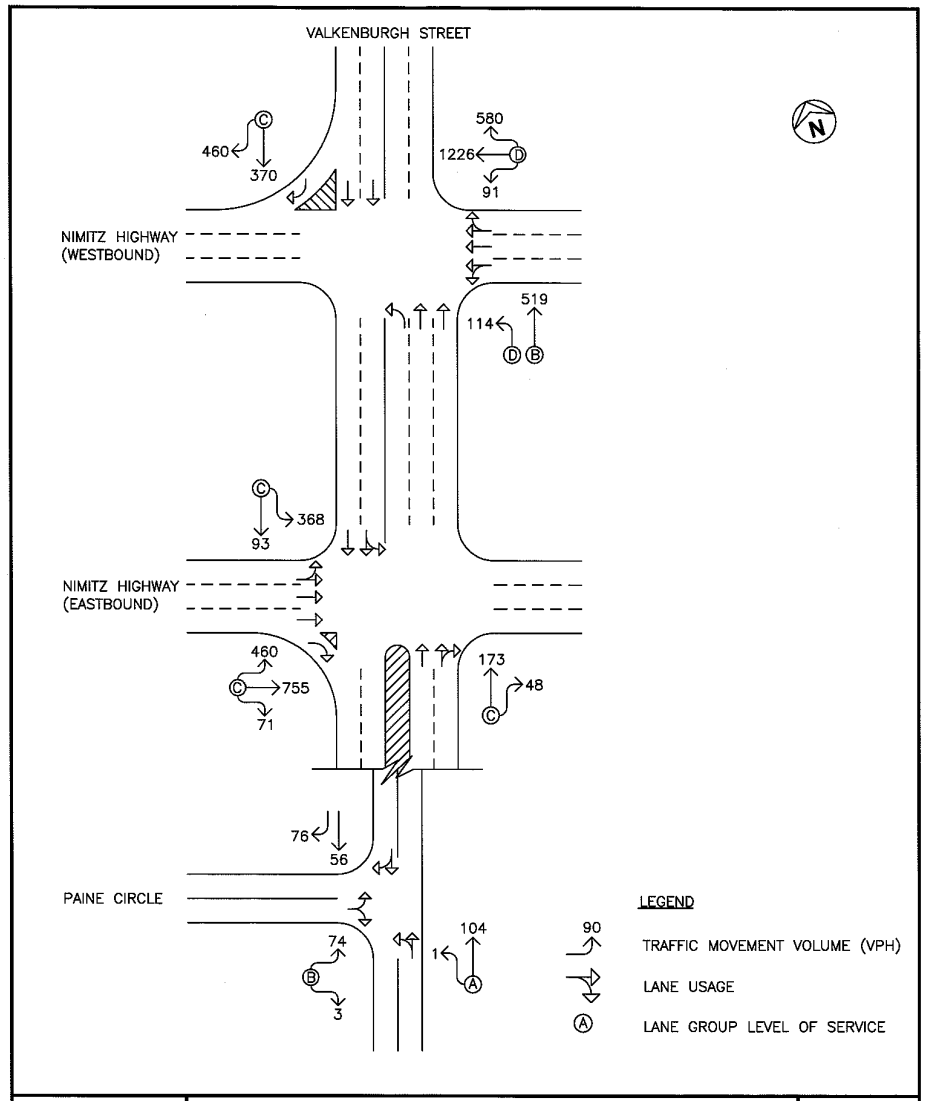
HFD REGIONAL FIRE TRAINING CENTER

YEAR 2025 AM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 8



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HFD REGIONAL FIRE TRAINING CENTER

YEAR 2025 PM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 9

study intersections are expected to operate at levels of service similar to existing conditions during both peak periods.

D. Total Traffic Volumes With Project

Figures 10 and 11 show the Year 2025 cumulative AM and PM peak hour traffic conditions with the development of the proposed HFD Regional Fire Training Center. The cumulative volumes consist of site- generated traffic superimposed over Year 2025 projected traffic demands. The traffic impacts resulting from the proposed project are addressed in the following section.

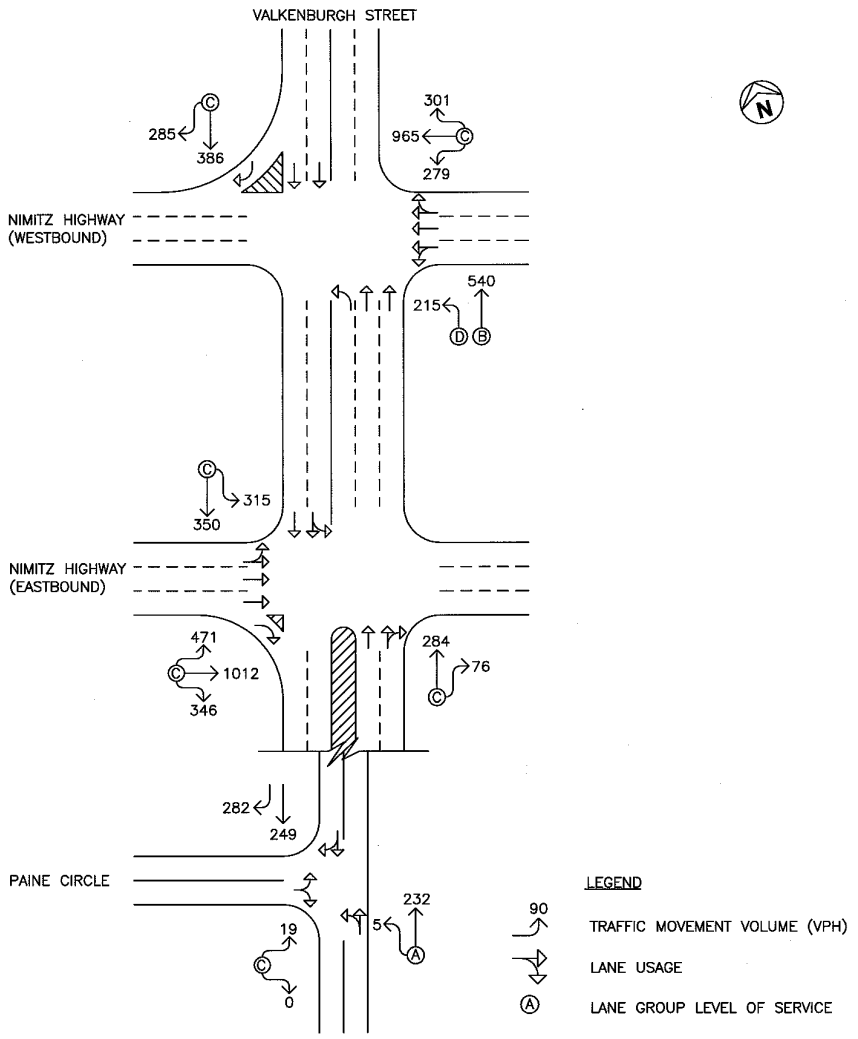
V. TRAFFIC IMPACT ANALYSIS

The Year 2025 cumulative AM and PM peak hour traffic conditions with the proposed HFD Regional Fire Training Center are summarized in Table 3. The existing and projected Year 2025 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix F.

Table 3: Existing and Projected (Without and With Project) LOS Traffic Operating Conditions

Intersection	Critical Traffic Movement		AM			PM		
			Exist	Year 2025		Exist	Year 2025	
				w/out Proj	w/ Proj		w/out Proj	w/ Proj
Valkenburgh St/ Nimitz Hwy (WB)	WB	LT-TH-RT	C	D	D	C	D	D
	NB	LT	D	D	D	D	D	D
	SB	TH-RT	C	D	D	D	D	D
Valkenburgh St/ Nimitz Hwy (EB)	EB	LT-TH-RT	C	C	C	C	C	C
	NB	TH-RT	C	C	C	C	C	C
	SB	LT-TH	C	C	C	C	C	C
Valkenburgh St/ Paine Cir	EB	LT-RT	C	C	C	B	B	B

Traffic operations under Year 2025 with project conditions are expected to remain similar to Year 2025 without project conditions during both peak periods. The critical movements at intersection of Valkenburgh Street with the westbound direction of traffic along Nimitz Highway is expected to continue operating at LOS "D" or better during both peak periods while those at the intersection with the eastbound direction of traffic along



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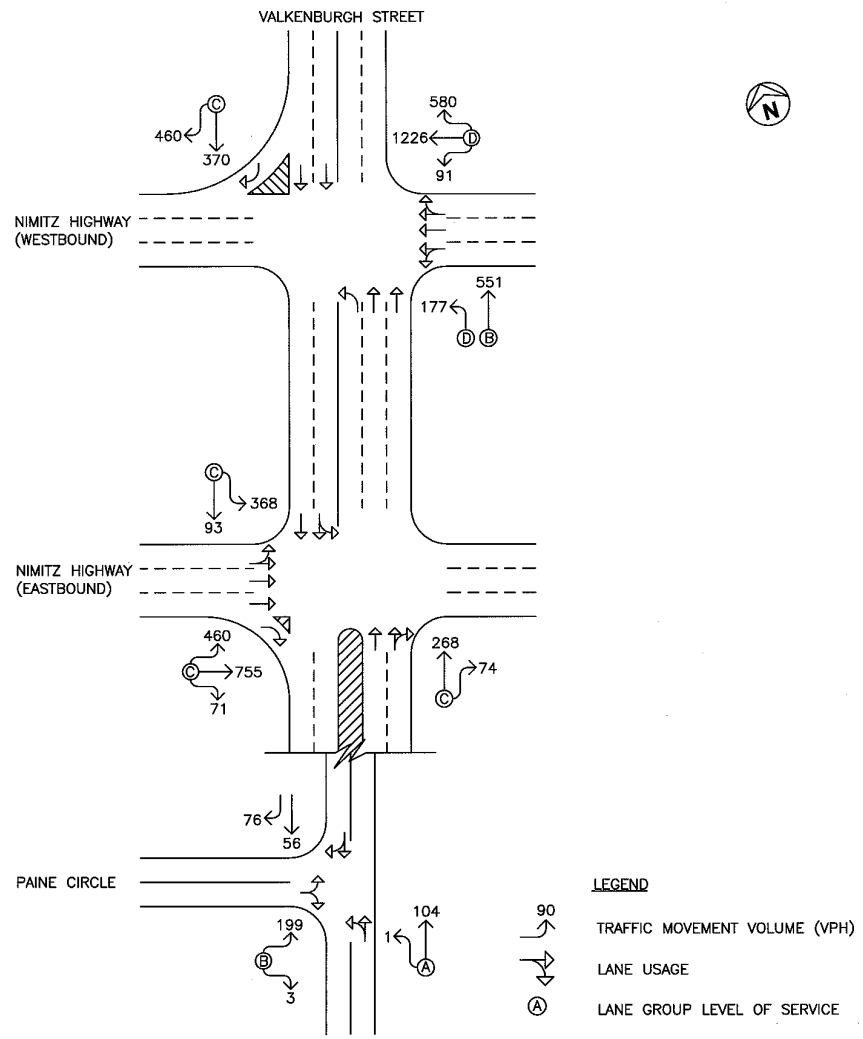
HFD REGIONAL FIRE TRAINING CENTER

YEAR 2025 AM PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 10



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HFD REGIONAL FIRE TRAINING CENTER

YEAR 2025 PM PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 11

Nimitz Highway are expected to continue operating at LOS "C" during both peak periods. At the intersection of Valkenburgh Street and Paine Circle, the Paine Circle approach of the intersection is expected to continue operating at LOS "C" and LOS "B" during the AM and PM peak periods, respectively.

VI. RECOMMENDATIONS

Based on the analysis of the traffic data, the following are the recommendations of this study associated with the development of the HFD Regional Fire Training Center:

1. Maintain sufficient sight distance for motorists to safely enter and exit all driveways.
2. Provide adequate on-site loading and off-loading service areas and prohibit off-site loading operations.
3. Provide adequate turn-around area for service, delivery, and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto public roadways.
4. Maintain sufficient turning radii at all driveways to avoid or minimize vehicle encroachments to oncoming traffic lanes.
5. Restrict turning movements at the northern driveway along Valkenburgh Street to right-turn-in and right-turn-out traffic movements only due to the proximity of that driveway to Nimitz Highway.
6. Consider scheduling class and training session start and end times to occur during off-peak periods to minimize the impact of the proposed project on the surrounding roadways and adjacent school.

VII. CONCLUSION

The facilities at the existing Charles H. Thurston Fire Training Center are inadequate to meet the current and future needs of the HFD fire training program. As such, the City & County of Honolulu Fire department plans to redevelop the existing site to provide Regional Fire Training Center. In addition, the proposed project includes the reconstruction of the existing Mokulele Fire Station. With the proposed project, traffic operations in the vicinity are expected to remain similar to without project conditions. As such, the proposed facility is not expected to have a significant impact on the surrounding roadways. However, due to the proximity of the training center to Nimitz Highway, a currently congested major east-west roadway, and the Holy Family Catholic Academy, it is recommended that consideration be

given to scheduling of the start and end times of classes and training sessions during off-peak periods.

Wilson Okamoto Corporation
1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5673, D4-5676
Counted By:GC, JT
Weather:Clear

File Name : ValNim Mauka AM
Site Code : 00000002
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Valkenburgh Street Southbound					Nimitz Highway Westbound					Valkenburgh Street Northbound					Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
06:00 AM	0	42	80	5	127	7	165	40	4	216	24	70	0	0	94	0	437
06:15 AM	0	59	88	4	151	13	149	47	3	212	21	77	0	0	98	0	461
06:30 AM	0	53	64	2	119	18	201	56	1	276	28	87	0	0	115	0	510
06:45 AM	0	68	69	3	140	28	158	39	4	229	30	100	0	0	130	0	499
Total	0	222	301	14	537	66	673	182	12	933	103	334	0	0	437	0	1907
07:00 AM	0	75	71	3	149	55	214	63	3	335	35	119	0	0	154	0	638
07:15 AM	0	76	76	2	154	61	218	69	1	349	54	106	0	0	160	0	663
07:30 AM	0	99	59	2	160	72	275	90	3	440	72	133	0	0	205	0	805
07:45 AM	0	99	60	1	160	39	195	59	0	293	51	145	0	0	196	0	649
Total	0	349	266	8	623	227	902	281	7	1417	212	503	0	0	715	0	2755
08:00 AM	0	54	60	2	116	30	138	53	2	223	37	106	0	0	143	0	482
08:15 AM	0	55	66	2	123	6	154	90	1	251	31	76	0	0	107	0	481
08:30 AM	0	42	73	9	124	4	149	48	3	204	18	90	0	0	108	0	436
08:45 AM	0	47	63	6	116	9	164	71	0	244	10	78	0	0	88	0	448
Total	0	198	262	19	479	49	605	262	6	922	96	350	0	0	446	0	1847
Grand Total	0	769	829	41	1639	342	2180	725	25	3272	411	1187	0	0	1598	0	6509
Apprch %	0	46.9	50.6	2.5		10.5	66.6	22.2	0.8		25.7	74.3	0	0			
Total %	0	11.8	12.7	0.6	25.2	5.3	33.5	11.1	0.4	50.3	6.3	18.2	0	0	24.6	0	

	Valkenburgh Street Southbound				Nimitz Highway Westbound				Valkenburgh Street Northbound				Eastbound	
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:00 AM														
07:00 AM	0	75	71	146	55	214	63	332	35	119	0	154	0	632
07:15 AM	0	76	**76**	152	61	218	69	348	54	106	0	160	0	660
07:30 AM	0	**99**	59	158	**72**	**275**	**90**	**437**	**72**	133	0	**205**	0	**800**
07:45 AM	0	99	60	**159**	39	195	59	293	51	**145**	0	196	0	648
Total Volume	0	349	266	615	227	902	281	1410	212	503	0	715	0	2740
% App. Total	0	56.7	43.3		16.1	64	19.9		29.7	70.3	0			
PHF	.000	.881	.875	.967	.788	.820	.781	.807	.736	.867	.000	.872	.000	.856

APPENDIX A

EXISTING TRAFFIC COUNT DATA

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5672, D4-5675
Counted By:DY, CY
Weather:Clear

File Name : ValNim Makai AM
Site Code : 00000003
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Valkenburgh Street Southbound					Nimitz Highway Westbound					Valkenburgh Street Northbound					Nimitz Highway Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	41	8	0	0	49	0	0	0	3	3	0	1	0	2	3	101	152	10	0	263	318
06:15 AM	62	18	0	0	80	0	0	0	2	2	0	3	5	1	9	93	158	11	0	262	353
06:30 AM	50	20	0	0	70	0	0	0	3	3	0	14	9	0	23	108	160	39	0	307	403
06:45 AM	54	41	0	0	95	0	0	0	1	1	0	17	4	0	21	107	195	33	0	335	452
Total	207	87	0	0	294	0	0	0	9	9	0	35	18	3	56	409	665	93	0	1167	1526
07:00 AM	58	61	0	0	119	0	0	0	1	1	0	40	15	1	56	123	198	69	0	390	566
07:15 AM	69	72	0	0	141	0	0	0	0	0	0	61	13	0	74	103	226	70	0	399	614
07:30 AM	85	100	0	0	185	0	0	0	3	3	0	102	27	1	130	116	281	94	0	491	809
07:45 AM	86	59	0	0	145	0	0	0	0	0	0	84	21	0	105	103	241	53	0	397	647
Total	298	292	0	0	590	0	0	0	4	4	0	287	76	2	365	445	946	286	0	1677	2636
08:00 AM	57	34	0	0	91	0	0	0	0	0	0	49	18	0	67	90	173	30	0	293	451
08:15 AM	52	11	0	0	63	0	0	0	1	1	0	36	9	0	45	63	123	14	1	201	310
08:30 AM	43	5	0	0	48	0	0	0	2	2	0	20	8	0	28	84	170	8	0	262	340
08:45 AM	42	13	0	0	55	0	0	0	0	0	0	8	2	0	10	84	133	4	0	221	286
Total	194	63	0	0	257	0	0	0	3	3	0	113	37	0	150	321	599	56	1	977	1387
Grand Total	699	442	0	0	1141	0	0	0	16	16	0	435	131	5	571	1175	2210	435	1	3821	5549
Apprch %	61.3	38.7	0	0		0	0	0	100		0	76.2	22.9	0.9		30.8	57.8	11.4	0		
Total %	12.6	8	0	0	20.6	0	0	0	0.3	0.3	0	7.8	2.4	0.1	10.3	21.2	39.8	7.8	0	68.9	

	Valkenburgh Street Southbound				Nimitz Highway Westbound				Valkenburgh Street Northbound				Nimitz Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	58	61	0	119	0	0	0	0	0	40	15	55	**123**	198	69	390	564
07:15 AM	69	72	0	141	0	0	0	0	0	61	13	74	103	226	70	399	614
07:30 AM	85	**100**	0	**185**	0	0	0	0	0	**102**	**27**	**129**	116	**281**	**94**	**491**	**805**
07:45 AM	**86**	59	0	145	0	0	0	0	0	84	21	105	103	241	53	397	647
Total Volume	298	292	0	590	0	0	0	0	0	287	76	363	445	946	286	1677	2630
% App. Total	50.5	49.5	0		0	0	0		0	79.1	20.9		26.5	56.4	17.1		
PHF	.866	.730	.000	.797	.000	.000	.000	.000	.000	.703	.704	.703	.904	.842	.761	.854	.817

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5673, D4-5676
Counted By:GC, JT
Weather:Clear

File Name : ValNim Mauka PM
Site Code : 00000002
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Valkenburgh Street Southbound					Nimitz Highway Westbound					Valkenburgh Street Northbound					Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
03:00 PM	0	74	133	6	213	29	256	104	2	391	60	106	0	0	166	0	770
03:15 PM	0	83	142	2	227	17	247	118	1	383	76	115	0	0	191	0	801
03:30 PM	0	96	134	4	234	23	281	98	2	404	45	112	0	0	157	0	795
03:45 PM	0	79	108	3	190	26	217	144	8	395	37	122	0	0	159	0	744
Total	0	332	517	15	864	95	1001	464	13	1573	218	455	0	0	673	0	3110
04:00 PM	0	91	106	4	201	27	242	89	0	358	54	127	0	0	181	0	740
04:15 PM	0	69	106	3	178	25	321	116	2	464	35	109	0	0	144	0	786
04:30 PM	0	65	105	3	173	20	270	125	1	416	38	155	0	0	193	0	782
04:45 PM	0	92	105	5	202	33	266	146	1	446	25	98	0	0	123	0	771
Total	0	317	422	15	754	105	1099	476	4	1684	152	489	0	0	641	0	3079
05:00 PM	0	88	114	1	203	24	283	141	2	450	23	126	0	0	149	0	802
05:15 PM	0	97	106	2	205	13	327	130	0	470	28	110	0	0	138	0	813
05:30 PM	0	75	96	3	174	8	311	118	2	439	23	121	0	0	144	0	757
05:45 PM	0	76	107	2	185	11	239	96	1	347	17	97	0	0	114	0	646
Total	0	336	423	8	767	56	1160	485	5	1706	91	454	0	0	545	0	3018
Grand Total	0	985	1362	38	2385	256	3260	1425	22	4963	461	1398	0	0	1859	0	9207
Apprch %	0	41.3	57.1	1.6		5.2	65.7	28.7	0.4		24.8	75.2	0	0			
Total %	0	10.7	14.8	0.4	25.9	2.8	35.4	15.5	0.2	53.9	5	15.2	0	0	20.2	0	

	Valkenburgh Street Southbound				Nimitz Highway Westbound				Valkenburgh Street Northbound				Eastbound	
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 04:30 PM														
04:30 PM	0	65	105	170	20	270	125	415	**38**	**155**	0	**193**	0	778
04:45 PM	0	92	105	197	**33**	266	**146**	445	25	98	0	123	0	765
05:00 PM	0	88	**114**	202	24	283	141	448	23	126	0	149	0	799
05:15 PM	0	**97**	106	**203**	13	**327**	130	**470**	28	110	0	138	0	**811**
Total Volume	0	342	430	772	90	1146	542	1778	114	489	0	603	0	3153
% App. Total	0	44.3	55.7		5.1	64.5	30.5		18.9	81.1	0			
PHF	.000	.881	.943	.951	.682	.876	.928	.946	.750	.789	.000	.781	.000	.972

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5677
Counted By:PA
Weather:Clear

File Name : HFD Parking Lot AM
Site Code : 00000006
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Valkenburgh Street Southbound					Westbound	Valkenburgh Street Northbound					HFD Parking Lot Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	2	0	0	0	2	2	0	0	0	2	4
06:15 AM	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	2
06:30 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	1	0	3	0	0	0	3	3	0	0	0	3	7
07:00 AM	0	0	1	0	1	0	2	0	0	0	2	1	0	0	0	1	4
07:15 AM	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	2
07:30 AM	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	2
07:45 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	2	0	2	0	4	0	0	0	4	3	0	0	0	3	9
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	2	3
Total	0	0	0	0	0	0	1	0	0	0	1	1	0	2	0	3	4
Grand Total	0	0	3	0	3	0	8	0	0	0	8	7	0	2	0	9	20
Apprch %	0	0	100	0			100	0	0	0		77.8	0	22.2	0		
Total %	0	0	15	0	15	0	40	0	0	0	40	35	0	10	0	45	

	Valkenburgh Street Southbound				Westbound	Valkenburgh Street Northbound				HFD Parking Lot Eastbound				
Start Time	Left	Thru	Right	App. Total	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:00 AM														
07:00 AM	0	0	**1**	**1**	0	**2**	0	0	**2**	**1**	0	0	**1**	**4**
07:15 AM	0	0	0	0	0	**1**	0	0	**1**	1	0	0	1	2
07:30 AM	0	0	0	0	0	**1**	0	0	**1**	1	0	0	1	2
07:45 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	1
Total Volume	0	0	2	2	0	4	0	0	4	3	0	0	3	9
% App. Total	0	0	100			100	0	0		100	0	0		
PHF	.000	.000	.500	.500	.000	.500	.000	.000	.500	.750	.000	.000	.750	.563

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5672, D4-5675
Counted By:DY, LKC
Weather:Clear

File Name : ValNim Makai PM
Site Code : 00000003
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Valkenburgh Street Southbound					Nimitz Highway Westbound					Valkenburgh Street Northbound					Nimitz Highway Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	74	25	0	0	99	0	0	0	7	7	0	87	8	1	96	94	246	41	0	381	583
03:15 PM	78	25	0	0	103	0	0	0	0	0	0	81	12	0	93	111	223	28	0	362	558
03:30 PM	94	27	0	0	121	0	0	0	1	1	0	39	13	0	52	124	191	14	0	329	503
03:45 PM	84	25	0	0	109	0	0	0	7	7	0	42	5	0	47	108	185	15	0	308	471
Total	330	102	0	0	432	0	0	0	15	15	0	249	38	1	288	437	845	98	0	1380	2115
04:00 PM	91	26	0	0	117	0	0	0	0	0	0	62	8	0	70	129	176	21	0	326	513
04:15 PM	66	33	0	0	99	0	0	0	3	3	0	36	7	0	43	103	185	13	0	301	446
04:30 PM	60	18	0	0	78	0	0	0	1	1	0	58	14	0	72	136	210	20	0	366	517
04:45 PM	105	29	0	0	134	0	0	0	0	0	0	41	12	0	53	87	182	24	0	293	480
Total	322	106	0	0	428	0	0	0	4	4	0	197	41	0	238	455	753	78	0	1286	1956
05:00 PM	94	24	0	0	118	0	0	0	1	1	0	37	18	0	55	103	159	16	0	278	452
05:15 PM	89	23	0	0	112	0	0	0	0	0	0	37	4	0	41	104	155	11	0	270	423
05:30 PM	71	12	0	0	83	0	0	0	1	1	0	32	6	1	39	120	120	3	0	243	366
05:45 PM	74	9	0	0	83	0	0	0	0	0	0	7	3	1	11	98	118	12	0	228	322
Total	328	68	0	0	396	0	0	0	2	2	0	113	31	2	146	425	552	42	0	1019	1563
Grand Total	980	276	0	0	1256	0	0	0	21	21	0	559	110	3	672	1317	2150	218	0	3685	5634
Apprch %	78	22	0	0		0	0	0	100		0	83.2	16.4	0.4		35.7	58.3	5.9	0		
Total %	17.4	4.9	0	0	22.3	0	0	0	0.4	0.4	0	9.9	2	0.1	11.9	23.4	38.2	3.9	0	65.4	

	Valkenburgh Street Southbound				Nimitz Highway Westbound				Valkenburgh Street Northbound				Nimitz Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	74	25	0	99	0	0	0	0	0	**87**	8	**95**	94	**246**	**41**	**381**	**575**
03:15 PM	78	25	0	103	0	0	0	0	0	81	12	93	111	223	28	362	558
03:30 PM	**94**	**27**	0	**121**	0	0	0	0	0	39	**13**	52	**124**	191	14	329	502
03:45 PM	84	25	0	109	0	0	0	0	0	42	5	47	108	185	15	308	464
Total Volume	330	102	0	432	0	0	0	0	0	249	38	287	437	845	98	1380	2099
% App. Total	76.4	23.6	0		0	0	0		0	86.8	13.2		31.7	61.2	7.1		
PHF	.878	.944	.000	.893	.000	.000	.000	.000	.000	.716	.731	.755	.881	.859	.598	.906	.913

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5677
Counted By:PA
Weather:Clear

File Name : HFD Parking Lot PM
Site Code : 00000006
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Valkenburgh Street Southbound					Westbound	Valkenburgh Street Northbound					HFD Parking Lot Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	0	0	3	0	3	0	0	0	0	0	0	1	0	1	0	2	5
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
03:30 PM	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	2	3
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	4	0	4	0	0	0	0	0	0	3	0	2	0	5	9
04:00 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	2
Total	0	0	2	0	2	0	0	0	0	0	0	2	0	1	0	3	5
05:00 PM	0	0	1	0	1	0	0	0	0	0	0	2	0	0	0	2	3
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Total	0	0	4	0	4	0	0	0	0	0	0	2	0	0	0	2	6
Grand Total	0	0	10	0	10	0	0	0	0	0	0	7	0	3	0	10	20
Apprch %	0	0	100	0			0	0	0	0		70	0	30	0		
Total %	0	0	50	0	50	0	0	0	0	0	0	35	0	15	0	50	

	Valkenburgh Street Southbound				Westbound	Northbound	HFD Parking Lot Eastbound				
Start Time	Left	Thru	Right	App. Total	App. Total	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 03:00 PM											
03:00 PM	0	0	**3**	**3**	0	0	**1**	0	**1**	**2**	**5**
03:15 PM	0	0	0	0	0	0	1	0	0	1	1
03:30 PM	0	0	1	1	0	0	1	0	1	2	3
03:45 PM	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	4	4	0	0	3	0	2	5	9
% App. Total	0	0	100				60	0	40		
PHF	.000	.000	.333	.333	.000	.000	.750	.000	.500	.625	.450

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5677
Counted By:PA
Weather:Clear

File Name : Fleet Service Assn. Parking Lot AM
Site Code : 00000005
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Valkenburgh Street Southbound					Fleet Service Association Parking Lot Westbound					Valkenburgh Street Northbound					Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
06:30 AM	9	0	0	0	9	0	0	7	0	7	0	0	0	0	0	0	16
06:45 AM	7	0	0	0	7	0	0	4	0	4	0	0	0	0	0	0	11
Total	17	0	0	0	17	0	0	11	0	11	0	0	0	0	0	0	28
07:00 AM	12	0	0	0	12	0	0	10	0	10	0	0	0	0	0	0	22
07:15 AM	16	0	0	0	16	0	0	14	0	14	0	0	0	0	0	0	30
07:30 AM	36	0	0	0	36	1	0	28	0	29	0	0	0	0	0	0	65
07:45 AM	15	0	0	0	15	0	0	13	0	13	0	0	1	0	1	0	29
Total	79	0	0	0	79	1	0	65	0	66	0	0	1	0	1	0	146
08:00 AM	5	0	0	0	5	0	0	12	0	12	0	0	0	0	0	0	17
08:15 AM	2	0	0	0	2	0	0	6	0	6	0	0	1	0	1	0	9
08:30 AM	1	0	0	0	1	0	0	3	0	3	0	0	0	0	0	0	4
08:45 AM	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Total	11	0	0	0	11	0	0	21	0	21	0	0	1	0	1	0	33
Grand Total	107	0	0	0	107	1	0	97	0	98	0	0	2	0	2	0	207
Apprch %	100	0	0	0		1	0	99	0		0	0	100	0			
Total %	51.7	0	0	0	51.7	0.5	0	46.9	0	47.3	0	0	1	0	1	0	

	Valkenburgh Street Southbound				Fleet Service Association Parking Lot Westbound				Valkenburgh Street Northbound				Eastbound	
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:00 AM														
07:00 AM	12	0	0	12	0	0	10	10	0	0	0	0	0	22
07:15 AM	16	0	0	16	0	0	14	14	0	0	0	0	0	30
07:30 AM	**36**	0	0	**36**	**1**	0	**28**	**29**	0	0	0	0	0	**65**
07:45 AM	15	0	0	15	0	0	13	13	0	0	**1**	**1**	0	29
Total Volume	79	0	0	79	1	0	65	66	0	0	1	1	0	146
% App. Total	100	0	0		1.5	0	98.5		0	0	100			
PHF	.549	.000	.000	.549	.250	.000	.580	.569	.000	.000	.250	.250	.000	.562

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-3889
Counted By:RF
Weather:Clear

File Name : ValPaine AM
Site Code : 00000000
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Valkenburgh Street Southbound					Westbound	Valkenburgh Street Northbound					Paine Circle Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	7	9	0	16	0	0	2	0	1	3	0	0	0	2	2	21
06:15 AM	0	12	15	1	28	0	0	6	0	0	6	0	0	0	6	6	40
06:30 AM	0	18	35	1	54	0	0	13	0	0	13	2	0	0	5	7	74
06:45 AM	0	30	42	0	72	0	0	14	0	0	14	1	0	0	4	5	91
Total	0	67	101	2	170	0	0	35	0	1	36	3	0	0	17	20	226
07:00 AM	0	52	66	2	120	0	1	34	0	0	35	5	0	0	5	10	165
07:15 AM	0	53	78	0	131	0	0	61	0	0	61	5	0	0	18	23	215
07:30 AM	0	79	92	1	172	0	0	97	0	0	97	5	0	0	20	25	294
07:45 AM	0	81	26	0	107	0	0	63	1	0	64	6	0	0	11	17	188
Total	0	265	262	3	530	0	1	255	1	0	257	21	0	0	54	75	862
08:00 AM	0	48	12	0	60	0	1	44	0	0	45	9	0	0	11	20	125
08:15 AM	0	14	7	0	21	0	2	27	0	0	29	11	0	0	3	14	64
08:30 AM	0	10	1	0	11	0	0	18	0	0	18	5	0	0	0	5	34
Grand Total	0	404	383	5	792	0	4	379	1	1	385	49	0	0	85	134	1311
Apprch %	0	51	48.4	0.6			1	98.4	0.3	0.3		36.6	0	0	63.4		
Total %	0	30.8	29.2	0.4	60.4	0	0.3	28.9	0.1	0.1	29.4	3.7	0	0	6.5	10.2	

	Valkenburgh Street Southbound				Westbound	Valkenburgh Street Northbound				Paine Circle Eastbound				
Start Time	Left	Thru	Right	App. Total	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:30 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:00 AM														
07:00 AM	0	52	66	118	0	**1**	34	0	35	5	0	0	5	158
07:15 AM	0	53	78	131	0	0	61	0	61	5	0	0	5	197
07:30 AM	0	79	**92**	**171**	0	0	**97**	0	**97**	5	0	0	5	**273**
07:45 AM	0	**81**	26	107	0	0	63	**1**	64	**6**	0	0	**6**	177
Total Volume	0	265	262	527	0	1	255	1	257	21	0	0	21	805
% App. Total	0	50.3	49.7			0.4	99.2	0.4		100	0	0		
PHF	.000	.818	.712	.770	.000	.250	.657	.250	.662	.875	.000	.000	.875	.737

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-5677
Counted By:PA
Weather:Clear

File Name : Fleet Service Assn. Parking Lot PM
Site Code : 00000005
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Valkenburgh Street Southbound					Fleet Service Association Branch 46 Westbound					Valkenburgh Street Northbound					Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
03:00 PM	12	0	0	0	12	5	0	9	0	14	0	0	0	0	0	0	26
03:15 PM	20	0	0	0	20	11	0	12	0	23	0	0	2	0	2	0	45
03:30 PM	22	0	0	0	22	6	0	10	0	16	0	0	1	0	1	0	39
03:45 PM	19	0	0	0	19	13	0	13	0	26	0	0	2	0	2	0	47
Total	73	0	0	0	73	35	0	44	0	79	0	0	5	0	5	0	157
04:00 PM	16	0	0	0	16	12	0	11	0	23	0	0	0	0	0	0	39
04:15 PM	21	0	0	0	21	7	0	10	0	17	0	0	2	0	2	0	40
04:30 PM	18	0	0	0	18	11	0	12	0	23	0	0	1	0	1	0	42
04:45 PM	26	0	0	0	26	14	0	14	0	28	0	0	0	0	0	0	54
Total	81	0	0	0	81	44	0	47	0	91	0	0	3	0	3	0	175
05:00 PM	13	0	0	0	13	6	0	9	0	15	0	0	1	0	1	0	29
05:15 PM	14	0	0	0	14	9	0	6	0	15	0	0	0	0	0	0	29
05:30 PM	10	0	0	0	10	7	0	2	0	9	0	0	0	0	0	0	19
05:45 PM	13	0	0	0	13	4	0	2	0	6	0	0	0	0	0	0	19
Total	50	0	0	0	50	26	0	19	0	45	0	0	1	0	1	0	96
Grand Total	204	0	0	0	204	105	0	110	0	215	0	0	9	0	9	0	428
Apprch %	100	0	0	0		48.8	0	51.2	0		0	0	100	0			
Total %	47.7	0	0	0	47.7	24.5	0	25.7	0	50.2	0	0	2.1	0	2.1	0	

	Valkenburgh Street Southbound				Fleet Service Association Branch 46 Westbound				Valkenburgh Street Northbound				Eastbound	
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 04:00 PM														
04:00 PM	16	0	0	16	12	0	11	23	0	0	0	0	0	39
04:15 PM	21	0	0	21	7	0	10	17	0	0	**2**	**2**	0	40
04:30 PM	18	0	0	18	11	0	12	23	0	0	1	1	0	42
04:45 PM	**26**	0	0	**26**	**14**	0	**14**	**28**	0	0	0	0	0	**54**
Total Volume	81	0	0	81	44	0	47	91	0	0	3	3	0	175
% App. Total	100	0	0		48.4	0	51.6		0	0	100			
PHF	.779	.000	.000	.779	.786	.000	.839	.813	.000	.000	.375	.375	.000	.810

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-3889
Counted By:RF
Weather:Clear

File Name : Dirt Parking Lot Off Paine Circle AM
Site Code : 00000000
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Southbound	Entering Dirt Parking Lot Westbound					Exiting Dirt Parking Lot Northbound					Paine Circle Eastbound					
Start Time	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
06:15 AM	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4
06:30 AM	0	8	0	0	0	8	0	0	1	0	1	0	0	0	0	0	9
06:45 AM	0	14	0	0	0	14	0	0	0	0	0	0	0	0	0	0	14
Total	0	27	0	0	0	27	0	0	1	0	1	0	0	0	0	0	28
07:00 AM	0	2	0	0	0	2	0	0	1	0	1	0	0	1	0	1	4
07:15 AM	0	4	0	0	0	4	0	0	2	0	2	0	0	0	0	0	6
07:30 AM	0	5	0	0	0	5	0	0	3	0	3	0	0	0	0	0	8
07:45 AM	0	0	0	0	0	0	2	0	2	0	4	0	0	3	0	3	7
Total	0	11	0	0	0	11	2	0	8	0	10	0	0	4	0	4	25
08:00 AM	0	2	0	0	0	2	0	0	1	0	1	0	0	1	0	1	4
08:15 AM	0	1	0	0	0	1	0	0	4	0	4	0	0	1	0	1	6
08:30 AM	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	3
08:45 AM	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	2
Total	0	4	0	0	0	4	0	0	9	0	9	0	0	2	0	2	15
Grand Total	0	42	0	0	0	42	2	0	18	0	20	0	0	6	0	6	68
Apprch %		100	0	0	0		10	0	90	0		0	0	100	0		
Total %	0	61.8	0	0	0	61.8	2.9	0	26.5	0	29.4	0	0	8.8	0	8.8	

	Southbound	Entering Dirt Parking Lot Westbound				Exiting Dirt Parking Lot Northbound				Paine Circle Eastbound				
Start Time	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:30 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 06:30 AM														
06:30 AM	0	8	0	0	8	0	0	1	1	0	0	0	0	9
06:45 AM	0	**14**	0	0	**14**	0	0	0	0	0	0	0	0	**14**
07:00 AM	0	2	0	0	2	0	0	1	1	0	0	**1**	**1**	4
07:15 AM	0	4	0	0	4	0	0	**2**	**2**	0	0	0	0	6
Total Volume	0	28	0	0	28	0	0	4	4	0	0	1	1	33
% App. Total		100	0	0		0	0	100		0	0	100		
PHF	.000	.500	.000	.000	.500	.000	.000	.500	.500	.000	.000	.250	.250	.589

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-3889
Counted By:RF
Weather:Clear

File Name : ValPaine PM
Site Code : 00000004
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Valkenburgh Street Southbound					Westbound	Valkenburgh Street Northbound					Paine Circle Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	0	34	22	0	56	0	0	82	0	0	82	12	0	2	18	32	170
03:15 PM	0	15	26	0	41	0	0	44	0	0	44	19	0	1	10	30	115
03:30 PM	0	16	14	0	30	0	0	35	0	0	35	10	0	0	1	11	76
03:45 PM	0	13	16	0	29	0	1	21	0	0	22	9	0	1	5	15	66
Total	0	78	78	0	156	0	1	182	0	0	183	50	0	4	34	88	427
04:00 PM	0	17	19	1	37	0	0	44	1	0	45	14	0	0	5	19	101
04:15 PM	0	18	17	0	35	0	1	27	0	0	28	10	0	0	3	13	76
04:30 PM	0	14	16	0	30	0	0	37	0	0	37	23	0	0	5	28	95
04:45 PM	0	16	20	0	36	0	0	21	0	0	21	10	0	1	8	19	76
Total	0	65	72	1	138	0	1	129	1	0	131	57	0	1	21	79	348
05:00 PM	0	8	23	0	31	0	0	15	0	0	15	23	0	1	5	29	75
05:15 PM	0	15	12	0	27	0	1	21	0	0	22	11	0	1	3	15	64
05:30 PM	0	6	6	0	12	0	0	16	0	0	16	12	0	0	0	12	40
05:45 PM	0	6	9	0	15	0	0	4	0	0	4	4	0	0	0	4	23
Total	0	35	50	0	85	0	1	56	0	0	57	50	0	2	8	60	202
Grand Total	0	178	200	1	379	0	3	367	1	0	371	157	0	7	63	227	977
Apprch %	0	47	52.8	0.3			0.8	98.9	0.3	0		69.2	0	3.1	27.8		
Total %	0	18.2	20.5	0.1	38.8	0	0.3	37.6	0.1	0	38	16.1	0	0.7	6.4	23.2	

	Valkenburgh Street Southbound				Westbound	Valkenburgh Street Northbound				Paine Circle Eastbound				
Start Time	Left	Thru	Right	App. Total	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 03:00 PM														
03:00 PM	0	**34**	22	**56**	0	0	**82**	0	**82**	12	0	**2**	14	**152**
03:15 PM	0	15	**26**	41	0	0	44	0	44	**19**	0	**1**	**20**	105
03:30 PM	0	16	14	30	0	0	35	0	35	10	0	0	10	75
03:45 PM	0	13	16	29	0	1	21	0	22	9	0	1	10	61
Total Volume	0	78	78	156	0	1	182	0	183	50	0	4	54	393
% App. Total	0	50	50			0.5	99.5	0		92.6	0	7.4		
PHF	.000	.574	.750	.696	.000	.250	.555	.000	.558	.658	.000	.500	.675	.646

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-3889
Counted By:RF
Weather:Clear

File Name : HFD Parking Lot Off Paine Circle AM
Site Code : 00000000
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Exiting HFD Parking Lot Southbound					Paine Circle Westbound					Northbound	Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	App. Total	Int. Total
06:00 AM	0	0	0	0	0	0	0	1	0	1	0	0	1
06:15 AM	0	0	0	0	0	0	0	2	0	2	0	0	2
06:30 AM	0	0	0	0	0	0	0	1	0	1	0	0	1
06:45 AM	0	0	0	0	0	0	0	2	0	2	0	0	2
Total	0	0	0	0	0	0	0	6	0	6	0	0	6
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	1	0	1	0	0	1
07:30 AM	0	0	0	0	0	0	0	1	0	1	0	0	1
07:45 AM	1	0	0	0	1	0	0	2	0	2	0	0	3
Total	1	0	0	0	1	0	0	4	0	4	0	0	5
08:00 AM	4	0	0	0	4	0	0	2	0	2	0	0	6
08:15 AM	4	0	0	0	4	0	0	0	0	0	0	0	4
08:30 AM	1	0	0	0	1	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9	0	0	0	9	0	0	2	0	2	0	0	11
Grand Total	10	0	0	0	10	0	0	12	0	12	0	0	22
Apprch %	100	0	0	0		0	0	100	0				
Total %	45.5	0	0	0	45.5	0	0	54.5	0	54.5	0	0	

	Exiting HFD Parking Lot Southbound				Paine Circle Westbound				Northbound	Eastbound	
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:30 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:30 AM											
07:30 AM	0	0	0	0	0	0	**1**	**1**	0	0	1
07:45 AM	1	0	0	1	0	0	**2**	**2**	0	0	3
08:00 AM	**4**	0	0	**4**	0	0	2	2	0	0	**6**
08:15 AM	4	0	0	4	0	0	0	0	0	0	4
Total Volume	9	0	0	9	0	0	5	5	0	0	14
% App. Total	100	0	0		0	0	100				
PHF	.563	.000	.000	.563	.000	.000	.625	.625	.000	.000	.583

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-3889
Counted By:RF
Weather:Clear

File Name : Dirt Parking Lot Off Paine Circle PM
Site Code : 00000004
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	Southbound	Paine Circle Westbound					Existing Dirt Parking Lot Northbound					Eastbound	
Start Time	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
03:00 PM	0	3	0	0	0	3	0	0	4	0	4	0	7
03:15 PM	0	5	0	0	0	5	0	0	5	0	5	0	10
03:30 PM	0	1	0	0	0	1	0	0	0	0	0	0	1
03:45 PM	0	1	0	0	0	1	0	0	2	0	2	0	3
Total	0	10	0	0	0	10	0	0	11	0	11	0	21
04:00 PM	0	2	0	0	0	2	0	0	1	0	1	0	3
04:15 PM	0	0	0	0	0	0	0	0	5	0	5	0	5
04:30 PM	0	4	0	0	0	4	0	0	14	0	14	0	18
04:45 PM	0	5	0	0	0	5	1	0	3	0	4	0	9
Total	0	11	0	0	0	11	1	0	23	0	24	0	35
05:00 PM	0	2	0	0	0	2	0	0	7	0	7	0	9
05:15 PM	0	2	0	0	0	2	0	0	3	0	3	0	5
05:30 PM	0	1	0	0	0	1	0	0	6	0	6	0	7
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	5	0	0	0	5	0	0	16	0	16	0	21
Grand Total	0	26	0	0	0	26	1	0	50	0	51	0	77
Apprch %		100	0	0	0		2	0	98	0			
Total %	0	33.8	0	0	0	33.8	1.3	0	64.9	0	66.2	0	

	Southbound	Paine Circle Westbound				Existing Dirt Parking Lot Northbound				Eastbound	
Start Time	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 04:15 PM											
04:15 PM	0	0	0	0	0	0	0	5	5	0	5
04:30 PM	0	4	0	0	4	0	0	**14**	**14**	0	**18**
04:45 PM	0	**5**	0	0	**5**	**1**	0	3	4	0	9
05:00 PM	0	2	0	0	2	0	0	7	7	0	9
Total Volume	0	11	0	0	11	1	0	29	30	0	41
% App. Total		100	0	0		3.3	0	96.7			
PHF	.000	.550	.000	.000	.550	.250	.000	.518	.536	.000	.569

APPENDIX B

LEVEL OF SERVICE DEFINITIONS

Wilson Okamoto Corporation
1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counter:D4-3889
Counted By:RF
Weather:Clear

File Name : HFD Parking Lot Off Paine Circle PM
Site Code : 00000004
Start Date : 2/1/2011
Page No : 1

Groups Printed- Unshifted

	HFD Parking Lot Off Paine Circle Southbound					Paine Circle Westbound					Northbound	Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	App. Total	Int. Total
03:00 PM	6	0	1	0	7	0	0	2	0	2	0	0	9
03:15 PM	6	0	0	0	6	0	0	1	0	1	0	0	7
03:30 PM	1	0	0	0	1	0	0	1	0	1	0	0	2
03:45 PM	0	0	0	0	0	0	0	1	0	1	0	0	1
Total	13	0	1	0	14	0	0	5	0	5	0	0	19
04:00 PM	4	0	0	0	4	0	0	1	0	1	0	0	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	4	0	0	0	4	0	0	2	0	2	0	0	6
04:45 PM	5	0	0	0	5	0	0	0	0	0	0	0	5
Total	13	0	0	0	13	0	0	3	0	3	0	0	16
05:00 PM	3	0	0	0	3	0	0	0	0	0	0	0	3
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	2	0	0	0	2	0	0	0	0	0	0	0	2
05:45 PM	1	0	0	0	1	0	0	0	0	0	0	0	1
Total	6	0	0	0	6	0	0	0	0	0	0	0	6
Grand Total	32	0	1	0	33	0	0	8	0	8	0	0	41
Apprch %	97	0	3	0		0	0	100	0				
Total %	78	0	2.4	0	80.5	0	0	19.5	0	19.5	0	0	

	HFD Parking Lot Off Paine Circle Southbound					Paine Circle Westbound					Northbound	Eastbound	
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:00 PM													
03:00 PM	6	0	1	0	7	0	0	2	0	2	0	0	9
03:15 PM	6	0	0	0	6	0	0	1	0	1	0	0	7
03:30 PM	1	0	0	0	1	0	0	1	0	1	0	0	2
03:45 PM	0	0	0	0	0	0	0	1	0	1	0	0	1
Total Volume	13	0	1	0	14	0	0	5	0	5	0	0	19
% App. Total	92.9	0	7.1	0		0	0	100	0				
PHF	.542	.000	.250	.000	.500	.000	.000	.625	.000	.625	.000	.000	.528

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average control delay per vehicle, typically a 15-min analysis period. The criteria are given in the following table.

Table 1: Level-of-Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec/veh)
A	≤10.0
B	>10.0 and ≤20.0
C	>20.0 and ≤35.0
D	>35.0 and ≤55.0
E	>55.0 and ≤80.0
F	>80.0

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

Level of Service A describes operations with low control delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

Level of Service B describes operations with control delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

Level of Service C describes operations with control delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

Level of Service D describes operations with control delay greater than 35 and up to 55 sec per vehicle. At level of service D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

"Highway Capacity Manual," Transportation Research Board, 2000.

Level of Service E describes operation with control delay greater than 55 and up to 80 sec per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

Level of Service F describes operations with control delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

"Highway Capacity Manual," Transportation Research Board, 2000.

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service (LOS) criteria are given in Table 1. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. If the degree of saturation is greater than about 0.9, average control delay is significantly affected by the length of the analysis period.

Table 1: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (Sec/Veh)
A	≤10.0
B	>10.0 and ≤15.0
C	>15.0 and ≤25.0
D	>25.0 and ≤35.0
E	>35.0 and ≤50.0
F	>50.0

"Highway Capacity Manual," Transportation Research Board, 2000.

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS
EXISTING PEAK HOUR TRAFFIC ANALYSIS

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: AM Peak
Project ID:
E/W St: Nimitz Highway Westbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Existing
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	3	0	1	2	0	0	2	0
LGConfig					LTR		L	T			TR	
Volume				230	902	281	215	509			353	266
Lane Width					12.0		12.0	12.0			12.0	
RTOR Vol						28						27

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4			5	6	7	8
EB Left					NB	Left	A			
Thru						Thru	A	A		
Right						Right				
Peds						Peds				
WB Left		A			SB	Left				
Thru		A				Thru		A		
Right		A				Right		A		
Peds						Peds				
NB Right					EB	Right				
SB Right					WB	Right				
Green		39.0					24.0	27.0		
Yellow		4.0					0.0	4.0		
All Red		1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
Westbound								
LTR	1909	4895	0.90	0.39	34.6	C	34.6	C
Northbound								
L	425	1770	0.58	0.24	35.6	D		
T	1809	3547	0.32	0.51	14.5	B	20.7	C
Southbound								
TR	900	3332	0.68	0.27	34.7	C	34.7	C

Intersection Delay = 31.0 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: PM Peak
Project ID:
E/W St: Nimitz Highway Westbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Existing
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	3	0	1	2	0	0	2	0
LGConfig					LTR		L	T			TR	
Volume				91	1146	542	114	489			346	430
Lane Width					12.0		12.0	12.0			12.0	
RTOR Vol						54						43

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4			5	6	7	8
EB Left					NB	Left	A			
Thru						Thru	A	A		
Right						Right				
Peds						Peds				
WB Left		A			SB	Left				
Thru		A				Thru		A		
Right		A				Right		A		
Peds						Peds				
NB Right					EB	Right				
SB Right					WB	Right				
Green		41.0					19.0	30.0		
Yellow		4.0					0.0	4.0		
All Red		1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
Westbound								
LTR	1987	4846	0.91	0.41	34.9	C	34.9	C
Northbound								
L	336	1770	0.43	0.19	36.7	D		
T	1738	3547	0.36	0.49	15.9	B	19.8	B
Southbound								
TR	980	3266	0.79	0.30	36.4	D	36.4	D

Intersection Delay = 31.8 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: AM Peak
Project ID:
E/W St: Nimitz Highway Eastbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Existing
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	0	0	0	0	0	2	0	0	2	0
LGConfig		LTR						TR		DefL	T	
Volume	440	946	286					284	76	294	289	
Lane Width		12.0						12.0		12.0	12.0	
RTOR Vol			29						8			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	A				NB Left				
Thru	A				Thru		A		
Right	A				Right		A		
Peds					Peds				
WB Left					SB Left	A	A		
Thru					Thru	A	A		
Right					Right				
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	46.0					14.0	30.0		
Yellow	4.0					0.0	4.0		
All Red	1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	2249	4890	0.86	0.46	27.7	C	27.7	C
Westbound								
Northbound								
TR	1033	3444	0.49	0.30	29.1	C	29.1	C
Southbound								
DefL	448	1770	0.82	0.49	29.1	C		
T	820	1863	0.44	0.44	19.8	B	24.5	C

Intersection Delay = 27.2 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: PM Peak
Project ID:
E/W St: Nimitz Highway Eastbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Existing
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	0	0	0	0	0	2	0	0	2	0
LGConfig		LTR						TR		DefL	T	
Volume	430	706	71					173	48	344	93	
Lane Width		12.0						12.0		12.0	12.0	
RTOR Vol			7						5			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	A				NB Left				
Thru	A				Thru		A		
Right	A				Right				
Peds					Peds				
WB Left					SB Left	A	A		
Thru					Thru	A	A		
Right					Right				
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	44.0					13.0	33.0		
Yellow	4.0					0.0	4.0		
All Red	1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	2176	4945	0.67	0.44	23.1	C	23.1	C
Westbound								
Northbound								
TR	1136	3441	0.25	0.33	24.6	C	24.6	C
Southbound								
DefL	576	1770	0.73	0.51	25.4	C		
T	857	1863	0.13	0.46	15.6	B	23.3	C

Intersection Delay = 23.3 (sec/veh) Intersection LOS = C

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: WOC
Date Performed: 4/11/11
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Existing
Project ID:
East/West Street: Paine Circle
North/South Street: Valkenburgh Street
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	236			249	246
Peak-Hour Factor, PHF	0.66	0.66			0.77	0.77
Hourly Flow Rate, HFR	1	357			323	319
Percent Heavy Vehicles	2	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT				TR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				19		0
Peak Hour Factor, PHF				0.88		0.88
Hourly Flow Rate, HFR				21		0
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/		No	/
Lanes				0	0	
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	1						21	
C(m) (vph)	938						294	
v/c	0.00						0.07	
95% queue length	0.00						0.23	
Control Delay	8.8						18.2	
LOS	A						C	
Approach Delay							18.2	
Approach LOS							C	

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: WOC
Date Performed: 4/11/11
Analysis Time Period: PM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Existing
Project ID:
East/West Street: Paine Circle
North/South Street: Valkenburgh Street
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	104			56	76
Peak-Hour Factor, PHF	0.64	0.64			0.86	0.86
Hourly Flow Rate, HFR	1	162			65	88
Percent Heavy Vehicles	2	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT				TR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				74		3
Peak Hour Factor, PHF				0.73		0.73
Hourly Flow Rate, HFR				101		4
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/		No	/
Lanes				0	0	
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	1						105	
C(m) (vph)	1428						690	
v/c	0.00						0.15	
95% queue length	0.00						0.53	
Control Delay	7.5						11.2	
LOS	A						B	
Approach Delay							11.2	
Approach LOS							B	

HFD Regional Fire Training Center Personnel Projections (Provided by HFD)

	EXISTING	FUTURE	NET CHANGE	Comments
HFD Multi-Purpose Building				
CPAT Practice				CPAT practice and testing occurs throughout the day and is not concurrent with the other training sessions. Maximum number of personnel on site is 30 personnel anticipated to be on site between 7:45 AM and 4:30 PM.
CPAT Testing				
Fire and Rescue Tactical Training				
Incumbent Firefighter Training	30	30	0	
HFD Recruit Training Academy				
Administration	6	8	2	
Fire Recruit Training				Maximum number of recruits on site is 30 personnel anticipated to be on site between 7:30 AM and 4:30 PM.
Firefighter Recruit Interviews				
Firefighter Recruit Class	30	30	0	
Training Tower Use				1 to 7 fire companies anticipated to use tower during off-peak periods.
HFD Support Services Facility				
Administration	24	3	55	Personnel anticipated to be on site between 7:45 AM and 4:30 PM.
Fire Prevention Bureau		36		
Fire Training and Research		40		
Recertification Training		32	32	Maximum of 30 students with 2 instructors
Certification Upgrade Training		32	32	Maximum of 30 students with 2 instructors
Elective Training				Only occurs when recertification and certification upgrade training not ongoing.
HFD Station 8	10	10	0	24 hour shifts with shift change at 8:00 AM
TOTALS	**100**	**221**	**121**	

APPENDIX D

PERSONNEL PROJECTIONS

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2025 PEAK HOUR TRAFFIC
ANALYSIS WITHOUT PROJECT

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: AM Peak
Project ID:
E/W St: Nimitz Highway Westbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Year 2025 w/out project
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	3	0	1	2	0	0	2	0
LGConfig					LTR		L	T			TR	
Volume				230	965	301	215	540			374	285
Lane Width					12.0		12.0	12.0			12.0	
RTOR Vol						30						29

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4			5	6	7	8
EB Left					NB	Left	A			
Thru						Thru	A	A		
Right						Right				
Peds						Peds				
WB Left	A				SB	Left				
Thru	A					Thru		A		
Right	A					Right		A		
Peds						Peds				
NB Right					EB	Right				
SB Right					WB	Right				
Green	40.0						23.0	27.0		
Yellow	4.0						0.0	4.0		
All Red	1.0						0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
Westbound								
LTR	1958	4895	0.92	0.40	36.6	D	36.6	D
Northbound								
L	407	1770	0.61	0.23	37.1	D		
T	1774	3547	0.35	0.50	15.3	B	21.5	C
Southbound								
TR	899	3331	0.72	0.27	36.0	D	36.0	D

Intersection Delay = 32.5 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: PM Peak
Project ID:
E/W St: Nimitz Highway Westbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Year 2025 w/out project
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	3	0	1	2	0	0	2	0
LGConfig					LTR		L	T			TR	
Volume				91	1226	580	114	519			370	460
Lane Width					12.0		12.0	12.0			12.0	
RTOR Vol						58						46

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left					NB Left	A			
Thru					Thru	A	A		
Right					Right				
Peds					Peds				
WB Left	A				SB Left				
Thru	A				Thru		A		
Right	A				Right		A		
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	43.0					17.0	30.0		
Yellow	4.0					0.0	4.0		
All Red	1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
Westbound								
LTR	2084	4846	0.93	0.43	35.1	D	35.1	D
Northbound								
L	301	1770	0.49	0.17	38.8	D		
T	1667	3547	0.40	0.47	17.4	B	21.3	C
Southbound								
TR	980	3266	0.84	0.30	39.5	D	39.5	D

Intersection Delay = 33.0 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: AM Peak
Project ID:
E/W St: Nimitz Highway Eastbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Year 2025 w/out project
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	0	0	0	0	0	2	0	0	2	0
LGConfig		LTR						TR		DefL	T	
Volume	471	1012	286					284	76	315	289	
Lane Width		12.0						12.0		12.0	12.0	
RTOR Vol			29						8			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	A				NB Left				
Thru	A				Thru		A		
Right	A				Right		A		
Peds					Peds				
WB Left					SB Left	A	A		
Thru					Thru	A	A		
Right					Right				
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	46.0					16.0	28.0		
Yellow	4.0					0.0	4.0		
All Red	1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	2252	4896	0.91	0.46	31.0	C	31.0	C
Westbound								
Northbound								
TR	964	3444	0.52	0.28	30.9	C	30.9	C
Southbound								
DefL	463	1770	0.85	0.49	32.2	C		
T	820	1863	0.44	0.44	19.8	B	26.3	C

Intersection Delay = 29.9 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: PM Peak
Project ID:
E/W St: Nimitz Highway Eastbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Year 2025 w/out project
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	0	0	0	0	0	2	0	0	2	0
LGConfig		LTR						TR		DefL	T	
Volume	460	755	71					173	48	368	93	
Lane Width		12.0						12.0		12.0	12.0	
RTOR Vol			7						5			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	A				NB Left				
Thru	A				Thru		A		
Right	A				Right				
Peds					Peds				
WB Left					SB Left	A	A		
Thru					Thru	A	A		
Right					Right				
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	44.0					15.0	31.0		
Yellow	4.0					0.0	4.0		
All Red	1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	2177	4947	0.72	0.44	24.1	C	24.1	C
Westbound								
Northbound								
TR	1067	3441	0.26	0.31	26.1	C	26.1	C
Southbound								
DefL	588	1770	0.76	0.51	27.3	C		
T	857	1863	0.13	0.46	15.6	B	24.9	C

Intersection Delay = 24.5 (sec/veh) Intersection LOS = C

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: WOC
Date Performed: 4/11/11
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2025 w/out project
Project ID:
East/West Street: Paine Circle
North/South Street: Valkenburgh Street
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	236			249	246
Peak-Hour Factor, PHF	0.66	0.66			0.77	0.77
Hourly Flow Rate, HFR	1	357			323	319
Percent Heavy Vehicles	2	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT					TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				19		0
Peak Hour Factor, PHF				0.88		0.88
Hourly Flow Rate, HFR				21		0
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/		No	/
Lanes				0	0	
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	1						21	
C(m) (vph)	938						294	
v/c	0.00						0.07	
95% queue length	0.00						0.23	
Control Delay	8.8						18.2	
LOS	A						C	
Approach Delay							18.2	
Approach LOS							C	

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: WOC
Date Performed: 4/11/11
Analysis Time Period: PM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2025 w/out project
Project ID:
East/West Street: Paine Circle
North/South Street: Valkenburgh Street
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	104			56	76
Peak-Hour Factor, PHF	0.64	0.64			0.86	0.86
Hourly Flow Rate, HFR	1	162			65	88
Percent Heavy Vehicles	2	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration		LT				TR
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				74		3
Peak Hour Factor, PHF				0.73		0.73
Hourly Flow Rate, HFR				101		4
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/			No /
Lanes				0		0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	1						105	
C(m) (vph)	1428						690	
v/c	0.00						0.15	
95% queue length	0.00						0.53	
Control Delay	7.5						11.2	
LOS	A						B	
Approach Delay							11.2	
Approach LOS							B	

APPENDIX F

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2025 PEAK HOUR TRAFFIC
ANALYSIS WITH PROJECT

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: AM Peak
Project ID:
E/W St: Nimitz Highway Westbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Year 2025 w/ project
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	3	0	1	2	0	0	2	0
LGConfig					LTR		L	T			TR	
Volume				279	965	301	215	540			386	285
Lane Width					12.0		12.0	12.0			12.0	
RTOR Vol						30						29

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4			5	6	7	8
EB Left					NB	Left	A			
Thru						Thru	A	A		
Right						Right				
Peds						Peds				
WB Left		A			SB	Left				
Thru		A				Thru		A		
Right		A				Right		A		
Peds						Peds				
NB Right					EB	Right				
SB Right					WB	Right				
Green		41.0					22.0	27.0		
Yellow		4.0					0.0	4.0		
All Red		1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
Westbound								
LTR	2006	4893	0.93	0.41	36.8	D	36.8	D
Northbound								
L	389	1770	0.63	0.22	38.8	D		
T	1738	3547	0.36	0.49	15.9	B	22.4	C
Southbound								
TR	900	3335	0.74	0.27	36.4	D	36.4	D

Intersection Delay = 33.0 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: PM Peak
Project ID:
E/W St: Nimitz Highway Westbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Year 2025 w/ project
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	3	0	1	2	0	0	2	0
LGConfig					LTR		L	T			TR	
Volume				91	1226	580	177	551			370	460
Lane Width					12.0		12.0	12.0			12.0	
RTOR Vol						58						46

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4			5	6	7	8
EB Left					NB	Left	A			
Thru						Thru	A	A		
Right						Right				
Peds						Peds				
WB Left		A			SB	Left				
Thru		A				Thru		A		
Right		A				Right		A		
Peds						Peds				
NB Right					EB	Right				
SB Right					WB	Right				
Green		42.0					19.0	29.0		
Yellow		4.0					0.0	4.0		
All Red		1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
Westbound								
LTR	2035	4846	0.95	0.42	38.7	D	38.7	D
Northbound								
L	336	1770	0.68	0.19	43.0	D		
T	1703	3547	0.41	0.48	17.0	B	23.3	C
Southbound								
TR	947	3266	0.87	0.29	42.6	D	42.6	D

Intersection Delay = 35.7 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: AM Peak
Project ID:
E/W St: Nimitz Highway Eastbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Year 2025 w/ project
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	0	0	0	0	0	2	0	0	2	0
LGConfig		LTR						TR		DefL	T	
Volume	471	1012	346					284	76	315	350	
Lane Width		12.0						12.0		12.0	12.0	
RTOR Vol			35						8			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	A				NB Left				
Thru	A				Thru		A		
Right	A				Right		A		
Peds					Peds				
WB Left					SB Left	A	A		
Thru					Thru	A	A		
Right					Right				
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	47.0					17.0	26.0		
Yellow	4.0					0.0	4.0		
All Red	1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	2293	4878	0.92	0.47	31.5	C	31.5	C
Westbound								
Northbound								
TR	895	3444	0.56	0.26	32.9	C	32.9	C
Southbound								
DefL	460	1770	0.86	0.48	33.6	C		
T	801	1863	0.55	0.43	22.0	C	27.5	C

Intersection Delay = 30.7 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.4

Analyst: CL
Agency: WOC
Date: 4/11/11
Period: PM Peak
Project ID:
E/W St: Nimitz Highway Eastbound

Inter.:
Area Type: All other areas
Jurisd:
Year : Year 2025 w/ project
N/S St: Valkenburgh Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	0	0	0	0	0	2	0	0	2	0
LGConfig		LTR						TR		DefL	T	
Volume	460	755	71					268	74	368	93	
Lane Width		12.0						12.0		12.0	12.0	
RTOR Vol			7						7			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	A				NB Left				
Thru	A				Thru		A		
Right	A				Right				
Peds					Peds				
WB Left					SB Left	A	A		
Thru					Thru	A	A		
Right					Right				
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	42.0					16.0	32.0		
Yellow	4.0					0.0	4.0		
All Red	1.0					0.0	1.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	2078	4947	0.75	0.42	26.1	C	26.1	C
Westbound								
Northbound								
TR	1101	3440	0.40	0.32	26.7	C	26.7	C
Southbound								
DefL	535	1770	0.84	0.53	27.1	C		
T	894	1863	0.13	0.48	14.5	B	24.6	C

Intersection Delay = 25.9 (sec/veh) Intersection LOS = C

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: WOC
Date Performed: 4/11/11
Analysis Time Period: AM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2025 w/ project
Project ID:
East/West Street: Paine Circle
North/South Street: Valkenburgh Street
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	5	232			249	282
Peak-Hour Factor, PHF	0.66	0.66			0.77	0.77
Hourly Flow Rate, HFR	7	351			323	366
Percent Heavy Vehicles	2	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT				TR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				22		0
Peak Hour Factor, PHF				0.88		0.88
Hourly Flow Rate, HFR				25		0
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/		No	/
Lanes				0	0	
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	7						25	
C(m) (vph)	901						281	
v/c	0.01						0.09	
95% queue length	0.02						0.29	
Control Delay	9.0						19.1	
LOS	A						C	
Approach Delay							19.1	
Approach LOS							C	

HCS+: Unsignalized Intersections Release 5.4

TWO-WAY STOP CONTROL SUMMARY

Analyst: CL
Agency/Co.: WOC
Date Performed: 4/11/11
Analysis Time Period: PM Peak
Intersection:
Jurisdiction:
Units: U. S. Customary
Analysis Year: Year 2025 w/ project
Project ID:
East/West Street: Paine Circle
North/South Street: Valkenburgh Street
Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street: Approach	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	104			56	76
Peak-Hour Factor, PHF	0.64	0.64			0.86	0.86
Hourly Flow Rate, HFR	1	162			65	88
Percent Heavy Vehicles	2	--	--		--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	0	1			1	0
Configuration	LT				TR	
Upstream Signal?		No			No	

Minor Street: Approach	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume				199		3
Peak Hour Factor, PHF				0.73		0.73
Hourly Flow Rate, HFR				272		4
Percent Heavy Vehicles				2		2
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage			/		No	/
Lanes				0	0	
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	1						276	
C(m) (vph)	1428						686	
v/c	0.00						0.40	
95% queue length	0.00						1.95	
Control Delay	7.5						13.7	
LOS	A						B	
Approach Delay							13.7	
Approach LOS							B	

Appendix E
Archaeological Assessment

Cultural Surveys Hawai'i Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

Providing Excellence in Cultural Resource Management

O'ahu P.O. Box 1114 Kailua, HI 96734 Ph.: (808) 262-9972 Fax.: (808) 262-4950
Maui 16 S. Market St., #2N Wailuku, HI 96793 Ph.: (808) 242-9882 Fax.: (808) 244-1994
Hawai'i 15-3011 Mako Way Pahoa, HI. 96778 Ph.: (866) 965-6478 Fax.: (808) 965-6582
Kaua'i P.O. Box 498 Lawai, HI 96765 Ph.: (808) 245-4883

December 15, 2011

Ms. Deona Naboa
O‘ahu Archaeologist
State Historic Preservation Division
Kakuhihewa Blvd., Suite 555
601 Kamōkila Boulevard
Kapolei, Hawai‘i 96707
Phone: (808) 692-8019
Fax: (808) 692-8020

CSH Job Code MOANALUA 11

Subject: Request for Concurrence on Recommendation of Archaeological Monitoring for the Honolulu Fire Department Charles H. Thurston Fire Training Facility Project, Moanalua Ahupua‘a, Honolulu (Kona) District, O‘ahu Island, Hawai‘i TMK:[1] 1-1-002:012

Aloha Ms. Naboa,

On behalf of our client, Group 70 International, Inc., Cultural Surveys Hawai‘i (CSH) is submitting this letter report to the Hawai‘i Department of Land and Natural Resources/State Historic Preservation Division (DLNR/SHPD) for review under Hawai‘i Administrative Rules (HAR) Chapter 13-275-5.

As outlined in these regulations, an initial step in the State of Hawai‘i historic preservation review process is consultation with the DLNR/SHPD to determine if a proposed project needs to undergo an inventory survey to ascertain if historic properties, including archaeological sites, are present. Under HAR 13-275-5, to comply with the review process, project proponents shall provide the DLNR/SHPD with a Tax Map Key, a project area map, and ask the DLNR/SHPD to make a decision regarding whether the project needs an inventory survey. The DLNR/SHPD then has 30 days to review available information and respond in writing with a determination whether or not an inventory survey is required.

Alternatively, to comply with this initial review process step, the project proponents can “submit documents claiming no significant historic sites are likely to be present” [HAR 13-275/284-5(b)(2)]. This letter report is intended to serve as an official request for this "no historic properties affected" determination.

Background

The Honolulu City & County Fire Department Charles H. Thurston Fire Training Facility Project entails improvements and new construction at the Honolulu Fire Department (HFD) Fire Training facility at 890 Valkenburgh Street, Honolulu, O‘ahu Island, Hawai‘i TMK: [1] 1-1-002:012 (Figure 1, Figure 2).

The project area is located on the northwestern side of the Honolulu International Airport, south of Nimitz Highway, west of Valkenburgh Street, and north of Paine Circle in the central portion of the south shore of O‘ahu on what has come to be referred in archaeological literature as the Hālawa-Moanalua plain.

In general, the project area vicinity is a mixture of office space, warehouses, and light industrial use. Honolulu International Airport lies to the southeast. Hickam (part of Joint Base Pearl Harbor Hickam) lies to the southwest. The intersection of Nimitz Highway and the Queen Liliuokalani Freeway with Kamehameha Highway just to the north creates a road pattern of some complexity. A ball park complex lies just to the south across Paine Circle.

The project area, permanently conveyed to the City from the Navy in 2005, is approximately 5.16-acres and exists almost entirely of buildings and an asphalt parking lot (Figure 3 thru Figure 10). The proposed project improvements will involve excavation for structural foundations, utility lines, landscaping, and additional parking (Figure 11).

Previously Identified Historic Properties

No previously identified historic properties are known in the immediate vicinity of the project area. Historic properties indicated within two kilometers include the former Kaloaloa Fishpond (SIHP 50-80-13-80), the Ka‘ihikapu Fishpond (SIHP 50-80-13-81), and Lelepaua Fishpond (SIHP 50-80-13-82) (Figure 12).

The 1935 Map of the Honolulu Plantation Company indicates that the entire project area was in commercial sugar cane fields 11 and 12 (Figure 13).

The 1996 Anderson and Bouthillier study produced an archaeological/historical resources sensitivity map which indicates that the present project area falls within a zone of “low” probability of archaeological and cultural resources with sensitivity increasing south, closer to the coast (Figure 14).

More recent summaries of the results of archaeological investigations at neighboring Hickam AFB (Figure 15; adapted from Jourdane and Dye 2006:18) show that in over 100 recent excavations, including over 50 in the Anderson and Bouthillier “High Sensitivity” zone, there have only been three areas in which sites have been designated.

Two of these designated sites lie some distance to the west on the eastern margin of the entrance to Pearl Harbor in what was clearly an intensively used area in traditional Hawaiian times. The nearest designated site (shown as locale “c” on Figure 15), and the only one within three kilometers, consisted of three pit

features (Desilets 2002a) designated as site 50-80-13-6406. While finds were limited to thermally altered limestone, charcoal and very sparse quantities of midden, the carbon dating ranges obtained of AD 1478 – 1664 and 1306 – 1452 include the earliest reported date for Hickam AFB. This appears to be the only site designated in the eastern half of the Hickam AFB lands in the past 70 years.

The closest studies such as the Carlson, 2001 study of the Manuwai Canal found no significant finds. In addition, Cultural Survey Hawai‘i’s recent archaeological investigation (Yucha and Hammatt 2008) of six geo-technical test borings in the 22 acres of undeveloped land to the southwest of the current project area’s western parcel evidenced no cultural deposits.

A consideration of the results of the 54 archaeological studies that have taken place at Hickam AFB since Anderson and Bouthillier (1996) produced their sensitivity map suggests that the designation of a large area of inland east Hickam AFB as of high archaeological sensitivity is simply not the case. At the time of the creation of the Anderson and Bouthillier (1996) sensitivity map there had not been a single archaeological study east of the present western reef runway taxi approach, which is to say there had not been a single archaeological study within two kilometers of the present project area.

The likelihood of significant subsurface deposits in eastern Hickam appears to be not high or even moderate but, as a generalization, may be expected to be rather low.

Results of Site Inspection

On 2 February, 2011, CSH (Chris Monahan) conducted a pedestrian site inspection of the project area with the project proponent (Honolulu Fire Department) and its representatives (including Group 70). The purpose of the site inspection, which was conducted after an informational meeting dealing with design and construction planning, was to observe current conditions and to assess the possibility, in association with background research conducted by CSH, of historic properties in the project area. CSH walked the entire project area.

Request for SHPD Concurrence with CSH recommendation of Archaeological Monitoring

Based on the absence of historic properties in or in the immediately vicinity of the project area, and the low likelihood of encountering historically-significant cultural deposits in subsurface context in the project area, CSH requests an SHPD determination of “no historic properties affected” for the proposed project. CSH recommends an archaeological monitoring program and that an archaeological inventory survey is not warranted for the proposed project.

On behalf of our client, we request written confirmation of SHPD’s determination of effect.

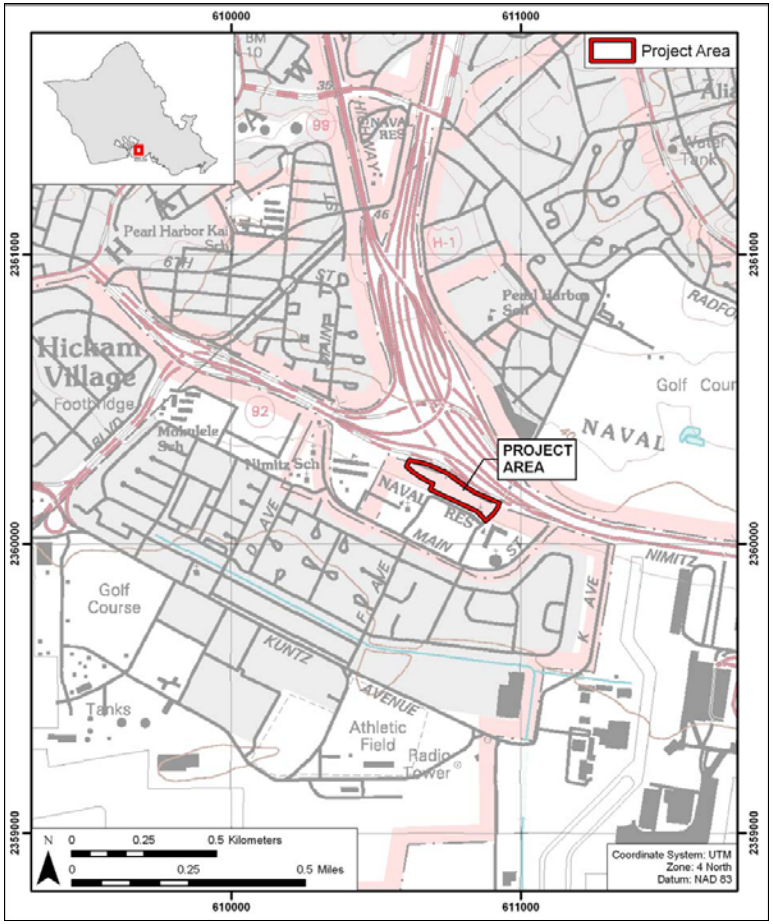

Figure 1. Portion of 1999 U.S. Geological Survey 7.5-minute series topographic map, Pearl Harbor quadrangle, showing project area

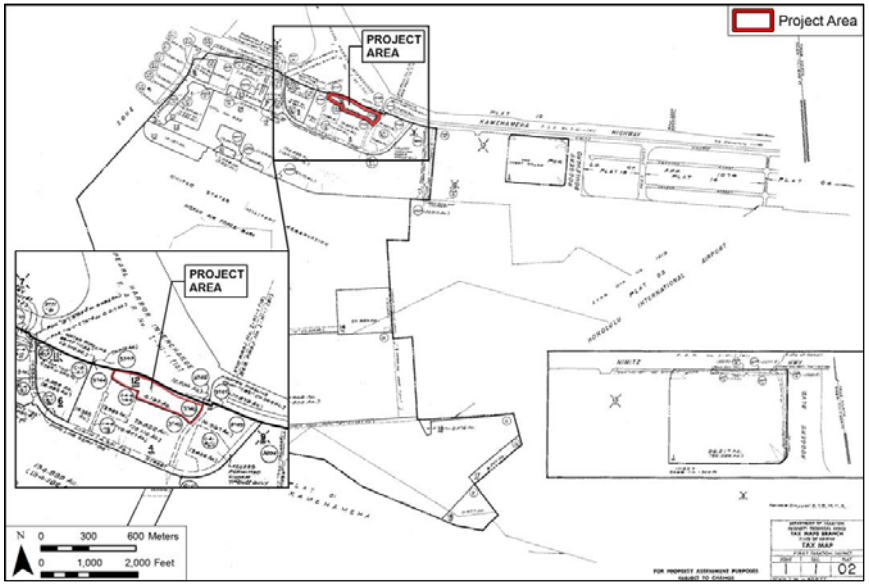

Figure 2. Tax Map Key (TMK) Plat [1] 1-1-002 showing project area

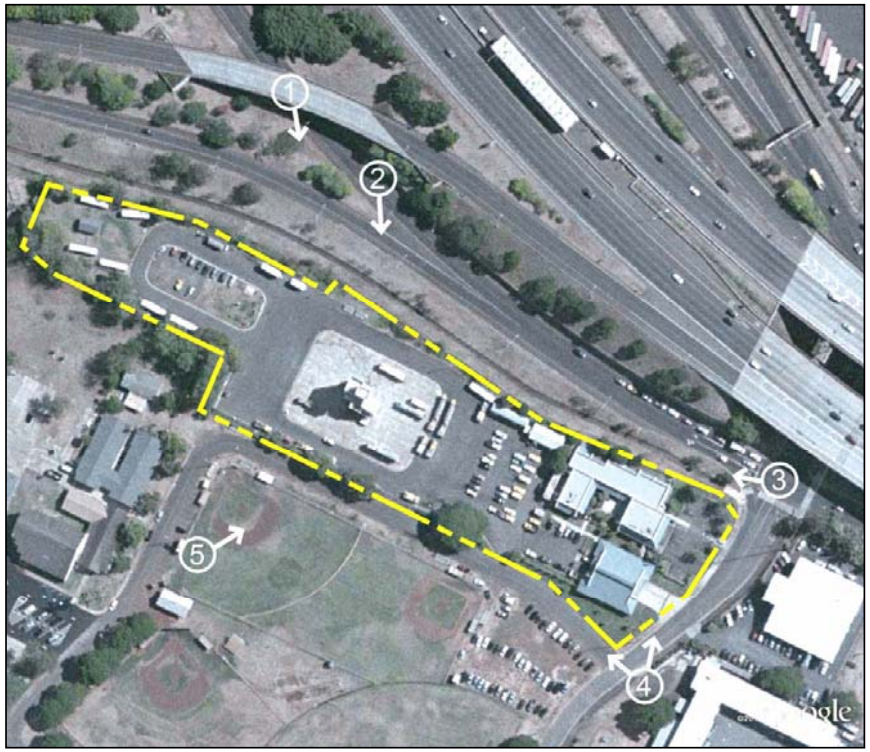

Figure 3. Aerial view of project area with Photograph Key to the following photographs

Figure 4. Photographic Key: Photo 1 View from H-1 Freeway on-ramp above Nimitz Highway

Figure 5. Photographic Key: Photo 2 View from the H-1 Freeway off-ramp immediately before merging with Nimitz Highway

Figure 6. Photographic Key: Photo 3 View approaching Valkenburgh Street from Nimtz Highway

Figure 7 Photographic Key: Photo 4 View of Mokulele Fire Station on the corner of Paine Circle and Valkenburgh Street .

Figure 8. Photographic Key: Photo 4 View of Mokulele Fire Station looking *mauka* on Valkenburgh Street with the raised H-1 Freeway in the background

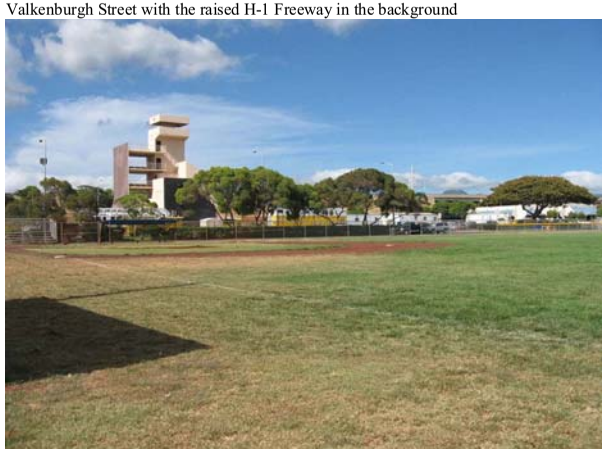

Figure 9. Photographic Key: Photo 5 View of the Training Center looking *mauka* from Lynch Park

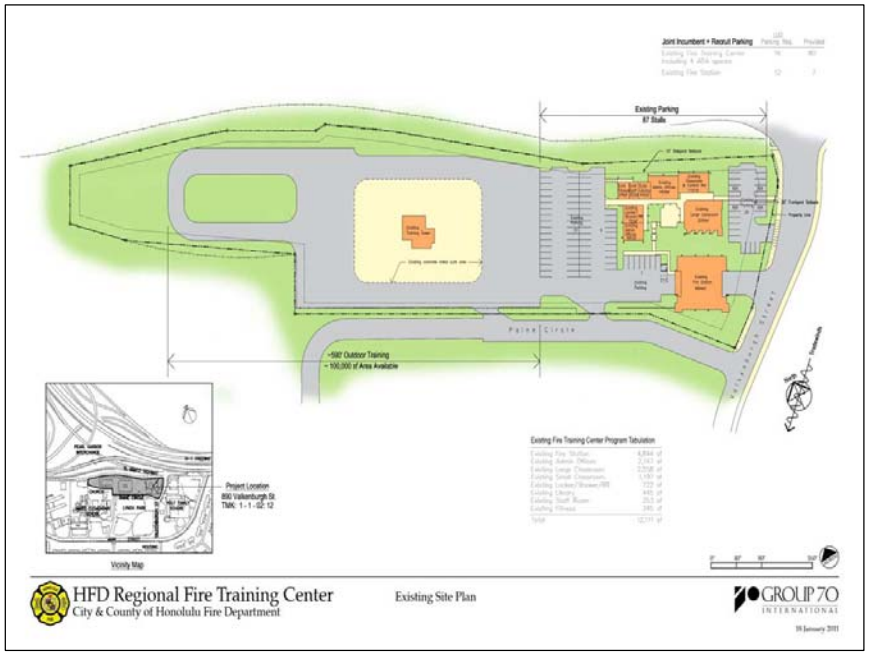

Figure 10. Figure shows existing facilities

Figure 11. Proposed Site Plan

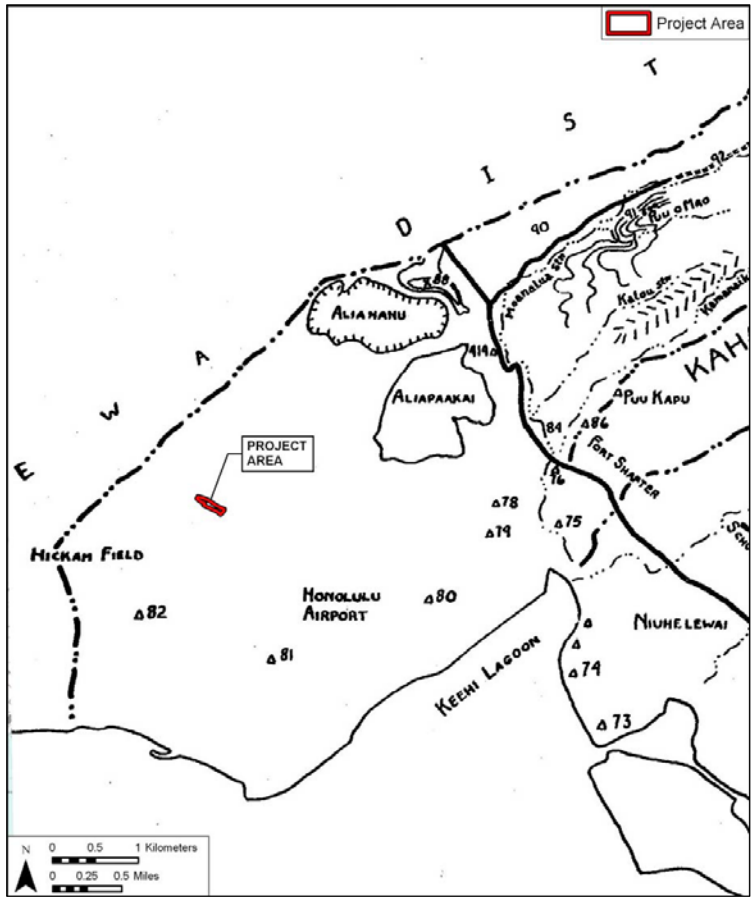

Figure 12. 1959 Bishop Museum site location map (adapted from Sterling and Summers) showing neighboring fishponds (Site 80 is the Kaloaloa Fishpond, Site 81 is the Kaʻihikapu Fishpond & Site 82 is the Lelepaua Fishpond)

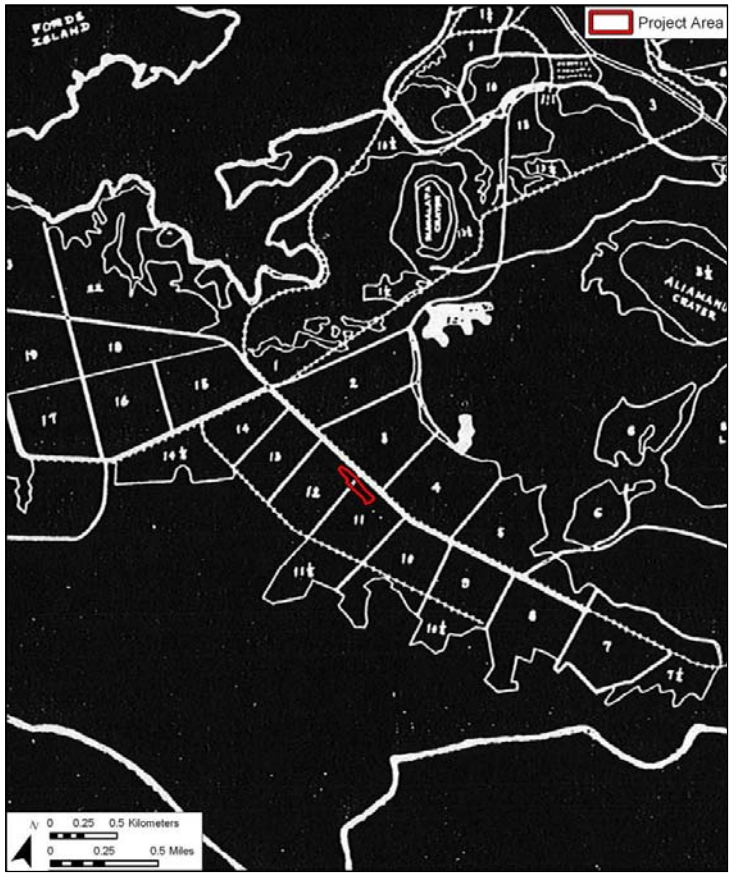

Figure 13. 1935 Map of the Honolulu Plantation Company showing project area in commercial sugar cane fields 11 and 12.

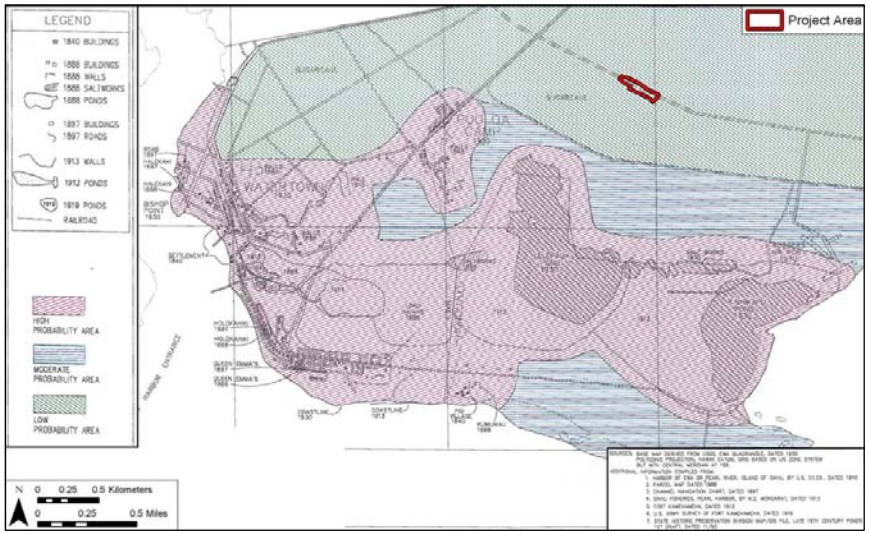

Figure 14. Map showing project in Low Probability Area for archaeological and historical resources (adapted from Anderson and Bouthillier 1996:29)

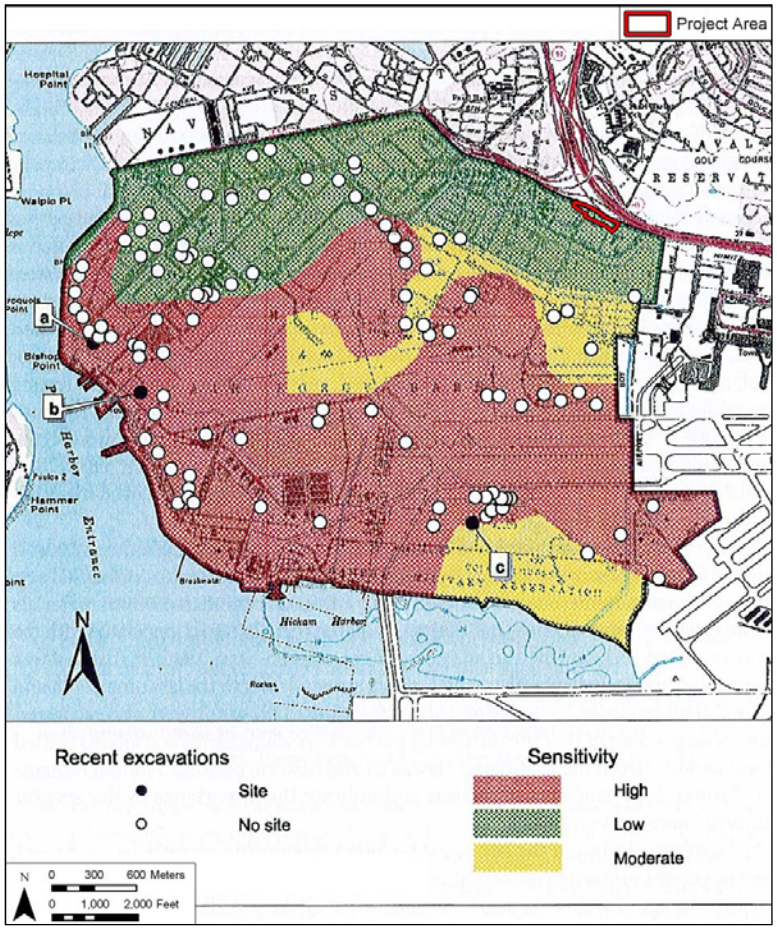

Figure 15. Results of recent archaeological investigations (adapted from Jourdane and Dye 2006:18) showing that in over 100 recent excavations, including over 50 in the Anderson and Bouthillier "High Sensitivity" zone, there have only been three sites found.

Please let us know if you have any questions or comments about this notification.

Sincerely,

Christopher M. Monahan, Ph.D.
Cultural Surveys Hawaiʻi
cmonahan@culturalsurveys.com

Appendix F
Cultural Impact Assessment

Cultural Impact Assessment for the Expansion of the HFD Fire Training Facility Project, Moanalua Ahupuaʻa, Kona District, Oʻahu Island (TMK: [1] 1-1-002:012)

Prepared for

Group 70 International, Inc.

Prepared by

Heather McMillen, Ph.D., Mary-Lindsey Correa, M.A., and Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawaiʻi, Inc.

Kailua, Hawaiʻi

(Job Code: MOANALUA 12)

July 2011

Oʻahu Office
P.O. Box 1114
Kailua, Hawaiʻi 96734
Ph.: (808) 262-9972
Fax: (808) 262-4950

www.culturalsurveys.com

Maui Office
1860 Main St.
Wailuku, Hawaiʻi 96793
Ph: (808) 242-9882
Fax: (808) 244-1994

Section 1 Prefatory Remarks on Language and Style

A Note about Hawaiian and other non-English Words:

Cultural Surveys Hawaiʻi (CSH) recognizes that the Hawaiian language is an official language of the State of Hawaiʻi, it is important to daily life, and using it is essential to conveying a sense of place and identity. In this report, CSH uses italics to identify and highlight all foreign (i.e., non-English and non-Hawaiian) words. Italics are only used for Hawaiian words when citing from a previous document that italicized them. CSH parenthetically translates or defines in the text the non-English words at first mention, and the commonly-used non-English words and their translations are also listed in the *Glossary* (Appendix A) for reference. However, translations of Hawaiian and other non-English words for plants and animals mentioned by community participants are referenced separately (see explanation below).

A Note about Plant and Animal Names:

When community participants mention specific plants and animals by Hawaiian, other non-English, or common names, CSH provides their possible scientific names (Genus and species) in the *Common and Scientific Names of Plants and Animals Mentioned by Community Participants* (Appendix B). CSH derives these possible names from authoritative sources, but since the community participants only name the organisms and do not taxonomically identify them, CSH cannot positively ascertain their scientific identifications. CSH does not attempt in this report to verify the possible scientific names of plants and animals in previously published documents; however, citations of previously published works that include both common and scientific names of plants and animals appear as in the original texts.

Section 2 Abbreviations

APE	Area of Potential Effect
CIA	Cultural Impact Assessment
CSH	Cultural Surveys Hawai‘i
DLNR	Department of Land and Natural Resources
DOH/OEQC	Department of Health/Office of Environmental Quality Control
HAFB	Hickam Air Force Base
HAR	Hawai‘i Administrative Rules
HFD	Hawai‘i Fire Department
HRS	Hawai‘i Revised Statutes
LCA	Land Commission Award
OHA	Office of Hawaiian Affairs
OIBC	O‘ahu Island Burial Council
SHPD	State Historic Preservation Division
TCP	Traditional Cultural Property
TMK	Tax Map Key
US	United States
USGS	United States Geological Survey

Section 3 Management Summary

Reference	Cultural Impact Assessment (CIA) for the Expansion of the HFD Fire Training Facility Project, Moanalua Ahupua‘a, Kona District, O‘ahu Island (TMK: [1] 1-1-002:012) (McMillen, Correa, Hammatt 2011)
Date	July 2011
Project Number (s)	Cultural Surveys Hawai‘i (CSH) Job Code: MOANALUA 12
Project Location	The Charles H. Thurston Fire Training Center that is proposed to be expanded is located near the airport on Valkenburgh Street. Surrounding it to the west are military family housing, the Assets School, and Trinity Missionary Baptist Church; to the southwest is Lynch Park; to the south is Holy Family Catholic Church and Academy; to the southeast is Fleet Reserve Association Branch 46; and to the north is Nimitz Highway.
Land Jurisdiction	City & County of Honolulu, Honolulu Fire Department
Agencies	State of Hawai‘i Department of Land and Natural Resources / State Historic Preservation Division (DLNR / SHPD); State Office of Environmental Quality Control (OEQC)
Project Description	The existing training center includes classrooms and administrative offices, an inoperable burn model training tower, a library, a fitness area with locker and showers, a 24/7 fire investigation section, a medical services office, and storage. These existing facilities are inadequate to meet the current needs of the HFD fire training program. The property also includes HFD’s Mokulele Fire Station. The HFD training center expansion is planned to occur in three phases. Phase I will include the construction of a new recruit academy, a 100-stall parking lot, and upgrades to the existing training tower site. Phase II will include the construction of a new incumbent building, and 99 parking spaces. Finally, Phase III will include a single engine company core concept prototype fire station to replace the existing fire station, future expansion of the new recruit academy, and expansion of the incumbent training building, and additional parking.
Project Acreage	Approximately 5.16 acres
Area of Potential Effect (APE) and Survey Acreage	For the purposes of this Cultural Impact Assessment, the APE is defined as the approximately 5.16 -acre Project area. While this investigation focused on the Project APE, the study area included the entire ahupua‘a (land division) of Moanalua.
Document Purpose	The Project requires compliance with the State of Hawai‘i environmental review process (Hawai‘i Revised Statutes [HRS] Chapter 343), which requires consideration of a proposed Project’s effect on cultural practices and resources. At the request of Group 70 International, Inc., CSH is conducting this CIA. Through document research and ongoing cultural consultation efforts, this report provides

	information pertinent to the assessment of the proposed Project's impacts to cultural practices and resources (per the Office of Environmental Quality Control's Guidelines for Assessing Cultural Impacts) which may include Traditional Cultural Properties (TCP) of ongoing cultural significance that may be eligible for inclusion on the State Register of Historic Places, in accordance with Hawai‘i State Historic Preservation Statute (Chapter 6E) guidelines for significance criteria (HAR §13-284) under Criterion E. The document is intended to support the Project's environmental review and may also serve to support the Project's historic preservation review under HRS Chapter 6E-42 and Hawai‘i Administrative Rules (HAR) Chapter 13-284.
Community Consultation	Hawaiian organizations, agencies and community members were contacted in order to identify individuals with cultural expertise and/or knowledge of the Project area and the vicinity. The consulted organizations included the State Historic Preservation Division (SHPD), the Office of Hawaiian Affairs (OHA), the O‘ahu Island Burial Council (OIBC), Hui Mālama I Nā Kūpuna ‘O Hawai‘i Nei, Moanalua Gardens Foundation, the Moanalua Senior Citizens Club, and community members of Moanalua Ahupua‘a.
Results of Background Research	Background research yielded the following results: 1. Moanalua is an ahupua‘a rich in natural and cultural resources and has been favored by Hawaiian ali‘i (chiefs) and revered valley chiefs. The ahupua‘a has protected offshore waters, flowing streams and springs, and habitable cave shelters, which made it attractive to early settlers. The upland valleys, Kamananui and Kamanaiki, are known for their endemic flora and their culturally significant features. 2. Although there is evidence that the uplands were occupied initially, the lower valleys were the focus for occupation. In the lower valleys taro, coconut, banana, breadfruit, and bark cloth were traditionally cultivated. The lowlands are also known for their extensive fishponds and salt ponds, which produced important resources. At the time of the Mahele (Land Division) at mid-nineteenth century, activity was based in the lowlands, which were used for wetland taro farming or lo‘i; house lots or pā hale; kula or dry land agriculture; loko or fishponds; and ‘auwai also known as irrigation ditches. Wetland taro fields made up 88% of the Land Commission Award (LCA) parcels and 84% of the acreage (Rigler 1990:110). No commoner land commission awards are known in the vicinity of the present Project area. It was common for the aristocracy and/or their konohiki (overseers) to retain fishponds and unique cultural resources such as the coastline at the mouth of Pu‘uloa (Pearl

	Harbor). 3. Taro fields were converted to rice cultivation; and by the end of the Nineteenth Century land use in other areas shifted to ranching and sugar plantations. A map of the Honolulu Plantation Company lands circa 1930 (Figure 15) indicates that the entire Project area was in commercial sugar cane fields. 4. The development of infrastructure and facilities for military and industrial use were significant factors in the transformation in Moanalua in the twentieth century with, for example, Rogers Airport, Pearl Harbor, Hickam Air Force Base, Tripler Army Hospital, and Fort Shafter. 5. In terms of cultural resources, Moanalua has had at least four documented heiau (temples), not all are intact; four petroglyph stones; and five fishponds. Other important wahi pana (storied places) include the house of bones, Keanaakamano (cave of the shark man), and Namakalele a place known for the "flying eyes" of the woman who once lived there. 6. The ahupua‘a was first held by ancient valley chiefs, then seized by Maui chiefs, and later seized by Kamehameha of Hawai‘i Island. He divided it between two uncles. One died in 1880, and passed it onto his son, Hoapili. When the other died in 1884, the land reverted back to Kamehameha and his wife Ka‘ahumanu. In 1839 Hoapili leased land to the first foreigner, Captain William Sumner who, under the Mahele, was one of two major awardees. The other major awardee was Lot Kamehameha (who was Hoapili's heir). Princess Ruth inherited Moanalua from Lot Kamehameha in 1872 and then Princess Pauahi Bishop inherited it from her. In 1883, Princess Pauahi bequeathed Moanalua Ahupua‘a to Samuel Mills Damon. The Damon estate included Moanalua and also spanned throughout the Hawaiian Islands. Samuel Mills Damon developed Moanalua for residential, agricultural, and industrial use. A relatively smaller portion of it was preserved as what is now known as Moanalua Gardens and there is also conservation land (under the Department of Land and Natural Resources) in the back of the valley. Beginning in the 1800s, the United States (US) began acquiring (through land condemnation) portions of the Damon Estate in Moanalua and developing it for military purposes. The current Project area was once Navy land but is now under the Hawaii Fire Department. 7. The Project area is in an indicated zone of "low" probability of archaeological and cultural resources, based on Anderson and

	Bouthillier (1996) and Hammatt and Shideler (2011).
Results of Community Consultation	CSH attempted to contact 32 community members and government agency and community organization representatives. Of the 15 people that responded, four kūpuna (elders) and/or kama‘āina (Native-born) participated in formal interviews for more in-depth contributions to the CIA. This community consultation indicates: 1. Mo‘olelo (oral traditions) indicate that Moanalua is a place with deep ancestral and historical significance for community participants. They unanimously describe Moanalua as a special place with a richness of natural, cultural, and spiritual resources. Mr. Roddy Akau describes Moanalua as one of the richest ahupua‘a on O‘ahu. 2. According to oral and written history, Moanalua was revered by some of the earliest Polynesians, by mountain chiefs, and later by Hawaiian ali‘i. Mr. Akau describes how Papa and Wākea (ancestors of the Hawaiian people) produced Kamawaelualani who married Kahikilaulani, a princess from Kahiki. Her search for the Pali Uli (translated as a “paradise” by Mr. Akau), brought her to Kamananui, to “a hill top area [that] was known as the most exalted place in Moanalua. She continued to sail to the back of the valley and stopped at Kulanaahane and presented her future husband, Kamawaelualani, a gift: an ‘ō‘ō bird (honey creeper) perched on a branch of an ‘ōhi‘a lehua tree with its bottom wrapped in earth.” Their unity produced ancient valley chiefs. Mr. Akau and Mr. Dwight Damon note the association of Moanalua with the Kamehameha line. Mr. Akau’s connection is personal as his family name is Kapahi‘kaua o Kamehameha, “the battle sword of Kamehameha” and derives from his fourth great grandfather who was born in 1795 during Kamehameha’s battle with Kalanikūpule (then King of O‘ahu). As Kamehameha’s troops were battling below Moanalua Valley and he rested at a sacred spring, he learned of a baby born of Kamananui valley chiefs. He went to see the baby and gifted him with his sword; thus the family name Kapahi‘kaua o Kamehameha. Mr. Damon relates how Kamehameha the Great “came to Moanalua after consolidating the islands…The history of Moanalua and the Kamehameha line is this: King Kamehameha the Great gave the ahupua‘a to Kame‘eiamoku who gave it to his son Hoapili who made Prince Lot (later Kamehameha V) his future heir,

	who willed it to Princess Ruth, who willed it to Princess Bernice Pauahi in May 1883. In October, 1884, Mrs. Bishop willed the ahupua‘a of Moanalua to her friend, S.M. Damon [Samuel Mills Damon].” 3. All community consultants described the fishponds and fisheries of Moanalua as an incredible resource of the past. In a letter dated April 12, 2011, Ms. Phyllis Cayan of SHPD commented, “This area was part of O‘ahu’s bounty of fishing – both offshore and in the former fishpond…Certainly, food production whether by fishing or gathering would have been an important part of the culture therein.” Mr. George Downing explains that Moanalua had an abundance of fish – citing examples of ō‘io (bonefish) (see Appendix B Common and Scientific Names for Plants and Animals Mentioned by Community Consultants) and mullet. Dr. Ishmael Stagner relates mo‘olelo from his kūpuna about the rich marine resources of Moanalua such as limu līpoa and limu kohu (species of seaweeds), which were gathered until the 1960s prior to the building of the seaplane runway. Growing up he also remembers: pāpio (juvenile big eye jack), manini (convict tang), mullet, and oysters–even some with momi (pearls). Mr. Akau says that in the 1400s and 1500s the largest fishponds on O‘ahu were created in Moanalua. He identifies the most significant as Lelepaua, which was about 350 acres and was just mauka (inland, mountain) of the current fire and police stations, and Kaihikapu, which was smaller but also near the Project area. Mr. Damon notes that Lelepaua is “mentioned in a Moanalua place-name chant named ‘Kahikilaulani ka Makani’” and in Gertrude Damon’s unpublished notebooks that recorded ethnographic information on Moanalua. Mr. Damon notes that Lelepaua was being filled in by 1900. In 1910 Salt Lake (Āliamanu) was filled with water by S.M. Damon and the McCandless brothers in order to create a mullet pond, and it is now the site of the Honolulu Country Club, according to Mr. Damon. 4. Mr. Damon describes changing land use of the area noting that in the mid to late 1800s, the lowlands of Moanalua, specifically the “basin of Kamananui Valley” were used for cattle ranching by William Sumner and J.I. Dowsett. By the late 1800s Mr. S.M. Damon took over these leases, and leased to the Honolulu Plantation Company who cultivated sugar cane in “Āliamanu, Salt Lake and Makalapa areas, which include the area where the Thurston Fire Station is located on Valkenburgh St[reet].”

	Mr. Damon notes that makai (lowland, ocean) areas of Kaloaloa became known as Damon Tract, “where locals leased residential and farm land from the Damon Estate at what is now a light industrial district and Honolulu International Airport.” 5. Community participants describe numerous cultural sites in Moanalua. In proximity to the Project area are the fishponds and the salt ponds. Mr. Damon suggests that the Project may uncover artifacts “as the area was in the vicinity of fish ponds and salt pans. But it is likely that the soil there had been plowed more than 100 years ago.” Mr. Akau and Dr. Stagner both describe the use of the flat lands (areas including Kaloaloa or Kahauiki) as Makahiki (ancient festival beginning about the middle of October and lasting about four months, with sports and religious festivities and taboo on war) grounds. Mr. Damon explains that Prince Lot’s (later Kamehameha V) cottage, which was “built to entertain foreign dignitaries,” was originally erected “between the present-day ‘Ōlelo building and Pu‘uloa Road,” and by 1960 was moved to Moanalua Gardens where it still stands. Important ancient sites farther mauka include Pali Uli heiau and Pōhaku Luahine, noted by Mr. Akau. 6. The community consultants who participated in this study do not anticipate direct cultural impacts will result from the proposed Project; however, they have recommendations for proceeding in a culturally and environmentally pono (correct, just) manner: Mr. Stagner recommends that the Honolulu Fire Department hold Makahiki Games in this area annually during the Makahiki season. This would perpetuate traditional land-use and cultural education. Mr. Akau recommends following protocol and offering appeasement to the spirits of the land, which has ancient cultural significance, even though the area is already developed on the surface. Mr. Downing is primarily concerned with the marine environment and says that although the Project area is inland, “it’s all connected” and so creating more pollution through development and construction can also trickle down into the shore lines. He encourages the city and state to be aware of and responsible for maintaining the integrity of these marine environments for the long term.
Recommendations	Based on the information gathered for the cultural and historic background and community consultation detailed in this CIA report, CSH foresees no potential direct impacts of the proposed Project on Native Hawaiian or other ethnic groups’ cultural practices customarily and traditionally exercised for subsistence, cultural or religious

	purposes. 1. They are not expected; however, land-disturbing activities may uncover burials or other cultural resources. Although previous archaeological surveys in proximity to the Project did not locate any cultural sites, should historic, cultural or burial sites or artifacts be identified during ground disturbance, the Project should immediately cease all work and the appropriate agencies notified pursuant to applicable law. 2. CSH recommends the Project proponents take measures to minimize environmental impacts during construction, taking into account the mauka-makai connections and concerns for the near shore waters. 3. CSH recommends the Project proponents consider the suggestions (detailed above) from community participants.

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Section 1 Introduction

1.1 Project Background

At the request of Group 70 International, Inc., Cultural Surveys Hawai‘i (CSH) is conducting a Cultural Impact Assessment (CIA) for the proposed expansion of the HFD Fire Training Facility Project. The 5.16 acre Project area is located in Moanalua Ahupua‘a (land division), Kona District, O‘ahu Island (TMK: [1] 1-1-002:012).

The Charles H. Thurston Fire Training Center, is located near the airport on Valkenburgh Street and serves as the primary venue for the training and education of Honolulu's firefighters. The training facility's 5.16-acre property has been conveyed from the Navy to the City. Surrounding uses include military family housing, the Assets School, and Trinity Missionary Baptist Church to the west, Lynch Park to the southwest, Holy Family Catholic Church and Academy to the south, Fleet Reserve Association Branch 46 to the southeast, and Nimitz Highway to the north.

Improvements to the training center will enhance the quality of the HFD's training program and will create a modern and well-equipped training environment for new recruits, as well as new facilities for incumbent fire fighters. With the proposed improvements the facility will become a Regional Training Center, providing critical training to firefighters from locations throughout the Pacific.

The existing training center includes classrooms and administrative offices, an inoperable burn model training tower, a library, a fitness area with locker and showers, a 24/7 fire investigation section, a medical services office, and storage. These existing facilities are inadequate to meet the current needs of the HFD fire training program. The property also includes HFD's Mokulele Fire Station.

The HFD training center expansion is planned to occur in three phases. Phase I will include the construction of a new recruit academy, a 100-stall parking lot, and upgrades to the existing training tower site. Phase II will include the construction of a new incumbent building, and 99 parking spaces. Finally, Phase III will include a single engine company core concept prototype fire station to replace the existing fire station, future expansion of the new recruit academy, and expansion of the incumbent training building, and additional parking.

1.2 Document Purpose

The Project requires compliance with the State of Hawai‘i environmental review process (Hawai‘i Revised Statutes [HRS] Chapter 343), which requires consideration of a proposed Project's effect on cultural practices. CSH is conducting this CIA at the request of Group 70 International, Inc. Through document research and ongoing cultural consultation efforts this report provides information pertinent to the assessment of the proposed Project's impacts to cultural practices and resources (per the *Office of Environmental Quality Control's Guidelines for Assessing Cultural Impacts*), which may include Traditional Cultural Properties (TCP) of ongoing cultural significance that may be eligible for inclusion on the State Register of Historic Places, in accordance with Hawai‘i State Historic Preservation Statute (Chapter 6E) guidelines

for significance criteria (HAR §13–284–6) under Criterion E which states to be significant an historic property shall:

> Have an important value to the Native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

The document is intended to support the Project's environmental review and may also serve to support the Project's historic preservation review under HRS Chapter 6E–42 and Hawai‘i Administrative Rules Chapter 13–284.

1.3 Scope of Work

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
2. Review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
3. Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices at or near the parcel; present and past uses of the parcel; and/or other practices, uses, or traditions associated with the parcel and environs.
4. Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.

1.4 Environmental Setting

1.4.1 Natural Environment

The Project area lies on what has come to be referred to in the archaeological literature as the Hālawa-Moanalua plain. The plain is largely formed by a raised reef limestone shelf but the former locations of Ka‘ihikapu and Lelepaua Fishponds have been described as "coral fill over swamp" (Foote et al. 1972). The Project area is believed to have been very close to sea level until fill activities circa 1931-1943. The Project area is shown on soil maps (Figure 4. Soils map of Project areas) overlying Makalapa Clay. The Makalapa series consists of moderately deep, well drained soils on uplands that formed in material weathered from volcanic tuff. Makalapa soils have slopes of two to 20 percent. Mean annual rainfall is about 30 inches and mean annual air temperature is about 74 degrees F. These soils are well drained; have slow to medium runoff; and slow permeability. Most of these soils are in urban development, military reservations and pasture. Natural vegetation is *kiawe* (*Prosopis pallida*), *koa-haole* (*Leucaena glauca*), lantana (*Lantana camara*), dwarf *koa* (*Acacia koaia*), finger grasses (*Chloris* spp.), and Bermuda grass (*Cynodon dactylon*) (Foote et al. 1972).

1.4.2 Built Environment

The Project area is almost entirely in asphalt parking lot and existing buildings. This area is a mixture of warehouses, office and light industrial uses. Honolulu International Airport lies to the southeast. Hickam Air Force Base (HAFB) (part of Joint Base Pearl Harbor Hickam) lies to the southwest. The intersection of Nimitz Highway and the Queen Liliuokalani Freeway with Kamehameha Highway just to the north creates a road pattern of some complexity. A ball park complex lies just to the south across Paine Circle.

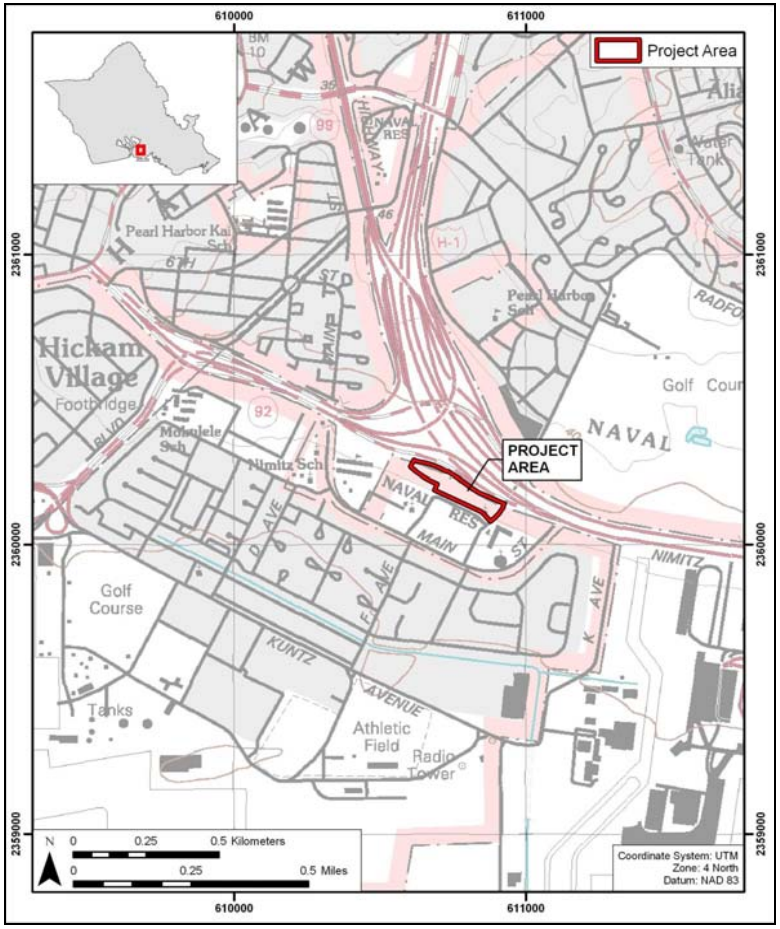

Figure 1. Portion of 1999 U.S. Geological Survey 7.5-minute series topographic map, Pearl Harbor topographic quadrangle, showing the Honolulu Fire Department Fire Training Facility Project

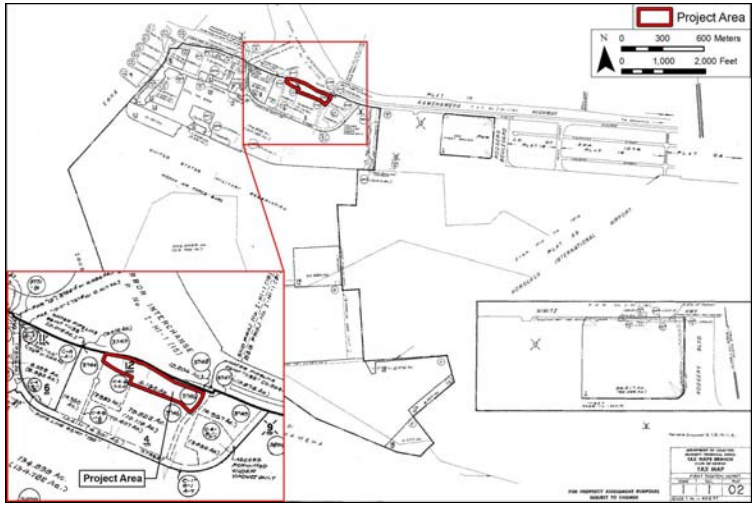

Figure 2. Tax Map Key (TMK) Plat [1] 1-1-002 showing Project area

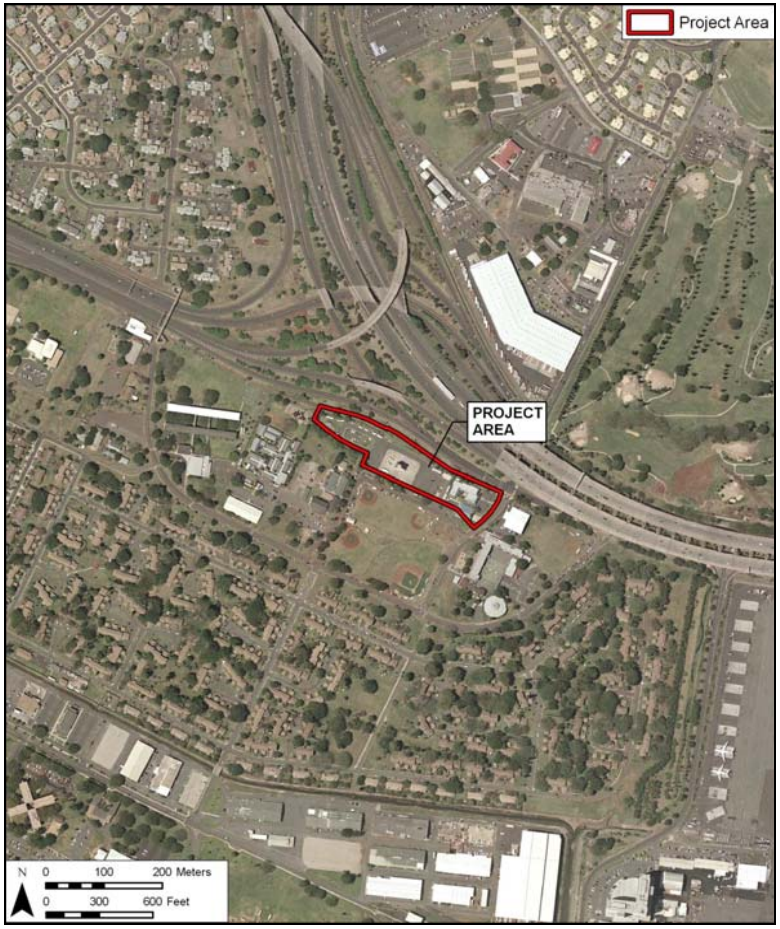

Figure 3. Aerial photograph (U.S. Geological Survey orthoimagery 2005) showing Project area

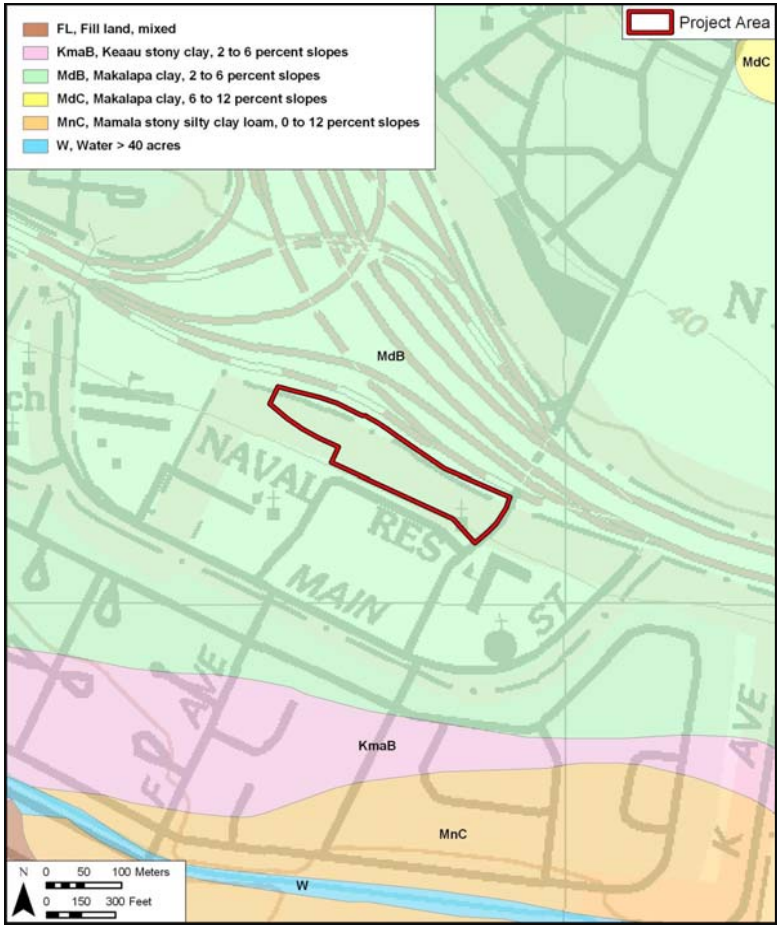

Figure 4. Soils map of Project area (adapted from Foote et al. 1972)

Section 2 Methods

2.1 Archival Research

Historical documents, maps and existing archaeological information pertaining to Moanalua Ahupua‘a, Kona Moku and the Project area vicinity were researched at the CSH library and other archives including the University of Hawai‘i at Mānoa’s Hamilton Library, the State Historic Preservation Division (SHPD) library, the Hawai‘i State Archives, the State Land Survey Division, and the archives of the Bishop Museum. Previous archaeological reports for the area were reviewed, as were historic maps and photographs and primary and secondary historical sources. Information on Land Commission Awards (LCAs) was accessed through Waihona ‘Āina Corporation’s Mahele Data Base (www.waihona.com) as well as a selection of CSH library references.

The definitive source for Hawaiian place names is Pukui et al.’s (1974) *Place Names of Hawai‘i*, but additional place-name translations and interpretations were also gleaned from Soehren’s “Hawaiian Place Names” database on the internet (http//www.ulukau.org), historical maps, Land Commission documents available at the Hawai‘i State Archives or on the internet at http://waihona.com.

For cultural studies, research for the Traditional Background section centered on Hawaiian activities including: religious and ceremonial knowledge and practices; traditional subsistence land use and settlement patterns; gathering practices and agricultural pursuits; as well as Hawaiian place names and mo‘olelo (oral traditions), mele (songs), oli (chants), ‘ōlelo no‘eau (proverbs) and more. For the Historic Background section research focused on land transformation, development and population changes beginning in the early post–European Contact era to the present day (see Scope of Work above).

2.2 Community Consultation

2.2.1 Sampling and Recruitment

A combination of qualitative methods, including purposive, snowball, and expert (or judgment) sampling, were used to identify and invite potential participants to the study. These methods are used for intensive case studies, such as CIAs, to recruit people that are hard to identify, or are members of elite groups (Bernard 2006:190). Our purpose is not to establish a representative or random sample. It is to “identify specific groups of people who either possess characteristics or live in circumstances relevant to the social phenomenon being studied.…This approach to sampling allows the researcher deliberately to include a wide range of types of informants and also to select key informants with access to important sources of knowledge” (Mays and Pope 1995:110).

We began with purposive sampling informed by referrals from known specialists and relevant agencies. For example, we contacted the SHPD, Office of Hawaiian Affairs, O‘ahu Island Burial Council (OIBC), and community and cultural organizations such as the Moanalua Gardens Foundation and Moanalua Senior Citizens Club for their brief response/review of the Project and to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the

Project area and vicinity, cultural and lineal descendants, and other appropriate community representatives and members. Based on their in-depth knowledge and experiences, these key respondents then referred CSH to additional potential participants who were added to the pool of invited participants. This is snowball sampling, a chain referral method that entails asking a few key individuals (including agency and organization representatives) to provide their comments and referrals to other locally recognized experts or stakeholders who would be likely candidates for the study (Bernard 2006:192). CSH also employs expert or judgment sampling which involves assembling a group of people with recognized experience and expertise in a specific area (Bernard 2006:189–191). CSH maintains a database that draws on over two decades of established relationships with community consultants: cultural practitioners and specialists, community representatives and cultural and lineal descendants. The names of new potential contacts were also provided by colleagues at CSH and from the researchers' familiarity with people who live in or around the study area. Researchers often attend public forums (e.g., Neighborhood Board, Burial Council and Civic Club meetings) in (or near) the study area to scope for participants. Please refer to Table 2, Section 4 for a complete list of individuals and organizations contacted for this CIA.

CSH focuses on obtaining in-depth information with a high level of validity from a targeted group of relevant stakeholders and local experts. Our qualitative methods do not aim to survey an entire population or subgroup. A depth of understanding about complex issues cannot be gained through comprehensive surveying. Our qualitative methodologies do not include quantitative (statistical) analyses, yet they are recognized as rigorous and thorough. Bernard (2006:25) describes the qualitative methods as "a kind of measurement, an integral part of the complex whole that comprises scientific research." Depending on the size and complexity of the Project, CSH reports include in-depth contributions from about one-third of all participating respondents. Typically this means three to twelve interviews.

2.2.2 Informed Consent Protocol

An informed consent process was conducted as follows: (1) before beginning the interview the CSH researcher explained to the participant how the consent process works, the Project purpose, the intent of the study and how his/her information will be used; (2) the researcher gave him/her a copy of the Authorization and Release Form to read and sign (Appendix C); (3) if the person agreed to participate by way of signing the consent form *or* by providing oral consent, the researcher started the interview; (4) the interviewee received a copy of the Authorization and Release Form for his/her records, while the original is stored at CSH; (5) after the interview was summarized at CSH (and possibly transcribed in full), the study participant was afforded an opportunity to review the interview notes (or transcription) and summary and to make any corrections, deletions or additions to the substance of their testimony/oral history interview; this was accomplished primarily via phone, post or email follow-up and secondarily by in-person visits; (6) participants received the final approved interview, photographs and the audio-recording and/or transcripts their interview if it was recorded. They were also given information on how to view the report on the OEQC website and offered a hardcopy of the report once the report is a public document.

If an interviewee agreed to participate on the condition that his/her name is withheld, procedures were taken to protect his/her confidentiality (see Protection of Sensitive Information below).

2.2.3 Interview Techniques

To assist in discussion of natural and cultural resources and cultural practices specific to the study area, CSH initiated semi–structured interviews (as described by Bernard 2006) asking questions from the following broad categories: gathering practices and mauka (inland, mountain) and makai (lowland, ocean) resources, burials, trails, historic properties and wahi pana (storied place/s). The interview protocol is tailored to the specific natural and cultural features of the landscape in the study area identified through archival research and community consultation. These interviews and oral histories supplement and provide depth to consultations from government agencies and community organizations that may provide brief responses, reviews and/or referrals gathered via phone, email and occasionally face-to-face commentary.

2.2.4 In-depth Interviews and Oral Histories

Interviews were conducted initially at a place of the study participant's choosing (usually at the participant's home or at a public meeting place) and/or—whenever feasible—during site visits to the Project area. Generally, CSH's preference is to interview a participant individually or in small groups (two–four); occasionally participants are interviewed in focus groups (six–eight). Following the consent protocol outlined above, interviews may be recorded on tape or a digital audio device and in handwritten notes, and the participant photographed. The interview typically lasts one to four hours, and records the "who, what, when and where" of the interview. In addition to questions outlined above, the interviewee is asked to provide biographical information (e.g., connection to the study area, genealogy, professional and volunteer affiliations, etc.).

2.2.5 Field Interviews

Field interviews are conducted with individuals or in focus groups comprised of kūpuna (elders) and kama‘āina (Native-born) who have a similar experience or background (e.g., the members of an area club, elders, fishermen, hula dancers) who are physically able and interested in visiting the Project area. In some cases, field visits are preceded by an off-site interview to gather basic biographical, affiliation and other information about the participant. Initially, CSH researchers try to visit the Project area to become familiar with the land and recognized (or potential) cultural places and historic properties in preparation for field interviews. All field activities are performed in a manner so as to minimize impact to the natural and cultural environment in the Project area. Where appropriate, Hawaiian protocol may be used before going on to the study area and may include the offering of ho‘okupu (offering, gift), pule (prayer) and oli (chant). All participants on field visits are asked to respect the integrity of natural and cultural features of the landscape and not remove any cultural artifacts or other resources from the area.

Building on open-ended and semi-structured approaches, field interviews included the structured methods enumerated in the above section. In some cases, participants may create a community resource map by surveying the Project area with the researcher/s in order to identify

significant cultural and natural features of the landscape. If the participant was comfortable sharing the location of resources; they were geo-referenced using GPS and included on the cultural resource map. If the participant preferred to keep the location private or to only identify its general location, the specific location was *not* recorded.

2.2.6 Protection of Sensitive Information

It is sometimes the case that participants in cultural studies agree to contribute their comments or be interviewed for a study on the condition that their names are withheld from the report. Their reasons for doing so vary from concern about protecting the identity of resource collectors and/or revealing the precise location of certain natural and cultural resources to opposition to the proposed Project. For the interviewee who agrees to participate on the condition that his/her name is withheld from public disclosure, CSH takes all precautions to make sure his/her contribution remains confidential. The confidentiality of subjects is maintained via protected files.

2.3 Compensation and Contributions to Community

Many individuals and communities have generously worked with CSH over the years to identify and document the rich natural and cultural resources of these islands for cultural impact, ethno–historical and, more recently, TCP studies. CSH makes every effort to provide some form of compensation to individuals and communities who contribute to cultural studies. This is done in a variety of ways: individual interview participants are compensated for their time in the form of a small honorarium and/or other makana (gift); community organization representatives (who may not be allowed to receive a gift) are asked if they would like a donation to a Hawaiian charter school or nonprofit of their choice to be made anonymously or in the name of the individual or organization participating in the study; contributors are provided their transcripts, interview summaries, photographs and—when possible—a copy of the CIA report; CSH is working to identify a public repository for all cultural studies that will allow easy access to current and past reports; CSH staff do volunteer work for community initiatives that serve to preserve and protect historic and cultural resources (for example in, Lāna‘i and Kaho‘olawe). Generally our goal is to provide educational opportunities to students through internships, share our knowledge of historic preservation and cultural resources and the State and Federal laws that guide the historic preservation process, and through involvement in an ongoing working group of public and private stakeholders collaborating to improve and strengthen the Chapter 343 environmental review process.

Section 3 Cultural and Historical Background

3.1 Overview

This section draws from archaeology, ethnography, and an archive of historic documents to present a portrait of Hawaiian culture and history as it relates to the specific Project area. Focusing in on geographic and temporal scales, this section first traces the exploration of the Pacific Ocean and the subsequent discovery and settlement of the Hawaiian archipelago, the opening and closing of a voyaging corridor between Hawai‘i and Tahiti, and later cultural changes and distinctive Hawaiian innovations that are reflected in the archaeological record, including expansion into marginal environments, exponential population growth, intensification of production, increased social stratification, and territorial division of land. This broad overview leads to an approximate chronological history of the ahupua‘a of the Project area, including the earliest known settlement and subsistence patterns, a compilation of wahi pana and associated mo‘olelo, successions of chiefly rule, the introduction of private property, plantation eras, and contemporary land use.

3.2 Discovery and Settlement of the Hawaiian Islands

By 10,000 years ago, humans had migrated to occupy nearly all the habitable land on the planet. Aside from crossing a series of short water gaps to reach Australia and New Guinea, they had reached it all by walking. The remaining unexplored region was the vast Pacific Ocean. Approximately 4,500 years ago, coastal dwellers of southeast China began a wave of migration through the closely-spaced, inter-visible islands of Southeast Asia. Advances in sailing strategies, canoe technology, and navigation techniques enabled their descendants to sail past the familiar insular waters a millennium later. These precocious seafarers systematically explored the remote, uninhabited regions of the Pacific Ocean to the east, as well as the Indian Ocean to the west. This led to the eventual discovery and colonization of virtually every habitable island in the Pacific Ocean, as well as coastal trading along the Indian sub-continent and settlement as far west as Madagascar (Howe 2007; Irwin 2007).

The ancient wayfinders most likely employed an expansionary strategy of first staging a series of exploratory probes to find likely islands, followed by returns to the homeland, and then launching colonizing expeditions (Irwin 1992). To do so, they sailed their double-hulled voyaging canoes eastward against the direction of the dominant trade winds by waiting for westerly wind shifts. After mentally mapping the positions of newly discovered islands in terms of celestial referents, they returned to their homelands to share the sailing directions for future voyages of colonization (Finney 1996). As most of the Pacific Islands are volcanic in origin, the exploratory seafarers, also horticulturalists, necessarily transported a landscape of plants. They brought with them taro, yams, breadfruit, bananas, and coconuts, as well as domesticated pigs, dogs, and chickens, and, possibly with intention, rats (Irwin 2007; Kirch 2000).

Later voyagers discovered and settled the distant archipelagoes of western Polynesia (e.g., Samoa, Tonga, and Fiji), the northwestern archipelagoes of Micronesia (e.g., Marshall Islands and Caroline Islands), and eastern Polynesia (e.g. Tahiti and Marquesas), and from there settled the widely-separated archipelagoes of Hawai‘i and Aotearoa as well as the solitary island of

Rapa Nui (Irwin 2007; Kirch 2000). Finney (2007:145) suggests that a waxing and waning rhythm of voyaging characterized the large, high-island archipelagoes of eastern Polynesia: “a flurry of back and forth sailings as the islands are being discovered, settled and supplied; then some continued long-range travel for personal, religious or other reasons; and then by a contraction of voyaging as populations grew and rival chiefdoms fought over land and power.”

Archeological excavations, linguistic reconstructions, and genetic studies suggest that the initial settlement of Hawai‘i came from eastern Polynesia as early as A.D. 300–600 (Kirch 2000:291) or as late as A.D. 700–800 (Athens et al. 2002). Mo‘olelo link Hawai‘i to Kahiki—the generic word for the ancestral homeland of Hawaiians, not a specific island—through accounts of the discovery of certain Hawaiian islands and subsequent inter-archipelago return trips (Beckwith 1970). The first settlers of Hawai‘i from within the region of Kahiki were probably from the Marquesas Islands (Kirch 2000:291). The archaeological record suggests that early Hawaiians formed settlements of hamlets along the coasts, interred the dead, ate domesticated pigs, dogs, and chickens, and began to clear tracts of forest between A.D. 600–1100 (Kirch 2000:293).

The early settlers of the Hawaiian archipelago would have been especially attracted to windward O‘ahu with its coral reefs, bays, and sheltered inlets for fishing, dense basalt dikes for the production of stone adzes and other tools, and amphitheatre-headed valleys and broad alluvial floodplains that contained fertile soils, numerous permanently flowing streams, and abundant rainfall for the cultivation of crops (Kirch 1985:69). The earliest known occupation sites on O‘ahu, in fact, are found in this region. Kirch’s (1985:69–80) synthesis of these archaeological sites provides a glimpse into the life of these early settlers of Hawai‘i. One site in particular—the Bellows Beach sand dune occupation site in Waimānalo—suggests settlement as early as A.D. 300–400 (Kirch 1985:71). While these radiocarbon dates have been much disputed, the cultural layers within the sand dunes are still considered among the oldest in Hawai‘i (e.g. Dye 2000). Archaeological excavation data from this site indicate that the settlers and their descendents, like their east Polynesian ancestors, lived in pole-and-thatch dwellings, interred the dead beneath these structures, cooked in small hearths (Figure 5), and manufactured stone tools (Figure 6) as well as bone and shell fishhooks (Figure 7), and supported themselves by cultivating inland crops, raising domesticated animals, hunting seabirds on offshore islets, fishing, and gathering shellfish (Kirch 1985:71–74). As they adapted to local conditions, they invented distinctive Hawaiian artifacts, including two-piece fishhooks and the lei niho palaoa (lei of rock oyster shell), which, in addition to other ornaments interred with individuals, suggests a degree of social stratification (Kirch 1985:71–74). Hawaiians also cared for the dead with a variety of ilina (burials, graves) depending on the social status of the deceased, including cremation burials, burial caves, burials in the sand and earth, burials directly underneath house floors, burials in the platforms of heiau (temples), and burials marked on the surface by stone terraces, mounds, platforms, and other monuments (Kirch 1985:238–242).

New fishhook styles discovered in Hawaiian archaeological sites and Tahitian words entering into the Hawaiian language suggest contact with Tahiti around A.D. 1200 (Kirch 2000:291). In addition, numerous mo‘olelo chronicle the era of two-way voyaging between the archipelagoes of Tahiti and Hawai‘i by detailing the feats of specific navigators (Cachola-Abad 1993). The Hawai‘i-Tahiti voyaging corridor eventually ceased as Hawaiians and Tahitians began to focus

more on local initiatives, such as building, maintaining, and deploying fleets of war canoes rather than guiding them on overseas adventures (Finney 2007:145). According to Fornander’s (1878:168–169) synthesis of mo‘olelo, the ali‘i (chief) La‘amaikahiki closed the era of voyaging between Tahiti and Hawai‘i when he returned to his ancestral homeland 21 generations before the 1870s. With an average of 20 years between generations, that places the cessation of Hawaiian long-distance voyaging at about A.D. 1450 (Fornander 1878:168–169).

Figure 5. A hearth cuts through the early occupation levels in the Bellows Beach sand dune site, which are marked by black midden deposits and separated by layers of sand (Kirch 1985:71)

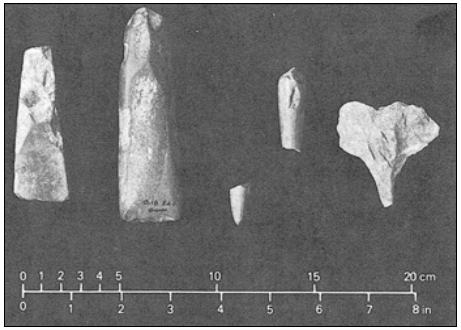

Figure 6. Stone artifacts from the Bellows Beach sand dune site; (from left to right) adzes, chisel fragments, and an awl (Kirch 1985:73)

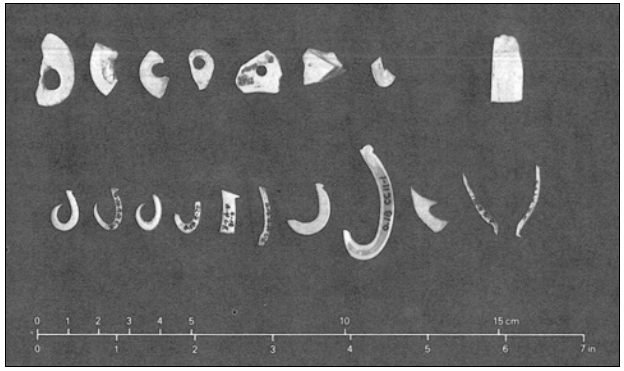

Figure 7. Fishing gear from the Bellows Beach sand dune site; (top row) unfinished fishhooks of bone and shell, and (bottom row) one-piece fishhooks and a segments of a two-piece fishhook (at far right) (Kirch 1985:73)

3.3 Expansion and Intensification

The archaeological record suggests that Hawaiians experienced exponential population growth, intensification of production, and increased social stratification around A.D. 1100–1650. Hawaiians converted valley floors and hillsides to lo‘i (terraced fields) with ‘auwai (irrigation ditches) that diverted stream water to irrigate kalo (taro) and other crops in flooded pond fields, developed dryland field systems for the cultivation of ‘uala (sweet potato) and other crops, and constructed stone-walled loko i‘a (fishponds) on shallow reef flats to grow and harvest fish (Kirch 2000:293–295). By A.D. 1600, the population, which had burgeoned to at least several hundred thousand people, expanded from the fertile windward regions into the most arid and marginal regions of the archipelago—the leeward valleys and coasts (Kirch 2007). This agricultural and aquacultural intensification supported emerging classes of ali‘i and maka‘āinana (commoners), whose labor created enduring heiau and other monuments that survive in the archaeological record (Kirch 2000:295–296).

The original settlers and their descendants had likely organized themselves into kin-based social groups. The necessity of defining territorial boundaries increased as the population rapidly grew, the amount of available land diminished, voyaging spheres contracted, and the society became more differentiated, hierarchical, and competitive (Kirch 1985:306). The original lineage territories and associated chiefdoms were most likely moku‘āina, or moku, (districts) that were sequentially divided (Ladefoged and Graves 2006). Between A.D. 1400–1500, Hawaiians developed a system of land tenure that centered on the ahupua‘a, a territorial unit that typically extended from the peaks of the mountains down to the sea, encompassing the entire ecology of an island and incorporating its main resource zones, including interior uplands and mountains, coastal lowlands, and fringing reefs (Kirch 2000:296). The maka‘āinana remained on the land they cultivated, but ali‘i now governed this ahupua‘a pattern of territorial units. These ahupua‘a territories changed through time; the regions in a moku with greater predictability of resources were most likely settled first and defined according to topographic features, and later divided into separate communities if increases in production could support larger populations (Ladefoged and Graves 2006).

Based on the distribution of sites in the most arid and marginal lands, virtually all of O‘ahu was territorially claimed and possibly occupied by A.D. 1650 (Kirch 1992:15). O‘ahu was divided into six moku—Kona, ‘Ewa, Wai‘anae, Waialua, Ko‘olauloa, and Ko‘olaupoko—that were further divided into 86 ahupua‘a (Kame‘eleihiwa 1992:330). These lands, in turn, were further divided as private property during the Mahele (Land Division) of 1848, but modern maps and land boundaries still generally follow the ancient system of land division.

3.4 Moanalua Ahupua‘a

Moanalua Gardens Foundation (MGF) was established in 1970 to preserve Moanalua. In 1973, anthropologist Dr. Katharine Luomala wrote a report for the National Park Service (part of U.S. Department of the Interior) describing and evaluating the significance of the botanical, archaeological, historical, and planning records of Moanalua. Her report supported MGF’s nomination of Moanalua Valley for designation as a national historical landmark. Luomala was convinced of the value in preserving Moanalua Valley. “Scientists and historians have leaned over backward in their reports, scientific contributions in themselves, to write objectively and

factually about Moanalua but clearly they have felt the aura of Moanalua" (Luomala 1973:29). The ahupua'a and its inhabitants, from mauka to makai areas, have been important to cultural, subsistence, and economic aspects of life on O‘ahu specifically and Hawai‘i more broadly.

Moanalua was probably settled between 766-1126 A.D. as it would have been appealing to early settlers of O‘ahu with its flowing streams and springs, habitable cave shelters, and protected offshore waters (Ayers 1971:51). According to Handy and Handy, Moanalua takes its name from "moana" meaning both ocean and broad expanse of sea or land, and "lua" meaning two, which they interpret as a description of Moanalua's great expanse of level land and reef at the sea (Handy and Handy 1972:474). These great expanses of land and reef were productive for the cultivation and harvesting of both plants and fish.

The present Project area lies within the seaward portion of Moanalua Ahupua‘a, the westernmost of the traditional Hawaiian land divisions (ahupua‘a) of the traditional Kona District (Kona Moku). There are numerous references to Moanalua in Hawaiian literature which may provide preliminary clues to the character of life during pre-Contact times—including patterns of settlement and land usage—within the ahupua‘a of Moanalua. These mo‘olelo are instructive for understanding life in Moanalua and its importance to Hawaiians generally. "Myth….is not merely a story told but a reality lived" (Malinowski 1971:18). The following descriptions of the creation of Moanalua contribute to our understanding of Moanalua.

The nineteenth-century Hawaiian archivist and historian Samuel Kamakau mentions Moanalua in an account of the mo‘olelo surrounding the arrival of the gods Kū and Lono to the Hawaiian Islands:

> According to the *mo‘olelo* of Kāne and Kanaloa, they were perhaps the first who kept gods (‘o laua paha nā kahu akua mua) to come to Hawai‘i nei, and because of their mana (supernatural or divine power) they were called gods. Kaho‘olawe was first named Kanaloa for his having first come there by way of Ke-ala-i-kahiki.
>
> Kū and Lono are spoken of in the *mo‘olelo* of the *lono-pūhā* practitioners and the medical *kāhuna* as having come from Kahiki [Tahiti]. They landed first on Kaua‘i, and from there they spread forth.
>
> In the *mo‘olelo* of Pele *mā*, it says that they first landed at Kalihi on Kaua‘i and from there went to Ka‘ena Point on O‘ahu and at Moana-lua left the salt pond. Then they went to Ka-uha-kō on Moloka‘i, to ‘Aleamai in Hāna, Maui, and then went to live at Kīlauea in Puna and Ka‘ū on Hawai‘i. (Kamakau 1991:112)

Hawaiian oral history recounts how Papa and Wākea created all the island of Hawaii as well as the descendants who populated them. Luomala (1973:14) describes Moanalua: "Probably no other O‘ahu region today can provide so many sites for visual illustration to help one to begin to recapture the emotional response to the sense of earthly and supernatural continuity described in Polynesian poetry and prose about the origin of gods and human beings." Namakahelu, a chantress and descendent of Moanalua, conveyed the creation chant of Moanalua to Gertrude McKinnon Damon (hereafter referred to as G.M. Damon) who documented oral histories of

Moanalua. Referring to G. M. Damon's unpublished work, Luomala describes the creation chant of Moanalua residents:

> According to the chant, the first person there was born in upland Moanalua, the son of Earth Mother, Papa, and Sky Father or Atmosphere, Wākea, whose other children were islands. The Moanalua-born's name Kama-wae-lua-lani is that both of an island (Kauai's ancient name) and a semi-divine being in human form. His semi-divine wife Kahiki-lau-lani, a foreigner from overseas Kahiki, travelled to Moanalua by what was both pointed cloud and a canoe. Her offspring were both natural features of the mountain landscape and ancestors of families living at Moanalua into historic times. (Luomala 1973:12-13)

Moanalua's abundant food and diverse flora made it a prize for conquering chiefs of O‘ahu, Maui, and Hawaii:

> Records tell of battles or major events relating to these chiefs at Moanalua. Each chief, to establish his claim to this land, found it politically and economically expedient to make a pilgrimage immediately to Moanalua to worship at its heiau, and aesthetically and recreationally pleasant to rest there and enjoy its landscape, sports, and performances of dancing and chanting. Consequently, the roll call is long and impressive of famous native Hawaiians who visited or lived at Moanalua. (Luomala 1973:28)

Moanalua is a place that has been valued by royalty. "From ancient times, Moanalua had been an appendage of the Royal House of Oahu. When Kahekili, King of the Island of Maui, conquered O‘ahu, Moanalua came over to him" (Sterling and Summers 1978:328). "From 1796 to the end of the monarchy in 1893, Moanalua continued as a resort for royalty. Representative is Kamehameha V cottage built by Lot Kamehameha as a summer home where feasts and performances provided by the hula specialists kept alive an art now criticized by foreign whites increasingly numerous on O‘ahu" (Luomala 1973:16).

3.4.1 Settlement Patterns

Compared to other areas in Kona District, Moanalua's upper valley is rich with endemic, indigenous, and Polynesian introduced plants. The lower part of the valley, which had been favored for occupation, was rich with cultivated plants and fish. Moanalua's valleys, Kamananui and Kamanaiki, were known for the cultivation of taro, coconut, breadfruit, wauke (paper mulberry) for tapa (bark cloth), and uhi (yam) (Handy and Handy 1972:474). Taro grown in Moanalua at the site of Iemi spring was said to have "leaves so large that the keepers groped in the dark for taro for the chiefs…..These patches weren't much to look at, but were peculiar in that a spring came up in them. They were kept for the chiefs. They lay in the level with the land till Iemi [spring] was reached" (Mokumaia 1922 cited in Sterling and Summers 1978:328).

Kamanaiki was especially known for its groves of coconut trees, including and especially the ones that were trained to recline at right angles. "It was an early custom among the land dwellers in Hawaii to commemorate some event, usually the visit of an important ali‘i, by pulling over the top of a young coconut tree and securing it a little height off the ground until its roots

reestablished themselves and could maintain this unnatural position, where upon the trunk resumed growing upward. These niu moe were at Lapakea in Kamanaiki" (Barrère 1971:61).

According to Mokumaia's 1922 article in the newspaper Kū‘oko‘a:

> It is said that this valley, Kamana-iki, had many inhabitants. It is the truth for the stones are still standing there, the coconuts are growing and the trail remains. It seemed that they gained a livelihood by farming. Two chiefs lived there in the valley. The one named Kepoo was a good chief. It was said that he planted groves of bananas and most of the orange trees. His dwelling house was close to the pools of Waiapuka…In the center of the smallest pool was a rock big enough to hold three men. It is said that that was where the soothsayers (makaula) sat to meditate on how to benefit the people. (Sterling and Summers 1978:334)

Following Captain Cook's 1776 arrival to Hawai‘i, epidemic diseases severely reduced the Hawaiian population and "it is probably that it was during these last years of the 18th century and early years of the 19th century that the uplands, formerly inhabited and cultivated all along the streams up to their headwaters, was rather rapidly abandoned, and the remaining dwellers of the land concentrated in the rich bottom lands at the base of the two main valleys of Moanalua, Kamananui and Kamanaiki" (Barrère 1971:56).

In the lowlands, productive salt ponds and fish ponds provided other important contributions to subsistence and livelihoods. In 1930 J. Gilbert McAllister of the Bishop Museum, attempted a comprehensive survey of archaeological sites on the island of O‘ahu. He recorded 18 sites in Moanalua, giving their approximate locations and describing their conditions at the time of the survey. The sites include several features including Āliapa‘akai (Salt Lake) and five fishponds.

The fishponds along the shoreline of Moanalua that were controlled by the ali‘i greatly increased the productivity of the area and can be seen as evidence of a thriving chiefly class in the ahupua‘a. The fishponds of the Hālawa-Moanalua Plain are summarized in Table 1. Apple and Kikuchi (1972:2) discuss the impact that such fishponds would have had on the general population of an area:

> Accessibility to these ponds and their products was limited to the elite minority of the native population - the chiefs and priests. Prehistoric ponds and pond products appear to have been taboo to the vast majority of Hawaiians and to have yielded them no direct benefit. However, indirect public benefit came from ownership by the chiefs of exclusive food sources. Royal fishponds...insured less demand on the commoners' food production resources. Every fish taken from a royal fishpond left its counterpart in the natural habitat available to lesser chiefs and commoners.

Archaeological sites also recall and document past subsistence and settlement patterns of the ahupua‘a. Luomala described how archaeologists' explorations in Moanalua Valley "found sufficient archaeological remains to conclude that large upland settlements once existed with an economy that had shifted from swidden farming to more permanent terraced fields, with fish from protected ponds and wild plants from the higher uplands for raw material and additional food" (Luomala 1973 6-7).

With regard to the vicinity of the Project area, it falls within an indicated zone of "low" probability of archaeological and cultural resources with sensitivity increasing moving south closer to the coast (Hammatt and Shideler 2011). This is based on a sensitivity map created by Anderson and Bouthillier (1996) and additional information from Jourdane and Dye (2006:18) which incorporates known archaeological investigations of the area and predicts which areas are likely or not likely to contain significant findings.

Hickam Air Force Base (HAFB) is near the Project area and has been the subject of much archaeological investigation. As can be seen from the results of recent archaeological investigations at Hickam AFB (adapted from Jourdane and Dye 2006:18) showing that in over 100 recent excavations including over 50 in the Anderson and Bouthillier "High Sensitivity" zone, there have only been three areas in which sites have been designated (all finds are far from the present Project area). Two of these lie some distance to the west on the eastern margin of the entrance to Pearl Harbor in what was clearly an intensively used area in traditional Hawaiian times. The nearest designated site (shown as locale "c" on Figure 8) and only one within three kilometers, consisted of three pit features (Desilets 2002a) designated as site 50-80-13-6406. While finds were limited to thermally altered limestone, charcoal, and very sparse quantities of midden, the carbon dating ranges obtained of AD 1478 – 1664 and 1306 – 1452 include the earliest reported date for HAFB. This appears to be the only site designated in the eastern half of the HAFB lands in the past 70 years.

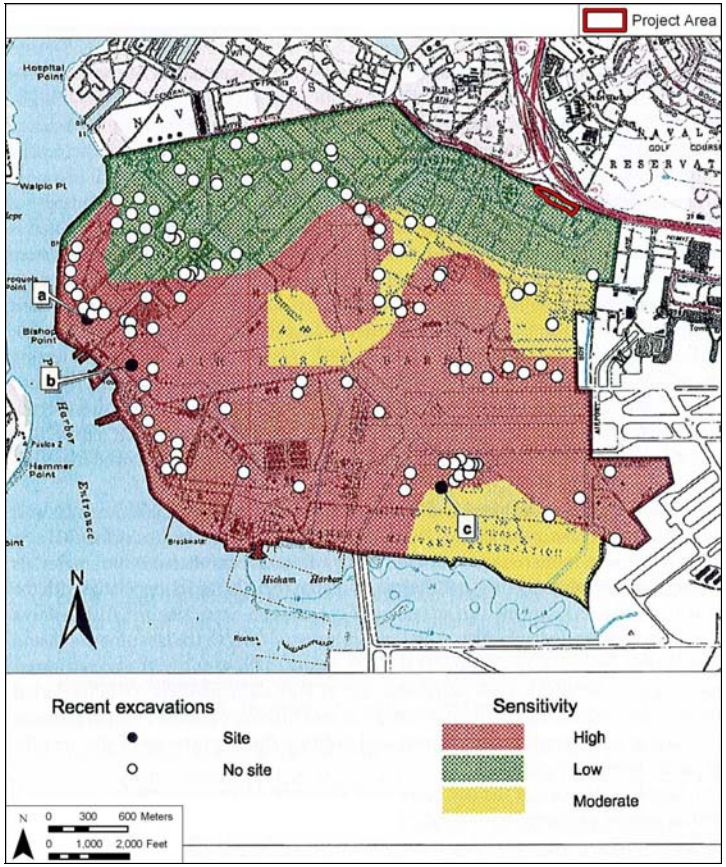

Figure 8. Results of recent archaeological investigations at Hickam AFB (adapted from Jourdane and Dye 2006:18) showing that in over 100 recent excavations including over 50 in the Anderson and Bouthillier “High Sensitivity” zone there have only been three areas in which sites have been designated (all finds far from the present Project area)

3.4.2 Place Names, Wahi Pana, and related Mo‘olelo

Hawaiian place names convey a wide variety of information about the relationships among people, landscapes and other natural and cultural resources. Place names may also express cultural, historical and/or spiritual values and concepts important to Hawaiian world views. It is common for places and landscape features to have multiple names, some of which may only be known to certain ‘ohana (families) or even certain individuals within ‘ohana, and many of which have been lost, forgotten or kept secret through time. Place names may also convey kaona (hidden meanings) and huna (secret) information that may even have political or subversive undertones. Before the introduction of writing to the islands, when cultural information was exclusively preserved and perpetuated orally, Hawaiians gave names to literally everything in their environment, including individual garden plots and ‘auwai, house sites, intangible phenomena such as meteorological and atmospheric effects, pōhaku (rocks), pūnāwai (fresh-water springs), and many others.

Reconstructed patterns of ancient settlement are informed by place names and by wahi pana, a term not easily defined or described. A Hawaiian wahi pana “physically and poetically describes an area while revealing its historical or legendary significance” (Landgraf 1994:v). Wahi pana are sacred places that include such cultural properties as heiau, loko i‘a, ala hele (trails), ilina and iwi kūpuna (ancestral bone remains), land divisions, and natural geographic locations (place names), such as streams, peaks, rock formations, ridges, and offshore islands and reefs that are associated with culturally significant beliefs or events. A wahi pana leaves an imprint on the landscape even if its tangible properties no longer exist, as the mana (supernatural or divine power) of previous people and events associated with this space continues to manifest itself. For example, the stereotypical heiau is composed of terraces, enclosures, walls, mounds, or upright stones, but heiau can also be sacred places on a landscape that lack built structures, natural landscape features such as rock outcroppings, and earthworks where mana is concentrated and transferred between the deities and worshippers (Becket and Singer 1999:xix-xx).

The mo‘olelo and oli of Hawaii are descriptive prose and poetry that celebrate the beauty and history of places, such as Moanalua, and evoke nostalgic memories by listing the names of its pleasurable pastimes, its sites, plants, birds, fish, and the like, and its human and superhuman occupants. Often mo‘olelo document and celebrate wahi pana and so these are introduced together for culturally and historically important sites in Moanalua. Previously documented and ongoing mo‘olelo of wahi pana that no longer have material traces are precisely the evidence of their enduring significance (Sahlins 1992:22). All wahi pana meanings are cited from Pukui et al. (1974) unless otherwise noted; and spelling and use of diacriticals follow Pukui et al. (1974).

3.4.2.1 Heiau and Pōhaku

The range of cultural features developed in Moanalua is a testament to its importance. Sites of worship include heiau and pōhaku of which there are notable examples in Moanalua.

Kamananui has multiple known petroglyph stones, four are described here. The first (A7-1, a code associated with Ayers 1971:13) is described as McAllister (1933:100-101) as 11 feet long by 8.7 feet wide and three feet high with at least 22 carvings and one kōnane board (an ancient game resembling checkers) on the surface. It is located “at the end of the old carriage road up Moanalua Valley, on the Honolulu side of the stream bank. Still there in 1957” (Sterling and

Summers 1978:338). [CSH visited the site in 2011 and it is still there.] This is called Pōhaku ka luahine (which is on the Hawaiian Register of Historic sites), and is associated with two legends, paraphrased by McAllister:

> During the consecration of a heiau in Moanalua Valley a small child cried. Now, any noise made by man or animal during such tapu periods meant instant death for the offender. The grandmother, desiring to protect the child, ran with it up the valley and hid behind this rock. Men were sent out in search, but were unable to find them. After the elapse of the tapu period of a few days, the woman and the child were safe and returned to their home. Namakahelu, the oldest living kama‘āina of Moanalua Valley, is of the opinion that this is a recent story. The stone, she says, was sacred, an akua, with at least two forms of which she knows. As a stone it was known as Laupo, and as a bird it was known as Laea. Offerings were placed before it. On the top and sides were a number of petroglyphs, probably many more formerly than now, for there are a number of indistinct depressions on which may or may not be artificial. Portions of the kōnane board which was on a flat portion of the upper side, have been badly weathered.

The other petroglyph bolder (A7-70, a code associated with Ayers 1971:13) is about one square meter and contains at least six human forms and nine other carvings. This one has no associated legends, nor does a third petroglyph stone that was taken from Kamanaiki valley and deposited in Bishop Museum. This stone has risen rather than incised figures (Stokes 1908, cited in Barrère 1971:60). This unique stone with figures in relief was found near Pu‘u o Ma‘o (“green hill” located above present day Moanalua Gardens) and is now kept at Bishop Museum. The basalt stone is approximately 31x21x17.5 inches depicts two human figures. “The hand has only three fingers…It is believed that the figure are of Hawaiian conception, but they resemble neither the carved wooden images nor the petroglyphs. They are unique in presenting a profile view, in the squatting position of the figures, and in the detail of the limbs” (McAllister cited in Sterling and Summers 1978:336).

Pōhaku o Kane is another notable pōhaku in the valley that may have been used as a shrine by a family for worship (Luomala 1973:14).

By the 1970's, all traces of the named heiau had been lost; T. Stell Newman writes:

> A search was made in 1970 for Paliuli, Koaloa, and Umi Mua (or Wakaina) heiau by B. Jean Martin and myself as part of the Statewide Inventory effort. Working from a copy of the original McAllister base map (not the simple drawing in the published volume), we determined McAllister's locations for Paliuli and Koaloa heiau and made a field check at these two locations. The location of Paliuli is now covered by residences and no trace of the heiau remains. Although the major part of a day was spent searching the hillside where McAllister plotted Koaloa heiau, no trace of it was found. It was probably destroyed by the old, now abandoned, road that winds up the mountain side. Ms. Martin and I also thoroughly checked the area where the heiau at Umi Mua was said to have been located after being shown the spot by Frances Damon Holt - without finding a trace of it. (Newman et al. 1973: 23)

Although Newman did not find the heiau, Koaloa’s remnants were located by Jan Becket and are depicted below. Koaloa, translated as “very brave,” was found with some terraces and walls remaining and evidence of the heiau extending up a nearby hillside, it had already “lost many of its stones to neighborhood rock wall builders” (Becket and Singer 1999:30).

Figure 9. Koaloa Heiau Photographed by Jan Becket (Becket and Singer 1999:31)

3.4.2.2

Kamananui Valley also contains Waiapuka, a site where three streams ran into three pools; and it is a site where chiefs bathed. The surrounding area had stone walls, a stone platform, thriving coconut trees, a trail, and a cave “large enough for a hundred people to live in and a cave big enough for one person to sit in and spy on Moanalua.” These were all taken as evidence of a “thickly populated” valley (Mokumaia 1922, cited in Sterling and Summers 1978:334).

Other traditions identify Moanalua with historical personages including the most prominent Hawaiian ali‘i. According to Luomala, Kālaikoa, a Maui chief, who got Moanalua as his share of

spoils used human flesh for shark bait and their long bones for his infamous double fence around his House of Bones (Luomala 1973:15). According to Kamakau, it was:

> filled with the bones of persons stripped, bound, and set up inside the house and all around the outside enclosure of the house…The house stood at Lapakea on the slope into Moanalua on the upper side of the old road….Eyewitnesses said, “It was a terrible and gruesome sight. The bones were stripped, bundled together, and the skulls set upon each bundle so that, seen from a distance, it looked like a company of living men.” (1961:138-139)

Fornander explains the “quantity [of bones Kalaikoa] collected was so great that he built a house for himself, the walls of which were laid up entirely of the skeletons of the slain” (1880:226). In 1818 Peter Corney visited the site and documented “a large stone house, or fort, which had formerly belonged to a great chief; it had a double fence of human bones around it; these were the bones of his enemies killed in the war before the islands were visited by Europeans…the natives are afraid to go near it; preferring to go a round of five or six miles to passing it” (1896:114-115). The existence of the "house of bones" into the nineteenth century is confirmed in accounts by early western visitors to Moanalua and its conjectured location (far from the present Project area) was recorded as an archaeological site during the first archaeological survey of O‘ahu when McAllister documented the house of bones as a site on the "plateau between Pu‘ukapua and Pu‘u o Ma‘o, inland of the highway" (1933:93-94). It no longer exists today.

Kamananui Valley is home to a legendary ancestor of Moanalua, a shark-man who dwelled at Keanaakamano (cave of the shark man). According to Barrère who references Beckwith (1940: 140-143), “His story is similar to other localized legends of a man with shark’s mouth on his back who regularly follows bathing parties to the sea, where he changes into his shark form and consumes one of the party. At last his dual nature is discovered and he is killed.” (1971:59). Based on Gertrude Damon’s notebooks, Barrère says that the Moanalua shark-man lived in a cave at Mano which is “on the Ewa side of the middle ridge that divides the upper waters at the head of the valley” in a cave that was washed out by floods.

Namakalele (literally “the flying eyes”) is a small land section in Moanalua is where Keawe and his wife Keanahaki lived. As the husband went daily to the mountains to cut wood and gather plants, his wife offered to do the fishing for their family with six children. She had special powers, and secretly sent her right and left eyes out separately to fish. Each day they would return with a bounty of fish, but she would eat them all except the one she would bring home. Her husband became frustrated and suspicious that she only returned with one fish and one day followed her. Before she called her eyes back, he caught them and returned home to the children with the bounty of fish and his wife’s eyes. Keanahaki stumbled home without her sight and her youngest child led her to where Keawe had hidden her eyes and she returned them to the sockets. (Paraphrased from McAllister 1933:94-95).

Another wahi pana of Moanalua was near Āliapa‘akai and Āliamanu. It was Leilono, an entrance to a world of ancestral spirits:

> Leilono at Moanalua, Oahu, was close to the rock Kapukaki and easterly of it (*a ma ka na‘e aku*), directly in line with the burial mound of

> Āliamanu and facing toward the right side of the north Star (*a huli i ka ‘ao‘ao ‘akau o ka Hokupa‘a*). On the bank of the old trail there was a flat bed of pahoehoe lava, and on it there was a circular place about two feet in circumference. This was the entrance to go down. . .(*ka puka o Leilono*)...(Kamakau 1964:48)

3.4.3 Ala: Trails

John Papa ‘Ī‘ī described a trail that passed through the valley of Moanalua and connected to Ewa:

> When the trail reached a certain bridge, it began going along the banks of taro patches, up to the other side of Kapālama, to the plain of Kaiwiula; on to the taro patches of Kalihi; down to the stream and up to the other side; down into Kahauiki and up to the other side; turned right to the houses of the Portuguese people; along the plain to Kauwalua, Kalaikoa’s house of bones; down to a coconut grove and along the taro patches of Kahohou; over to the other side, and from there to a forded stream and up to Kapapakolea, and established resting place for travelers. (I‘i 1959:95)

This resting place along the stream may have been Iemi spring, which was used for irrigating taro lo‘i and it was also enjoyed by travelers on the trail from Ewa. According to Mokumaia in 1922, “When those of Ewa came, women carried bundles containing tapas and mats woven from bulrushes…rested beside Iemi spring. There they drank water till their thirst was quenched and then proceeded along to the stream close to a hill, called Keakua-wailele close to the coconut grove of Lapakea” (Sterling and Summers 1978:332). The spring has since been capped.

Although it is more than two miles from the Project area, it is interesting to consider that it may have been used for salt transport because of its proximity to the Āliapa‘akai (salt ponds).

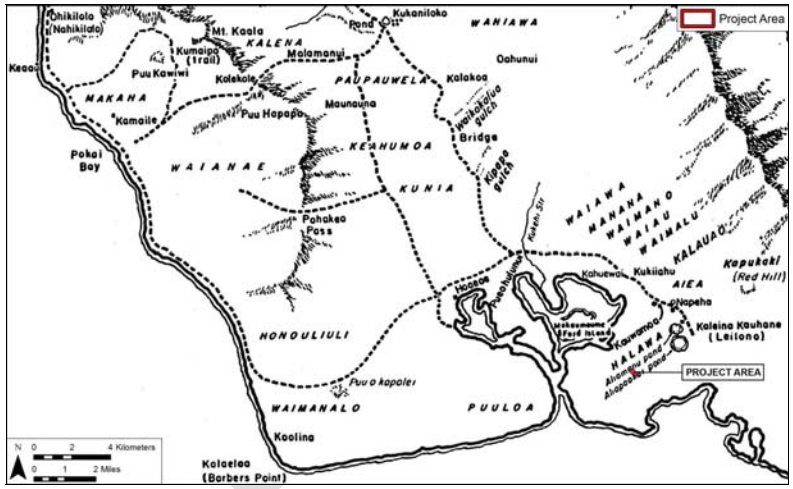

Figure 10. Trails of Leeward Oahu as describe by I'I. Map by Paul Rockwood. (Adapted from 'Ī'ī 1959:96)

3.4.4 Salt ponds

One tradition associates the creation of Āliapa'akai and the nearby adjacent Āliamanu Crater (bird salt pond) with the goddess Pele who settled for a time in Moanalua in her search for a home:

> ...[Pele] left Kauai and went to Oahu, to a place near Honolulu, to Moanalua, a beautiful suburb. There she dug a fire pit. The earth, or rather the eruption of lava, was forced up into a hill which later bore the name Ke-alia-manu (The Bird White Like a Salt Bed or The White Bird). The crater which she dug filled up with salt water and was named Ke-alia-paa-kai (The White Bed of Salt, or Salt Lake). (Westervelt 1987:40)

Āliapa'akai is also the site where the legendary hog-man, Kamapua'a, attempted to seduce Pele (Beckwith 1940:1-3) but he is lured away when shown an image of a beautiful woman.

Āliapa'akai was traditionally believed to have a connection with the ocean, and thus the source of salt but in the latter nineteenth century, a geologist determined that there was no connection between the tides and the level of the lake; rather it was tied to rainfall (Sterling and Summers 1978:331). This 0.9 mile wide body of water once stretched across a crater of the same name and was filled in 1973 to construct a golf course.

Before and into the 1800s, Moanalua's Salt Lake provided an important export, salt, for international commercial activity. In 1832, William Ellis described Āliapa'akai as "so impregnated with salt, that twice a year the natives take out between two and three hundred barrels of fine, clear, hard, crystallized salt: this lake is not only an interesting natural curiosity, but an important appendage to the island. It belongs to the king, and is not only useful in curing large quantities of fish, but furnishes a valuable article of commerce…" (1832:28). In May of 1824, Charles Stewart (1828:288) exclaimed how 400 barrels of salt at three dollars a barrel were prepared for a Russian ship. Ten years later Frederick Bennett who arrived to Oahu on a whaling ship in 1835, remarked:

> A great number of natives are occasionally employed in collecting the salt it produces, and bearing it, in calabashes and bags, to the declivities of the hills, where it is piles in mounds, or stacks, until otherwise disposed of. I counted more than forty men engaged in the pond alone; whilst others, hurrying over the hills, bearing their saline burdens to the various distant depots, presented a scattered multitude… (1840:400)

Salt from Āliapa'akai continued to be a productive enterprise until the 1850s when George Bates (1854:102) noted a change. Barrère quote him saying:

> Formerly [before the Mahele] it belonged to the king, and its yield afforded him a good revenue. Vessels came annually from the Russian settlements on the Northwest coast, and from other parts of the Continent, to obtain supplies. The trade, however, has fallen off. Although the salt has almost wholly disappeared, it is still found in small quantities in the lake, in a crystallized state. (Barrère 1970:58)(text in brackets is from Barrère)

3.4.5 Loko I‘a: Fishponds

McAllister (1933) recorded five fishponds named: Mapunapuna (Site 78) (bubbling), Awaawaloa (Site 79) (too salty), Kaloaloa (Site 80), Kaihikapu (Site 81) (taboo sacredness), and Lelepaua (Site 82); and “Kaualua or Kauwalua” fishpond (Site 85) (McAllister 1933:93-94).Figure 11,Figure 12, and Figure 13 document the proximity of the Project area to past fishponds.

Table 1. Loko of the Hālawa-Moanalua Plain

Name	Site Number	Acres	Construction Features
Kaloaloa	50-80-13-80	36	-
Ka‘ihikapu	50-80-13-81	258	1372 m seaward wall with 3 outlets
Lelepaua	50-80-13-82	332	Earthen and coral embankments
Waiaho	50-80-13-94	13	Coral and sand walls and 5 outlets
Ke‘oki	50-80-13-95	-	Narrow wall of coral, rock and sand

Loko Waiaho and Loko Ke‘oki were located in the western portion of the HAFB lands while Loko Lelepaua and Loko Ka‘ihikapu were approximately 1.3 kilometers southwest and southeast (respectively) of the present Project area.

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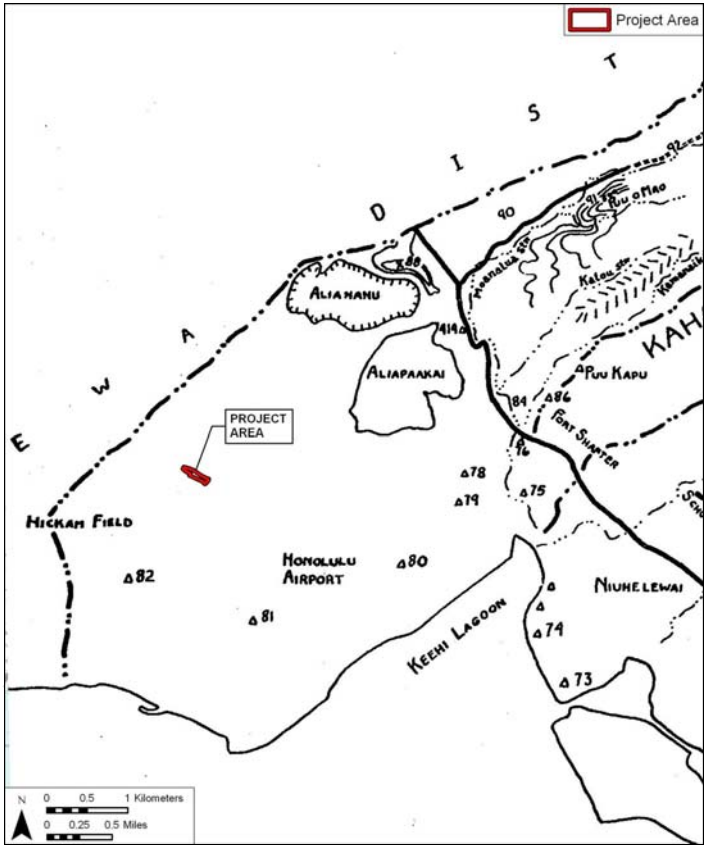

Figure 11. 1959 Bishop Museum site location map (adapted from Sterling and Summers) showing neighboring fishponds (Site 80 is the Kaloaloa Fishpond, Site 81 is the Ka‘ihikapu Fishpond and Site 82 is the Lelepaua Fishpond)

Figure 12. Covington, 1881. Government Survey Oahu Island - Registered Map 1381. Showing Project area and neighboring Kaloaloa Fishpond, Ka‘ihikapu Fishpond, and Lelepaua Fishpond

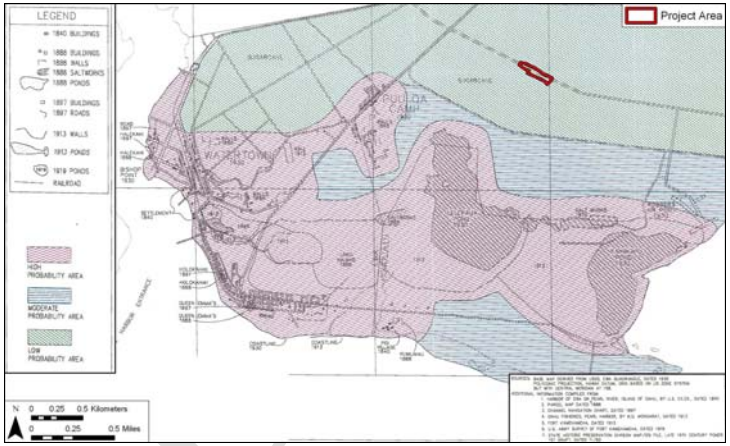

Figure 13. Composite Site Map 1840-1930 (adapted from Anderson and Bouthillier 1996:21) showing relationship of the Project area to Lelepaua Pond, Ka‘ihikapu Pond and the 1930s salt works

3.4.6 Ilina: Burials

Based on archaeological studies of nearby HAFB, there is little expectation that archaeological sites exist in the Project area. The Project area is west of the greater HAFB area, which has been the subject of over 70 archaeological studies. Those findings relate to the Project area because of their proximity. (For a detailed listing of previous archaeological studies at HAFB and Fort Kamehameha, see Table 2 in Hammatt and Schideler 2011). Particular concern was generated for the greater Hickam area by the discovery of at least 87 burials at Fort Kamehameha. It now appears that the area of burials was fairly localized.

There are other pre-Contact burial caves in Moanalua Ahupua‘a, but they are not in proximity to the Project area (see Sterling and Summers 1978:334-335). A proper cemetery called Pu‘u O Ma‘o located above Moanalua Gardens still exists today, but it is not in direct proximity to the Project, either:

> …People dwelt on these hills and when the small-pox epidemic broke out among the whole race the death rate was tremendous. Thus the names were given to the two hills down to this day. When a new generation made their home on Puu-o-Hawaii, they gave it the name that is now found by the cemetery, Puu Omar, after the flowers planted by the residents on the hill. They planted oma‘o flowers [native cotton, Gossypium tomentosum], which grew, flourished and were made into leis for personal adornments. The hill is re-named Puu-Omao to this very day. (Mokumaia 1922 cited in Sterling and Summers 1978:335)

3.4.7 Changing Land Ownership and Management

The O‘ahu dynasty fell in the 1770s to the Maui chiefs (Kahekili) who seized lands, including Moanalua, and next by Kamehameha from Hawai‘i who divided lands among followers. He gave Moanalua to two uncles. In 1800, the major recipient died and his son, Hoapili, inherited his share (Barrère 1971:56). With the death of the other uncle in 1884, the remainder of Moanalua reverted back to Kamehameha or to Ka‘ahumanu, his favorite wife and the Queen Regent after his death. In 1839 Hoapili first leased Moanalua land to a foreigner, Captain William Sumner (Barrère 1971:63) who used it for pasture.

The Organic Acts of 1845 and 1846 initiated the process of the Mahele—the division of Hawaiian lands—that introduced large scale private property into Hawaiian society. In 1848, Kamehameha III divided the land into four categories: Certain lands to be reserved for himself and the royal house were known as Crown Lands; lands set aside to generate revenue for the government were known as Government Lands; lands claimed by ali‘i and their konohiki (headman of a land division under the chief) were called Konohiki Lands; and habitation and agricultural plots claimed by the common people were called kuleana (Native land rights) (Chinen 1985:8-15).

To apply for fee-simple title to their lands, native tenants were required to file their claim with the Land Commission within the specified time period of February 1846 and February 14, 1848. The Kuleana Act of 1850 confirmed and protected the rights of native tenants. Under this act, the claimant was required to have two witnesses who could testify they knew the claimant and the boundaries of the land, knew that the claimant had lived on the land for a minimum of two years,

and knew that no one had challenged the claim. The land also had to be surveyed. Not everyone who was eligible to apply for kuleana lands did so and, likewise, not all claims were awarded. Some claimants failed to follow through and come before the Land Commission, some did not produce two witnesses, and some did not get their land surveyed. Out of the potential 2,500,000 acres of Crown and Government lands, Chinen documents less than 30,000 acres of land were awarded to the Native-Hawaiian tenants (1958:31), although the actual acreage may have been more.

A total of 103 men and women became landowners in Moanalua from various social classes (Rigler 1990:22). Most of this land went to two individuals who were awarded over 6,000 acres each: Lot Kamehameha and Captain William Sumner (Rigler 1990:22). Sumner was given LCA 152, which was much of Moanalua except the taro lands; however, these same lands including the taro lands were also granted to Lot Kamehameha (Hoapili’s foster son and heir). Because Lot Kamehameha was primarily interested in the low lands for its fishponds and cultivation of taro (and later rice) and Sumner was primarily interested in the uplands for pasture, there was no contestation of this conflicting land ownership (Barrère 1971:63).

Sumner received a claim to Moanalua via signed agreement. Hoapili Kane and Kauikeaouli (Kamehameha III) signed a document that gave Sumner rights to the open country and mountains of Moanalua for $50 for 55 years. Once payment was collected and time expired, Sumner and his heirs could occupy the land payment-free under Hoapili Kane and his heirs (Rigler 1990:85).

The documentation of their activities is vague, but it is known that during the 1850’s Lot Kamehameha built a summer residence and had his konohiki manage his fishponds and lo‘i. In 1867, Lot Kamehameha attempted to cultivate rice in the taro lands. He also mined salt from Aliapa‘akai, reporting a profit in salt sales of $254 (Rigler 1990:75-76). William Sumner raised cattle in the uplands of Moanalua.

Subsequently Land Commission Awards were granted to 101 commoners for parcels they were actively cultivating or resident upon. These comprised 101.9 acres in 151 parcels. The Land Commission Awards were heavily concentrated three kilometers to the east of the present Project area in the “bottom lands” along Moanalua Stream and the two tributaries. Citing Native Testimony, (Barrère 1971:64) reported that kuleana were awarded only in the bottom lands of Moanalua to interrelated groups of people whose lands had been received after the Battle of Nu‘uanu, and later, from konohiki of varying degrees and relationship to the Kamehameha line. Rigler similarly reported that most of the land consisted of kuleana awards granted to the maka‘ainana for agricultural purposes in the lowlands (1990). The largest parcels were awarded to: Kaikainali‘i (LCA 868 with eight ‘āpana [land parcel]) and Ho‘omoeapule who was the head konohiki of Moanalua under Lot Kamehameha (LCA 1044 with nine ‘āpana). Each of these individuals were awarded approximately 10% of the Moanalua lands received for Kuleana Awards (Rigler 1990:29).

The lowlands of Moanalua consisted of mostly grasses and shrubs due to the lack of rainfall, yet maka‘ainana activity was based there, not the uplands. The majority of the lowlands were used for lo‘i; pā hale (house lots); kula or dryland agriculture; loko; and ‘auwai. Wetland taro fields were made up 88% of the LCA parcels and 84% of the acreage (Rigler 1990:110).

No commoner land commission awards are known in the vicinity of the present Project area. It was common for the aristocracy and/or their overseers to retain fishponds and unique cultural resources such as the coastline at the mouth of Pearl Harbor.

Upon the death of Lot Kamehameha (Later Kamehameha V) in 1872, his half-sister, Princess Ruth Ke‘elikolani, inherited Moanalua. Next it was inherited by her close kin Princess Bernice Pauahi Bishop, and finally by Samuel Mills Damon from Mrs. Bishop as part of her legacy in a codicil to her will:

> This is a Codicil to the last Will and Testament of me, Bernice P. Bishop, dated October thirty-first A. D. Eighteen hundred and eighty-three:
>
> 9th. I give, devise and bequeath unto my friend Samuel M. Damon, of said Honolulu, all of that tract of land known as the Ahupua‘a of Moanalua, situated in the District of Honolulu, Island of Oahu; and also the fishery of Kaliawa; to have and to hold with the appurtenances to him, his heirs and assigns forever. (http://www.ksbe.edu/pauahi/codicil1.php)

Samuel Mills Damon soon purchased the Sumner heirs’ title to the ahupua‘a and then began purchasing the remaining 89 kuleana titles (Barrère 1971:65). Moanalua had turned a corner for industrial and urban development, as well as military infrastructure.

Beginning in the 1800s, the United States (US) began acquiring (through land condemnation) portions of the Damon Estate in Moanalua and developing it for military purposes. Eminent domain (an exercise of power of government agencies to take private property for public use) has been used throughout Hawaii for military expansion. The current Project area was once Navy land but is now under the Hawaii Fire Department.

3.4.8 Transforming Landscape

In the late 1800s there were a number of developments in the Hālawa-Moanalua coastal plain that were not well documented (see Anderson and Bouthillier 1996 for discussion). Starting from the east side of the Pearl Harbor entrance and moving to the east these included four coastal communities: Halekahi, Holokahi, Queen Emma’s property, and Kumumau (see Figure 13). These were all on the coast and none of these were close to the present Project area.

The 1881 Oahu Island Hawaiian Government Survey map (Figure 12) shows no development in the Project area other than fishponds. The annotation “Ancient Coast Line” is of interest in suggesting that prior to the creation of the Lelepaua and Ka‘ihikapu fishponds out into the shallows that the shoreline may have been significantly closer to the present Project area (but still a kilometer away).

At the end of the nineteenth century, the Honolulu Sugar Company (later Honolulu Plantation Company) began leasing portions of Moanalua for sugar cane cultivation. By the mid-1930s the company had more than 23 thousand acres of land leased in the ahupua‘a. Sugar cane planting extended seaward into the present study area (Figure 14). It appears that a Honolulu Plantation Company railroad line crossed east/west makai of the present Project area by 1906 and the OR&L ran east/west just to the north (at the Nimitz alignment) (Figure 14). A sugar plantation community developed at Pu‘uloa Camp circa 1930 and another community called Watertown

developed adjacent to the east side of the Pearl Harbor entrance. A map of the Honolulu Plantation Company lands circa 1930 indicates that the entire Project area was in commercial sugar cane fields no. 11 and no. 12.

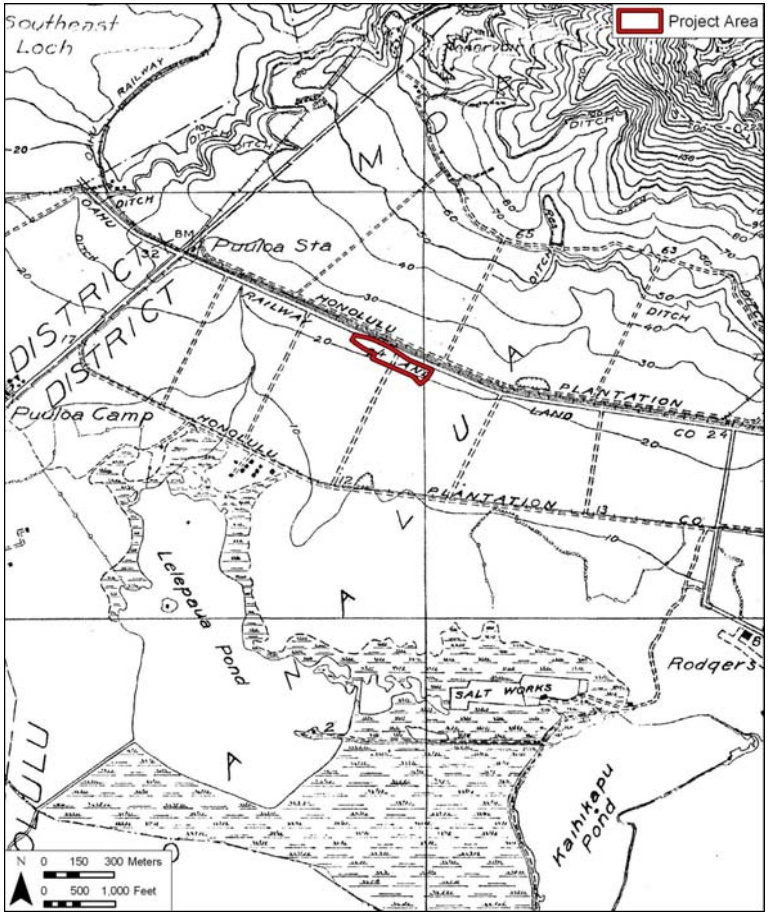

Figure 14. 1927/1930 U.S. Geological Survey (1999)

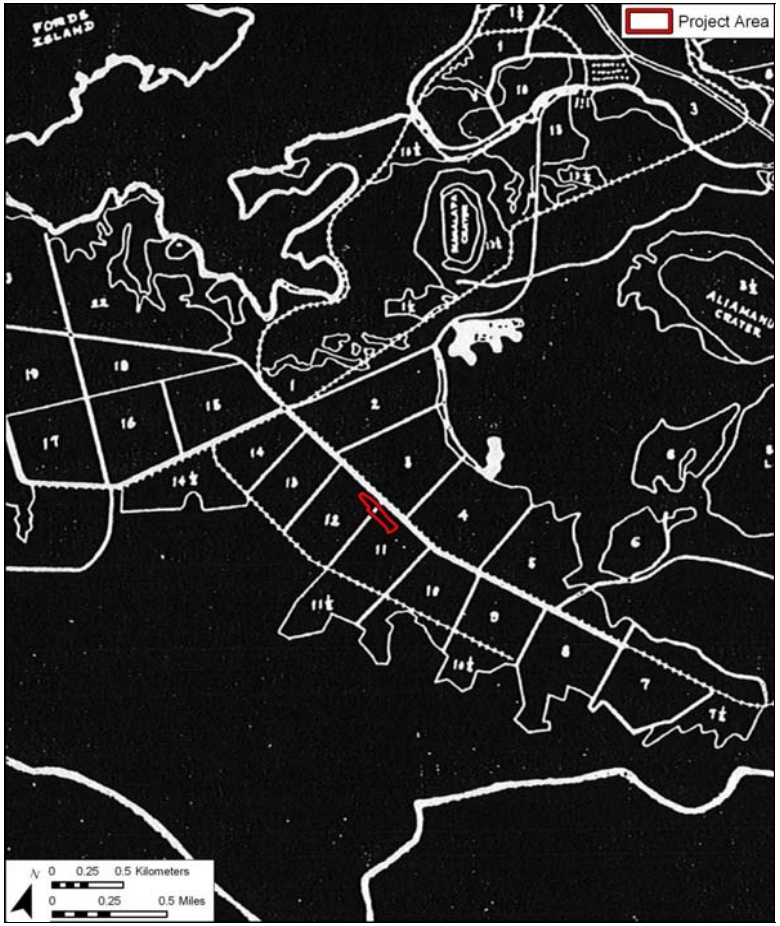

Figure 15. Honolulu Plantation Company map circa 1930 showing Project area as in former cane fields No. 11 & 12 (Conde and Best 1973:331)

Anderson and Bouthillier (1996) note the presence of a salt works between Lelepaua Pond and Ka‘ihikapu Pond circa 1930 (see Figure 13). Rodgers Airport (which was to become Honolulu International Airport) is understood to have been begun in 1930 (see Figure 14). Pearl Harbor had been the focus of American interests in the Hawaiian Islands for many decades prior to annexation. Following annexation in 1898 and with an eye on the need to establish a coaling station for American warships running to the Philippines and beyond improvements at the Pearl Harbor entrance was a major concern. Some 429 acres were purchased from Queen Emma Kaleleonalani for $28,285 which was developed as Fort Upton (changed to Fort Kamehameha in 1909). An additional 400 acres were purchased from the Damons in 1911. In 1908 the Navy undertook the dredging of the Pearl Harbor channel that was blocked by a shallow sand bar that had greatly restricted earlier development efforts. Much of the fill from this and later dredging efforts was used to fill in low-lying lands. Five separate coastal defense batteries were built (including Battery Selfridge and Battery Hawkins). The Fort Kamehameha post housed Hawaii’s first aviation unit in 1917/1918. The population of the base remained about 1800 until World War II.

The Hawaiian Aviation web site offers the following brief history of the bases early development:

> In 1934, the Army Air Corps saw the need for another airfield in Hawaii and assigned the Quartermaster Corps the job of constructing a modern airdrome from tangled brush and sugar cane fields adjacent to Pearl Harbor on the island of Oahu. The site consisted of 2,200 acres of ancient coral reef, covered by a thin layer of soil, located between Oahu’s Waianae and Koolau mountain ranges, with the Pearl Harbor channel and naval reservation marking its western and northern boundaries, John Rodgers Airport to the east, and Fort Kamehameha on the south…The new airfield was dedicated May 31, 1935 and named in honor of Lt. Col. Horace Meek Hickam, a distinguished aviation pioneer killed Nov. 5, 1934, at Fort Crockett in Galveston, Texas…Hickam AFB now consists of 2,850 acres of land and facilities valued at more than $444 million. (State of Hawaii Department of Transportation, Airports Division 2011)

The very substantial fill activities and airport construction particularly associated with 1942/1943 are readily apparent in a comparison of the 1930 (Figure 14) and 1943 (Figure 16) maps. The vicinity of the Project lands have been rapidly developed with roads and elongated warehouse-like buildings.

The 1953 Army map service quad map (Figure 17) shows further urban and light industrial development in the Project vicinity largely associated with the expansion of Honolulu International Airport and Hickam Air Force Base.

During the 1940's, the U.S. military began acquiring additional land from the Damon family for the construction of the Tripler Army Medical Center Facility. Construction began in 1944 and the hospital was completed in 1950. Following statehood the lands of Moanalua were greatly developed for residential and light industrial uses. By 1977 (Figure 18) the development of the vicinity was much as it remains today.

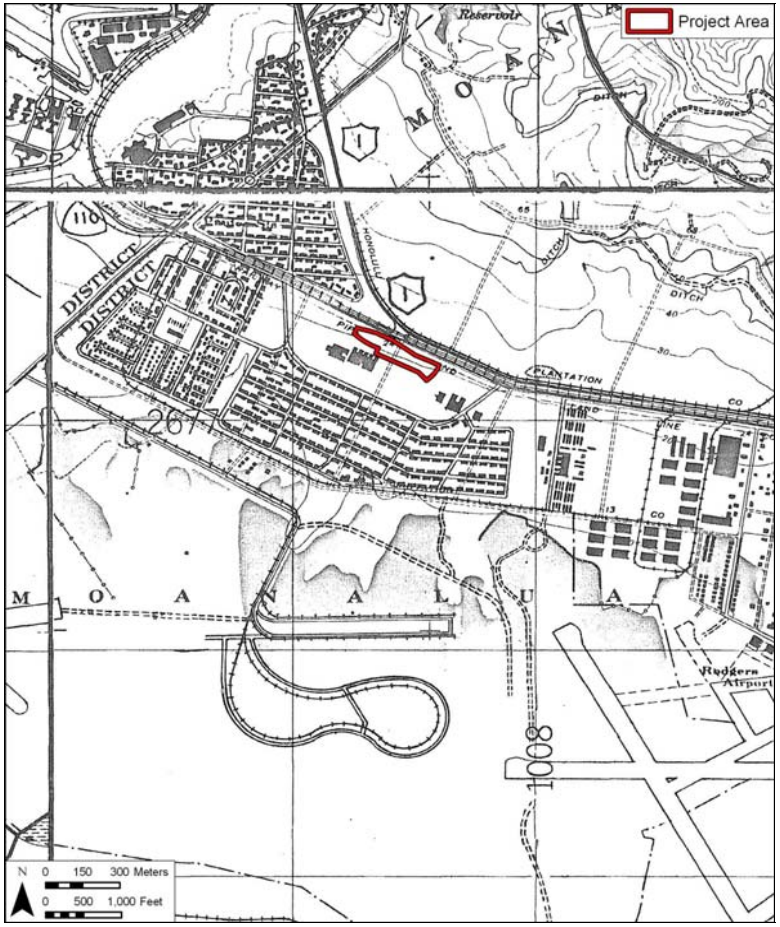

Figure 16. 1943 War Department 7.5 minute topographic map of O‘ahu, Moanalua Quadrangle.

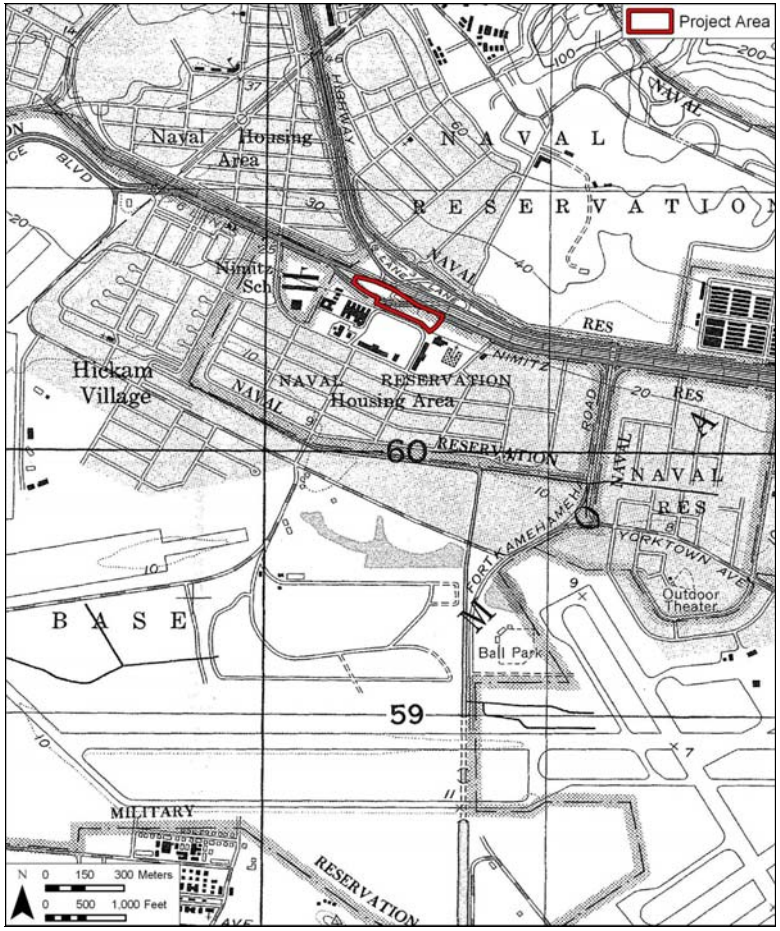

Figure 17. 1953 Army Map Service quad map

Figure 18. 1977 aerial photograph showing Project area

Section 4 Community Consultation

Throughout the course of this assessment, an effort was made to contact and consult with Hawaiian cultural organizations, government agencies, and individuals who might have knowledge of and/or concerns about traditional cultural practices specifically related to the Project area. This effort was made by letter, email, telephone and in-person contact. The initial outreach effort was started in February 2011. Community consultation was continued into June 2011 and is ongoing at the time of this CIA. In the majority of cases, a letter (Appendix E), map, and an aerial photograph of the Project area were mailed.

In most cases, two to three attempts were made to contact individuals, organizations, and agencies apposite to the CIA for this Project. The results of the community consultation process to date are presented in Table 2 below. Excerpts from more extensive interviews specifically related to Moanalua Ahupua‘a and the Project area are presented in Section 5.

Table 2. Summary of Community Consultation Efforts

Name	Affiliation, Background	Notes
Ailā, William	Hui Mālama I Na Kupuna O Hawai‘i Nei	2/22/11 CSH sent email 4/12/11 2nd letter sent
Akau, Roddy	Cultural liaison for Kamananui Valley, Referred by Moanalua Gardens Foundation	3/9/11 CSH sent email 3/10/11 CSH called Mr. Akau 3/15/11 CSH interviewed Mr. Akau at Moanalua valley park 3/28/11 draft summary sent 4/18/11 Mr. Akau revised draft 4/30/11 revised draft summary sent 5/12/11 Mr. Akau reviewed summary 6/1/11 CSH sent revised (3rd) draft for final approval via post 6/10/11 CSH left voice message to follow up for interview approval; Mr. Akau called back and said he would mail additional comments to incorporate by next week 6/13/11 Mr. Akau met CSH at Moanalua Valley park with additions for interview summary 6/16/11 CSH emailed and posted

Name	Affiliation, Background	Notes
		updated summary to Mr. Akau 6/23/11 Mr. Akau made additions to summary and authorized its use
Ayau, Halealoha	Hui Mālama O Nā Kūpuna O Hawai‘i Nei	2/22/11 CSH sent email 4/11/11 2nd email sent
Becket, Jan	Kamehameha Schools; Photographer	2/22/11 CSH sent email 4/11/11 2nd email sent 4/18/11 Mr. Becket responded via email describing cultural features in Moanalua valley and referring a potential community contact, Robert Marr who grew up in Moanalua 5/27/11 Mr. Becket emailed CSH to say he had not been successful in reaching Robert Marr 6/6/11 CSH followed up via email 6/13/11 visited and photographed cultural sites in Moanalua Valley
Brown, Desoto	Referred by SHPD	
Cayan, Phyllis "Coochie"	SHPD Cultural Specialist	2/22/11 CSH sent email 4/12/11 2nd letter sent 4/12/11 SHPD replied in a letter
Damon, Dwight	Descendent of S.M. Damon	3/28/11 CSH called and interviewed Mr. Damon via telephone 4/4/11 and 4/11/11 additional telephone phone interviews 5/2/11 CSH mailed summary and authorization forms 5/16/11 CSH left telephone message on 5/24/11 Mr. Damon left a message saying he would call in a day or two 6/1/11 CSH returned his call 6/10/11 CSH left voicemail 6/23/11 Mr. Damon called CSH to say

Name	Affiliation, Background	Notes
		he will write a statement for the report in lieu of an interview summary 6/26/11 CSH received Mr. Damon's emailed written statement
Downing, George	Expert waterman referred by SHPD. Renown surfer, big wave rider, and board shaper. Recipient of a Lifetime Achievement Award from the John Kelly Awards granted by the Surfrider Foundation	5/2/11 CSH sent letter 5/16/11 CSH left telephone message on 5/26/11 Mr. Downing left a message for CSH 6/6/11 CSH returned his call and left a message 6/6/11 CSH conducted telephone interview and took a brief statement from Mr. Downing, then faxed a summary of his comment for approval which he approved the same day
Fujita, Mitsuko	Kama‘āina of Aiea and Manana; Family historian and researcher	2/22/11 CSH sent email 4/12/11 2nd letter sent
Gaines, Leialoha	Community Contact	2/22/11 CSH sent email 4/12/11 2nd email sent
Ho, Mikilani	Community Contact	2/22/11 CSH sent email 4/12/11 2nd letter sent 5/16/11 CSH called; number not working
Holts	Referred by Terri Kekoolani	No contact information provided
Hughes, Claire Ku‘uleilani	Expert in Native Hawaiian nutrition and foods, referred by SHPD	4/25/11 CSH sent email 4/25/11 Response emailed to CSH
Inciong, Tane	Referred by CSH staff	4/12/11 CSH sent email 5/16/11 CSH left a message
Lanakila Senior Center	Referred by SHPD as a potential location to identify Moanalua kūpuna	5/16/11 CSH called and the program contact recommended the Moanalua Seniors Club instead.
Kahn, Leimomi	Association of Hawaiian Civic Clubs, President	2/22/11 CSH sent email 4/11/11 2nd email sent

Name	Affiliation, Background	Notes
		5/16/11 CSH left telephone message
Kamelamela, Jonah	Kama‘āina of Aiea	2/25/11 CSH sent letter 4/12/11 2nd letter sent
Kane, Shad	Makakilo/Kapolei Neighborhood Chairperson	2/22/11 CSH sent email 4/12/11 2nd letter sent
Kekina, Mabel	Kupuna	2/25/11 CSH sent letter 4/12/11 2nd letter sent
Kekoolani, Terri	Community Activist, Kaimuki Mokapu	2/22/11 CSH sent email 2/22/11 Ms. Kekoolani responded via email and referred CSH to the Holts, Damons, Moanalua Valley Association
Lee, Aggie	Kama‘āina of Aiea	2/22/11 CSH sent letter
McKeague, Mark Kawika	Chair of O‘ahu Island Burial Council	5/23/11 CSH sent letter 6/7/11 Mr. McKeague emailed saying he had no specific information about the area but forwarded CSH's email to Uncle Shad and Dr. Jonathan Scheuer
McQuivey, Jace	Vice President and General Legal Council,Hawai‘i Reserves, Inc.	2/22/11 CSH sent email 4/12/11 2nd letter sent 5/25/11 CSH learned that he has no comment
Minato, Risa	Program manager, HCRI-RP Social Science Research Institute	2/22/11 CSH sent email 4/11/11 2nd letter emailed
Moanalua Gardens Foundation	Cultural and Environmental Education in Hawai‘i	3/7/11 Pauline Worsham referred Roddy Akau
Nāmu‘o, Clyde	OHA	2/22/11 CSH sent email 2/25/11 Sent letter 3/23/11 OHA responded in a letter
Oral History Project at UHM	Referred by SHPD	5/9/11 CSH sent email 5/30/11 CSH sent 2nd email 6/6/11 CSH sent 3rd email

Name	Affiliation, Background	Notes
Scheuer, Jonathan	Kona Moku representative of OIBC; OIBC Chair Kawika McKeague forwarded CSH email to him on 6/7/11	6/11/11 Dr. Scheuer emailed CSH and referred Roddy Akau
Stagner, Ishmael	Works with Alu Like, Inc. Raised at Pearl Harbor Peninsula	2/22/11 CSH sent email 2/23/11 Mr. Stagner responded 3/17/11 CSH interviewed Mr. Stagner 6/1/11 Mr. Stagner approved interview
Sugimura, Yuriko J.	Aiea Neighborhood Board	2/25/11 CSH sent letter 4/12/11 2nd letter sent
Tamamoto, Claire	Aiea Community Association	2/22/11 CSH sent email 4/12/11 2nd letter sent
Turner, Dayle	Language Arts Teacher at Leeward, hiker	2/22/11 CSH sent email 4/12/11 emailed 2nd letter
Uchida, Erin	Moanalua Senior Citizens Club	5/16/11 CSH left message 5/16/11 Ms. Uchida returned call and invited CSH to a meeting to introduce Project 5/23/11 CSH attended meeting and talked to club members

4.1 Written Responses

Written Responses from OHA, SHPD and from Dr. Claire Ku‘uleilani Hughes generally emphasized the importance of fishing to Moanalua in traditional and contemporary times and included no strong concerns about the Project.

4.1.1 Office of Hawaiian Affairs

PHONE (808) 594-1888 FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD11/5573

March 23, 2011

Heather McMillen, Researcher
Cultural Surveys Hawai'i, Inc.
P.O. Box 1114
Kailua, Hawai'i 96734

Re: **Pre- Cultural Impact Assessment Consultation**
Honolulu Fire Department Training Facility Expansion
Moanalua, Island of O'ahu

Aloha e Heather McMillan,

The Office of Hawaiian Affairs (OHA) is in receipt of your February 22, 2011 request for comments ahead of a cultural impact assessment (CIA) for the proposed expansion of the Honolulu Fire Department (HFD) Training Facility (project) in Moanalua on the Island of O'ahu.

Your letter describes that the intent of the project is to enhance the quality of the HFD's training program for new recruits and additional facilities for incumbent HFD fire fighters. The project will be completed in three phases. Project activities in Phase I include the construction of a new academy, 100-stall parking lot and upgrades to the existing training tower. A new incumbent building and 99 additional parking spaces will be constructed during Phase II. The project will be completed in Phase III with the construction of a new fire station, additional parking and expansion of existing facilities. All project activities will occur on the previously developed 5.16 acre parcel where the existing training facility is situated.

We have no specific comments on the CIA at this time. Thank you for initiating consultation at this early stage and we look forward to reviewing the CIA and providing additional comments at that time. Should you have any questions, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Chief Executive Officer

Figure 19. OHA Response letter dated March 23, 2011

4.1.2 State Historic Preservation Division

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULEKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAHUHIHEWA BUILDING
601 KAMOKILA BLVD, KAPOLEI HI 96706

April12, 2011

Dr. Hal Hammatt, Ph.D.
Cultural Surveys Hawaii
P.O. Box 1114
Kailua, Hawaii 96734

Log No. 2011.0949
Doc.No.1104pc002

Dear Dr. Hammatt:

SUBJECT: MOANALUA 12: A Cultural Impact Assessment (CIA) for the proposed expansion of the HFD Fire Training Facility Project. Moanalua Ahupua'a, Kona District, O'ahu Island. TMK: [1] 1-1-002:012.

Mahalo for the opportunity to offer some strategic thoughts on the aforementioned CIA for the proposed expansion of the HFD Fire Training Facility Project at Moanalua Ahupua'a. As your researchers will note, this was an area for gathering and fishing prior to urbanization.

This area was part of O'ahu's bounty of fishing – both offshore and in the former fishponds – accessed by the natives who lived mauka and went makai for such purposes. Evidence of the fishponds still remains despite the development of Honolulu Airport, military housing and other urban developments. There may be other traditional cultural uses which are not visible or evident in today's changed environment (i.e., making rope, canoe building, fish hook production, kapa making, lauhala weaving). Certainly, food production whether by fishing or gathering would have been an important part of the culture therein.

Here are some referrals that may be helpful in this CIA outreach:

1. The notable Dr. Claire Ku'uleilani Hughes, PH., R.D. who writes a monthly article for the *Ka Wai Ola* (OHA newspaper) use to gather limu at Keehi area.
2. Kupuna George Downing can be reached at Downing Hawaii shop and may have mana'o on this area. He is a well known waterman of O'ahu.
3. The Bishop Museum's Desoto Brown may be able to contribute mo'olelo and other referrals.
4. The Kupuna at Lanakila Senior Center in Liliha/Kalihi may have mana'o for this area too.
5. The Oral History Project at the University of Hawaii at Manoa may also have histories of folks and/or families that can add to your CIA.

Any questions, please call me at 808-692-8025 or email at Phyllis.L.Cayan@hawaii.gov.

Sincerely,

Phyllis Coochie Cayan
SHPD History and Culture Branch Chief

Figure 20. SHPD Response letter dated April 12, 2011

4.1.3 Claire Ku‘uleilani Hughes

CSH contacted Dr. Claire Ku‘uleilani Hughes via email to invite her participation in the CIA, and in an email dated April 25, 2011 she responded:

> I have no information on that area. I am familiar with the HFD Training facility and have been on site a couple of times. I know that prior to the US Navy taking over Pearl Harbor that there were very large fish ponds in the entire area. Many of these fish ponds belonged to the ali‘i. I am not sure of their exact location, however, Sites of O‘ahu, Sterling and Summers, has information on this.

4.1.4 Dwight Damon

On March 28 and April 4, 2011 CSH spoke for multiple hours with Mr. Dwight Damon via telephone. He related a wealth of information on Moanalua and his family's history there. On June 26, 2011 Mr. Damon submitted a written statement to include in this report. It is reproduced in the figure below.

Moanalua 12 Project
Statement by Dwight Damon on June 26, 2011
I, Dwight Damon, was born at Kuakini Hospital in 1958. I grew up at my family home on Salt Lake crater rim comprised of the place names Papakolea and Papakia, Moanalua and currently live on the same property. For 20 years I have owned and operated the Movie Museum, an art house movie theater in Kaimuki.

Family connections to Moanalua
My family connections to the ahupua'a of Moanalua are longstanding. As Damons, we used to be custodians of the area, and now although we still own property there (I have a little over10 acres in Alia Pa'akai, first owned by my uncle Samuel Renny Damon and then my father Henry E. Damon since 1958, and my brother J.P. owns Moanalua Gardens, formerly owned by the S.M. Damon Estate, which includes the "Hitachi" monkeypod tree and other beautiful flora, Chinese Hall and the Kamehameha V cottage) my brother and I are now primarily interested in preserving our properties as historians of these historic places and of the greater Moanalua area. In 1884, my great, great grandfather, Samuel Mills Damon II (hereafter referred to as S.M. Damon), was bequeathed the entire ahupua'a of Moanalua by Princess Bernice Pauahi Bishop. [Later he established the Damon Estate which held property in trust in Moanalua until the passing of S.M. Damon's last grandchild in 2004.]

Although S.M. Damon may be the most well-known, he was not the first Damon in Hawai'i. The first Damon ancestor to arrive was S.M. Damon's father, the Reverend [Samuel Chenery] Damon (hereafter referred to as Reverend Damon). Reverend Damon was trained in seminary and intended to be a missionary in India, but he did not go to India. In 1833 the Seamen's Bethel was built in Honolulu to support sailors, preach to them, and help keep them orderly in port. When the first chaplain there died in 1840, Reverend Hiram Bingham requested Reverend Damon to come to Hawai'i and be the chaplain at Seamen's Bethel. Reverend Damon agreed, got married near Boston to Julia Mills and sailed with his new wife to Honolulu. They arrived in late 1842 and established themselves at the Seamen's Bethel (where "The Friend" building is today) and lived a few blocks mauka on Chaplain Lane. Reverend Damon was not only close to visiting sailors and sea captains in his congregation; he was also close to Honolulu residents and the Hawaiian chiefs, namely Kamehameha III, who called upon him for his judgment on how Hawaiians were coping with foreigners during a time of rapid change in Honolulu. Reverend Damon was more than a chaplain; he played a role in facilitating foreign relations and communications by liaising between foreigners, foreign residents and Hawaiians, establishing a reading room, and publishing and distributing a newspaper, the *Temperance Advocate and Seamen's Friend*, later shortened to *The Friend*. This monthly, sometimes semi-monthly newspaper began publication in January, 1843. Reverend Damon presided over the wedding of the future Queen Liliuokalani with John Owen Dominis. When Reverend Damon died in February, 1885, King Kalakaua attended his funeral.

In 1845 the Reverend Damon's son, S.M. Damon, was born. S.M. Damon became a successful businessman, entrepreneur and philanthropist. He developed land, infrastructure, businesses, and he supported the establishment of cultural institutions (e.g. museums and gardens). Among the notable business relationships he developed was one with Charles Reed Bishop. Charles Reed Bishop married Princess Bernice Pauahi Pākī and they were close friends of the Damons. In 1852, Reverend Damon's wife Julia Mills Damon and Bernice Pauahi Bishop were President and Vice President respectively of the

Stranger's Friend Society, which aided sick and destitute travelers. In 1871, S.M. Damon was hired to work at Bishop and Co., Hawaii's first bank, was made a partner in 1881, and bought the bank outright in 1895. During this time, he was also buying properties in Moanalua. He continued to do so, perhaps as late as the early 1900s. He was already leasing land to the Honolulu Plantation Company, who had plowed the land to prepare for sugar cultivation.

The close ties between the Bishops and the Damons were cemented over a long course of time. Princess Bernice Pauahi Bishop's deep trust of S.M. Damon had as much to do with Reverend Damon's respected position with Hawaiian royalty and the local community as with her belief that S.M. Damon was committed to enriching Hawaii's cultural and economic landscape. It was this belief and her close friendship with S.M. Damon that led her to bequeath to him the ahupua'a of Moanalua. S.M. Damon had proven a valuable financial advisor to Princess Pauahi, so she trusted him over anyone else to manage her vast land holdings. Before her death, Mrs. Bishop named S.M. Damon, her husband and a few others as the first trustees of the Bishop Estate, later known as Kamehameha Schools.

The association of Moanalua with the Kamehameha line began with Kamehameha the Great who came to Moanalua after consolidating the islands. The stories of Kamehameha I at Moanalua can be found in the notebooks of my grandmother Gertrude MacKinnon Damon as well as can the pre-contact history of Moanalua. Many of Gertrude MacKinnon Damon's stories of Moanalua were related to her by the blind chantress Namakahelu whom Gertrude met for the first time on November 11, 1917 at the funeral services of Queen Liliuokalani. The history of Moanalua and the Kamehamehas is this: King Kamehameha the Great gave the ahupua'a to Kame'eiamoku who gave it to his son Hoapili who made Prince Lot (later Kamehameha V) his future heir, who willed it to Princess Ruth, who willed it to Princess Bernice Pauahi in May 1883. In October, 1884, Mrs. Bishop willed the ahupua'a of Moanalua to her friend, S.M. Damon.

When S.M. Damon received the ahupua'a of Moanalua, he continued in the legacy of others who had industriously leased the Moanalua lands before him. These were Mr. William Sumner and Mr. J.I. Dowsett. Sumner, who raised cattle in the basin of Kamananui Valley, received his lease well before the Mahele, in 1839. His interests were succeeded by J.I. Dowsett. Dowsett received Salt Lake from Kamehameha V in 1874. Dowsett had a large ranch in Moanalua by 1885. Over time S.M. Damon took over Dowsett's leases and owned them by the late 1800s.

In 1853, one of the structures that remains to this day was built by Prince Lot, later Kamehameha V. Lot erected his cottage between the present-day 'Olelo building and Pu'uloa Road. The cottage was built to entertain foreign dignitaries to allow them to see the "hula hula" which had been banned in the Honolulu city area, but which foreigners had read about in the journals of Capt. Cook and others. Long after Kamehameha V's death, S.M. Damon moved the cottage to the edge of Mapunapuna Fish Pond several years after receiving the ahupua'a of Moanalua from Bernice Pauahi Bishop. S.M. Damon's idea was to create a compound with native Hawaiian museums thatched with pili grass, and he expanded the cottage into a showplace for the public to visit. He had Benjamin F. Dillingham build a railway spur into Moanalua in the 1890s for that purpose. S.M. Damon lived near Honolulu City at 1728 Nuuanu Avenue, but stayed in the Prince Lot cottage whenever visiting Moanalua. He built additions to the cottage over the years until finally; he put up a Victorian mansion on Pu'u O Maui (just mauka of Moanalua Gardens)

in 1912. By 1905 he built Chinese Hall close to the other structures near Mapunapuna Fish Pond. [By 1960, the S.M. Damon Estate moved the structures to their current location in Moanalua Gardens (the former site where S.M. Damon's Japanese Gardens and tea house existed between 1910 and the 1940s) to make way for Mapunapuna Industrial Subdivision.] S.M. Damon was a very busy person between 1885 and 1900. During this time he served in the Hawaiian government as Minister of Finance and Privy Counselor under Kalakaua and Liliuokalani, and later served as advisor and financial minister in the provisional government and under the Republic of Hawaii. He also served on the first board of the Bernice Pauahi Bishop Museum and on the boards of several other institutions and businesses. During this time he was also importing agricultural firsts to Hawaii beginning with the anthurium in the late 1880s and he hired a horticulturalist from Edinburgh named Donald MacIntyre to import various fruit trees, such as the Pirie mango, and a wide variety of flowers, including orchids, and to landscape a polo field and the first golf course in Hawaii. The plant varieties as well as S.M. Damon's public-spirited contributions at Moanalua have been well documented in books, newspaper articles and magazines from the late 1800s to well after S.M. Damon's death in 1924.

In the late 1800s, S.M. Damon leased land to Honolulu Plantation Company for sugar cane cultivation throughout the Aliamanu, Salt Lake and Makalapa areas which include the area where the Thurston Fire Station is located on Valkenburgh St. Oahu Railway (which is today's Nimitz Highway) ran just mauka of the Thurston Fire Station. I own an 1884 Monsarrat working map (originally located for decades on the wall at the S.M. Damon Estate offices) that shows Puuloa Road at one point crossed the Oahu Railway line just a few hundred feet to the Diamond Head side of the Thurston Fire Station as it headed down to Queen Emma's house (Fort Kamehameha). There is also a marked trail several hundred feet to the ewa side of the Thurston Fire Station which used to run from the Halawa area down to the fish ponds directly makai of the fire station. By 1900, one of the fish ponds called Lelepaua was apparently being filled in. Information about this came from a report called *Commercial Fisheries of the Hawaiian Islands* by John N. Cobb, who was an agent of the US Fish Commission. The report was published in 1901 as part of House of Representatives Document No. 249, 57th Congress.

As a child, I rarely traveled to the area where the Thurston Fire Station is, as Moanalua Road was the main way to go Ewa or Honolulu bound from where I live. And when traveling to the airport, Puuloa Road was the way to get to John Rogers Airport, now known as Honolulu International Airport. And while I never had any reason to go into the naval residential areas, the area has interested me in more recent times because of its changing history, and the fact that the land had formerly been owned by S.M. Damon and was condemned by the military in the late 1800s and the early 1900s. Many other areas in Moanalua have also been condemned by the military. Additionally, although the area was remote and dry compared to, say, the fertile Mapunapuna district, the stories and place names from the area appear in the notebooks of Gertrude MacKinnon Damon. In Notebook II, Lelepaua is mentioned in a Moanalua place-name chant named "Kahikilaulani ka Makani" and it is also mentioned in Notebook XX, where Gertrude speaks of Moanalua's fish ponds.

Gertrude MacKinnon Damon was born in Scotland and married S.M. Damon's eldest son, Samuel Edward Damon, also known as "Ned". Mrs. Damon lived with Ned at Pu'ukapu, on the Moanalua site just ewa of where Fort Shafter is located today. Gertrude Damon had four children with Ned, who died in 1904, four years after she arrived in Hawaii. Of the four, the only child who survived to maturity was

Samuel Renny Damon, who died in 1957, and whose widow sold his house to my father, Henry Edward Damon, who moved from the East Coast to Hawaii upon the death of Samuel Renny. Gertrude MacKinnon Damon, after being widowed for several years, married Samuel Renny Damon's unwed uncle Henry Fowler Damon around 1910. Henry Fowler died on the 19th of December, 1926, but all four of *his* children survived to maturity. Their names are Harriet "Haku" Damon Baldwin, Frances "Patches" Damon Holt, Joan Damon Haig and my father, Henry Edward Damon, who was born in 1921. All these Damons grew up in the Moanalua area at Pu'ukapu near the famous, long vanished "House of Bones". See Gertrude MacKinnon Damon notebooks. Following the use of their mother Gertrude MacKinnon's notebooks to successfully avert the construction of the H-3 Freeway through Moanalua, Frances "Patches" Damon and Harriet "Haku" Baldwin organized the Moanalua Gardens Foundation in 1980 and the Prince Lot Hula Festival at Moanalua Gardens was born at that time. My father Henry Edward Damon was also interested in preserving Moanalua history. A decade following the 1957 sale of much of the Damon Estate lands by Samuel Renny Damon to developers Clarence Ching and K.J. Luke, my father explained publicly that Salt Lake was not a natural lake and had not been since 1910 when S.M. Damon had the McCandless brothers build a well to fill the lake with water, turning it into a mullet pond. Henry Edward Damon also explained that the lake had been polluted by raw sewage dumped from the Aliamanu military area since the 1950s, and he argued that its best use would be a golf course, which had been the original plan of the developers (who envisioned Japanese nationals jetting in and out of Honolulu after playing golf at the filled-in Salt Lake) back in the 1950s. Today, the Honolulu Country Club exists where Salt Lake once was. The pre-1910 history of Salt Lake is a fascinating one, and I take an interest in the unique geology of the volcanic craters and flatlands that stretch out to the ocean and include the Thurston Fire Station site. Many stories and legends and the history of salt-gathering surround Alia Pa'akai (Salt Lake) and the salt pan areas around Lelepaua and Kaihikapu Fish Ponds. Namakahelu, who died in 1940 at the age of 97, was Gertrude MacKinnon Damon's informant for many of the tales and legends of the area. Interesting scientific information on Salt Lake as a natural phenomenon can be found in stories and in letters to the editor in The Advertiser May 22, August 9, 13 and 15, 1926. I am also fascinated by the controversies in the area further makai at Kaloaloa during the 1920s – 1950s. Kaloaloa, also known as Damon Tract, was an area where locals leased residential and farm land from the Damon Estate at what is now a light industrial district and Honolulu International Airport. In 1945, apparently, there was a large riot involving the residents of the nearby naval air station and residents at Damon Tract. Controversies surrounding the expansion of the John Rogers Airport in the 1950s and the attempted raising of rents of Damon Tract tenants and the subsequent purchase of the Damon Tract lands by Clarence Ching, Lillian Tom Loo and K.J. Luke in 1956 also caused public outcry. All make for a noteworthy modern history of the general area. Over the years I have learned much from informants on the Moanalua area. In recent times, I have spoken with Rubellite Kawena Johnson, Nathan Napoka, my aunt, Frances "Patches" Damon Holt, who willed me my grandmother Gertrude MacKinnon Damon's original notebooks (copies of which may be found at the Moanalua Gardens Foundation and University of Hawaii), Loren Gill (deceased) and Rodney Akau, to name a few. Earlier in the last century, Moanalua's history was covered by J.K. Mokumaia in the Hawaiian language newspaper Kuokoa in articles dated February 17, March 3, March 10, March 17, March 31, April 7, April 21, May 4, August 17, August 24 and August 31, 1922. The archaeologist McAllister in the Bishop Museum's 1933 publication *Archaeology of Oahu* reveals interesting Moanalua lore. He does not cite Gertrude MacKinnon Damon (probably because her notebooks weren't known publicly until well after her death in 1951), though he does mention Namakahelu. Among Gertrude MacKinnon's informants (all deceased), covering the period 1917 through

the 1940s, are the following: Jerome and Louis Feray, L.A. Hardy, Hui Hui, C.P. Iaukea, Cecelia Keolanui, Kimona Aalioaa, David Malo Kupihea, Hattie Lem, Maka Puahi, Malia Kau, Janet McIntyre, Moanauli, Clara Mokumaia, Solomon Mokumaia, Judge Monsarrat, Namakahelu, Mrs. Nichols, Pililua, Mary Kawena Pukui. There are also three last informants (all deceased) who ought to be noted: Douglas Damon (S.M. Damon's youngest son), Jackie Roxburgh (groundskeeper at Moanalua Gardens for decades—and who grew up there) and Muriel Lupenui (a resident of Mokauea Island in the early 1900s). Based on what I know of the Thurston Fire Station area and its history, I do not believe the expansion will impact the cultural landscape in any significant way. This is not to say that some artifacts won't be dug up, as the area was in the vicinity of fish ponds and salt pans. But it is likely that the soil there had been plowed more than 100 years ago.

Figure 21. Written statement from Mr. Dwight Damon, emailed June 26, 2011

Section 5 Summaries of Community Interviews

5.1 Overview

Kama‘āina and kūpuna with knowledge of the proposed Project and study area participated in semi-structured interviews from March 2011 to June 2011 for this CIA. CSH attempted to contact 32 individuals for this CIA report; of those, 15 were contacted, and four participated in formal interviews. CSH initiated the interviews with questions from the following five broad categories: wahi pana and mo‘olelo, agriculture and gathering practices, freshwater and marine resources, cultural and historic properties, and burials. Participants' biographical backgrounds, comments, and concerns about the proposed development and permanent Project footprint are presented below.

5.2 Acknowledgements

The authors and researchers of this report extend our deep appreciation to everyone who took time to speak and share their mana‘o (thoughts, opinions) with CSH whether in interviews or brief consultations. We request that if these interviews are used in future documents, the words of contributors are reproduced accurately and not in any way altered, and that if large excerpts from interviews are used, report preparers obtain the express written consent of the interviewee/s.

5.3 Roddy Akau

Mr. Roddy Akau was born in 1957 in Honolulu to Samuel Akau, Jr. and Agnes Kamakawiwo‘ole ("the brave eye") and now lives in Kalihi. Mr. Akau was referred to CSH by Moanalua Gardens Foundation. He is a board member and cultural liaison for Kamananui and Kamanaiki Valleys in Moanalua Ahupua‘a. He is a cultural and lineal descendent of Moanalua Ahupua‘a and he is a cultural practitioner, specifically a kahuna lā‘au lapa‘au (medicinal plant specialist). CSH met with Mr. Akau on three occasions in Moanalua Valley, once at Moanalua Gardens, and once in Kalihi during March, April, May, and June 2011. The following section is a summary of these conversations that incorporates direct quotes provided by Mr. Akau in writing.

Upon meeting Mr. Akau, his hyper-awareness of and connections to his environment were striking. As an example of the connections he has with the environment and those who lived in Moanlua before, he showed CSH photographs he had taken in the valley at his family's cemetery of cloud formation that was clearly a large eye, and another cloud formation that is a profile of a Hawaiian warrior in a helmet with a rainbow in the background. Mr. Akau's eyes light up and he speaks with intensity as he explains his intimate knowledge and understanding related to the mo‘olelo of this place, and of his own spiritual journey as a caretaker of the valley, a healer, cultural practitioner, and lineal descendent of Moanalua Ahupua‘a.

Connections to land

Mr. Akau's family name is Kapahi‘kaua o Kamehameha, "the battle sword of Kamehameha" and derives from his fourth great grandfather who was born in 1795 during the battle between

Kamehameha and Kalanikūpule (the King of O‘ahu). As the troops of Kamehameha were battling below Moanalua Valley, he was resting at a sacred spring and he learned of a baby born of Kamananui Valley chiefs. He went to see the baby and gifted him with his sword; thus the family name Kapahi‘kaua o Kamehameha. Although Mr. Akau’s ancestors lived apart from the ruling chiefs, they were known and respected for their spiritual powers and this mo‘olelo recognizes them for that.

Mr. Akau is a lineal descendent of the konohiki of Kamananui. He explains:

> The konohiki rights have been held by my family for many generations, from Kamananui all the way down to Kumumauu (entrance to Pu‘uloa or Pearl harbor, Diamond Head side of the entrance). Lelepaua fishpond lies under the air force base [HAFB] and mauka of the base. My ancestors were very god-like people. I come from the demigods’ lineage, and this lineage is my birthright. These mountains of Kamananui were also known as the “Halemano” mountains, all the way to Wahiawa. Moanalua valley gave birth to a particularly mysterious culture. My ancestors were very kapu (forbidden, sacred). These mountain chiefs kept up their kapu as chiefs even though they did not live with the ruling chiefs of the island, but dwelt apart in the mountains. Their ancestors had the kapu as chiefs. My family were of the ancient priesthood of ‘Io or ‘Iolani, the holy spirit of the Kānaka Maoli of Hawai‘i. Early writers failed to record the history of ‘Io or its priesthood for the reason that ancient Maoli Hawaiian considered that name too sacred or too fearsome to utter in the open. The high priests seldom spoke of ‘Io, except in their silent prayers or in their temples.

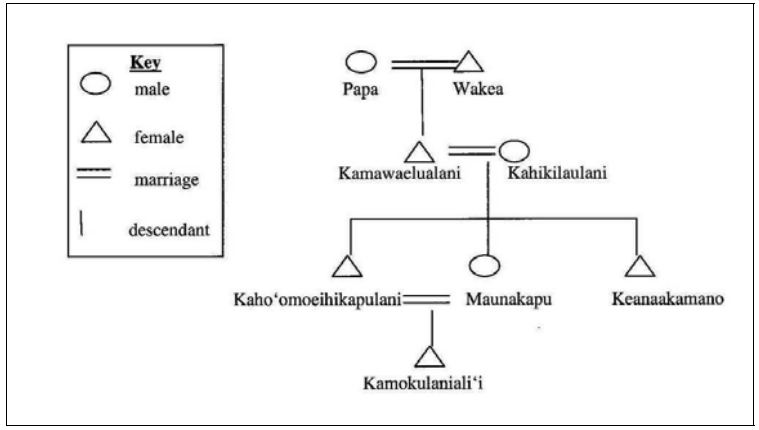

Figure 22. Mr. Akau’s ancestral connection to Moanalua

Gesturing mauka, Mr. Akau remarked, “All those mountains and ridges are my genealogy,” succinctly articulating the inextricable connection he has with the land. Mr. Akau describes how Papa and Wākea (ancestors of the Hawaiian people) produced Kamawaelualani who married Kahikilaulani:

> Kahikilaulani was a princess from Kahiki who sailed up north, searching for the ‘Pali Uli,’ the paradise, sailed along the coast of Kaua‘i, noticed it was not there. She then sailed to O‘ahu along the Keei channel. There she noticed the blue black mountains of Pali Uli, the paradise. She asked the guardian shark, Makali‘i, for permission to enter its channel. The alters of Pali Uli stood up high upon her approach to Kamananui at the beginning of the valley. This hill top area was known as the most exalted place in Moanalua. She continued to sail to the back of the valley and stopped at Kulanaahane and presented her future husband, Kamawaelualani, a gift: an ‘ō‘ō bird (honey creeper) [*Moho nobilis*] perched on a branch of an ‘ōhi‘a lehua tree [*Metrosideros* spp.] with its bottom wrapped in earth.

Kahikilaulani became the first ancestor of Moanalua. Together with Kamawaelualani, she produced three children: Kaho‘omoeihikapulani, Maunakapu, and Keanaakamano. Kaho‘omoeihikapulani and Maunakapu (pi‘o [Marriage of full brother and sister of nī‘aupi‘o rank, presumably the highest possible rank]) gave birth to a son named Kamokulaniali‘i, which is Mr. Akau’s ancestor and the name of Moanalua Valley Park today.

> At Panae, in Kamananui, is where the first prayers were sent up to ‘Io (the divine) by Kamokulaniali‘i. A mo‘o (lizard, water spirit, enchanter) wahine (woman) came down from the heavens to teach him the true meaning of prayer, for the spirit. These prayers belong only to “the house”…These prayers were left with Malia.

Malia Halemano Kau (or Kauloaiwi) is Mr. Akau’s late paternal great-grandmother and she was an oli kapu kumu (chanter of forbidden or sacred chants):

> Kumu hula in her time came to Moanalua to learn the sacred chants (oli kapu) from Malia. Malia’s parents were Halemano Kapahikauao Kamehameha (k) [kāne, or father] and Luka Halemano (w) [wahine, or mother]. Malia was left with all teachings. Halemano’s sisters Nohoano nui, Nohoano Liilii, Loka and Namakahelu were Malia’s teachers, but it was Namakahelu, who was her last kumu until her aunty passed in 1940. There are also ones that need to be mentioned, too, who were great masters in hula/lua, before Halemano’s time: Paakaula, Pililua, Kahoohuli, Kapahi, Kamakookaaina, Ua, Pumali, Hoohipa, Kahawaii, Hamanalau and others, who were of the Moanalua schools…Admiral Chester Nimitz visited Malia at Moanalua. He often sent a car to pick her up to bless the Navy fleet when they were at Pu‘uloa harbor.

“Many of O‘ahu’s ruling chiefs, up to the time of Kamehameha, rest high up in these mountains of Kamananui and Kamanaiki.” These ridge tops are named after Mr. Akau’s ancestors. For example, Maunakapu, Keanaakamano (the cave made by a shark), which is a middle ridge; Hoomoeihikapulani (sacred ones lay resting from the heavens) ridge top; and

Kamokulaniali‘i (resting place of the sacred chiefs) is where his ancestors came to experience the spiritual aspects of prayer. Kamananui Valley was known as a place where high kāhuna (priests) came to have their ancient prayers.

Since Mr. Akau had shown CSH the photograph of the eye in the cloud formation, CSH asked him about the mo‘olelo of the flying eye (see 3.4.2 for a description from Sterling and Summers 1978). He laughed with recognition, saying that although he interpreted the eye to mean his ancestors are watching over him, he did know the story of Namakalele (flying eye). “My grandfather’s mother’s name was Namakalele. She was named after her ancestor, Namakalele. Her husband, Keawe, later found out about her secret.” She would stay home and her eyes would return a bountiful catch, which astounded her husband. When her husband returned home at the end of the day, he was always surprised and could not imagine how she did it. One day he came home early and caught her eye flying as it was returning to her. He caught it and never returned it. She was blind from then onward.

Mr. Akau explained that the mo’olelo of Moanalua as he knows them have not really been recorded in depth. He attributes his knowledge of the area to his grandparents who shared their mana‘o with him, explaining that there has never been a book written about the place. He emphasizes, “everything about Hawai‘i is very sensitive. It is so beyond historical into spiritual aspects.” He sees the entire landscape as a spiritual and genealogical landscape, one that requires adhering to Hawaiian protocols to keep things in balance.

When Mr. Akau was 22 years of age, his father and his uncle took him and his cousins deep into Kamananui Valley for the first time. It was then that he first recalls feeling intensely connected to the place and noticing how his life started to change. In 1994 he began caring for the Pu‘u o Ma‘o cemetery where his ancestors are buried. (It is located above Moanalua Gardens.) Soon after that, he was compelled and encouraged to apply to study with Papa Henry Auwae, the legendary po‘okela (grand master) lā‘au lapa‘au of the Big Island. Mr. Akau trained as a haumāna (student, apprentice) of Papa Henry from 1996 to 2000, until he passed away. The training Mr. Akau received from Papa Henry was life changing, but his spiritual journey and growth did not end with Papa Henry’s passing. “I’ve learned a lot, and things also come to me in my dreams.” He practices his healing with patients and also shares his knowledge with third year students at University of Hawai‘I, John A. Burns Medical School.

> I am so blessed and fortunate throughout these 17 years, many of my grand aunts/uncles before their passing have shared the mo‘olelo of Moanalua. And even my aunts/uncles who are now in their 70s and 80s, also, have shared with me, too, the mo‘olelo. Often most would say I am the chosen one to receive all this and many of them gave me their blessings, even my dad. A lot of “weight,” besides other things! My ancestors are my constant source of strength. Not too often they come in my dreams but, I know I’m being guided/protected. The experience has been so overwhelming after all these years.

Figure 23 Pu‘u o Ma‘o cemetery (CSH June 2011)

Gathering

“I’m not the healer, I’m just the instrument. The power comes from God, my ancestors, and the lā‘au (plants),” Mr. Akau humbly explains. “Healing is 80% spiritual and 20% medicines. You gotta be right with yourself [to have healing power].” Referencing Traditional and Customary rights law (regarding public property and undeveloped land) 12.7, he describes how, as a practitioner, he has the right to collect his medicines on public and undeveloped property. [Mr. Akau was referring to “Section 7. The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights (Hawaii State Legislature 2007)”.] There are cultural protocols for collecting medicines that he is obliged to follow. For example, times of day and moon cycles influence collection times.

He primarily collects on the outer islands because things are less available and more polluted here on O‘ahu. He often collects medicines on Kaua‘i and Maui, but also collects on the Big

Island, as far as Mauna Kea and Mauna Loa. Here on O‘ahu, he regularly collects in Kamananui Valley, where he “follows in his ancestors’ footsteps.” He decides where to collect based on where he is when he needs the plants and based on the origin of the person who needs the plants. Although all the plants he collects from Kamananui valley can also be found elsewhere, the plants he collects there are special because he is connected to the place and plants. As he guided CSH through Kamananui Valley, he pointed out a number of medicinal plants, both exotic and endemic. For example, an endemic tree with fragrant anise-scented leaves that Mr. Akau pointed out is mokihana (*Melicope oahuensis*). He talked about its medicinal value and a number of species in the genus are also valued for hula and lei.

Past Land Uses

Mr. Akau says that Moanalua had the largest fishponds on O‘ahu. The most significant were Lelepaua, which was about 350 acres and was just mauka of the current fire and police stations, and Kaihikapumanuia, which was smaller. “There are a lot of sacred things there,” he explains. In the 1400s and 1500s he says the fishponds were created and they had underground connections to Pu‘uloa. Each pond had a guardian puhi (eel). His family guarded the caves in the area. There were many heiau, about every 1000 feet, along the coast and special people who lived in the area who were the caretakers of these places.

Mauka-Makai Connections

Mr. Akau explains that Kamananui is the “valley of the supernatural” and is the larger valley and Kamanaiki is the smaller valley of Moanalua Ahupua‘a. Mr. Akau describes Pu‘uloa as a supernatural site that kept the area in balance. In other words, the entire ahupua‘a of Moanalua, from the ridge tops to the ocean waters is connected both through supernatural and physical attributes. These connections are illustrated by, for example Kamananui valley’s petroglyph rock and meditation stones and the shark pond and channels. Following in the footsteps of his ancestors, Mr. Akau maintains connections to, and continues to visit, these places. He took CSH to view the petroglyphs on Pōhaku Luahine and explained that the figures depicted relate a supernatural story. He also continues to meditate at the sacred stones of his ancestors. Mr. Akau also describes how there were sharks that had relationships with this valley and with his ancestors. Specifically, there are shark ponds in the back of the valley that are linked through channels connected to Pu‘uloa, Alia Pa‘akai, and Kamananui’s shark pond. Mr. Akau’s third great grand uncle was known as Kimona the Shark Man of Moanalua. He bore the mark of a manō (shark) on his back and he had close relationships to the sharks. Kimona used to ride a shark named Makali‘i who lived in Ke‘ehi (near the airport) and his domain was from Waianae to Maunalua Bay in Hawai‘i Kai. Mr. Akau took CSH to view a shark pond and talked about how the area has changed over time, with rocks shifting and areas caving in. When we arrived, the pool was blue and clean. Mr. Akau wasted no time in taking a refreshing swim in the revitalizing waters. “Many families at Moanalua were of the manō house. Many of them had the marks, the birthmark of a shark, on their bodies!” he exclaims.

Beyond Kamananui and Kamanaiki valleys of Moanalua lies Kahauiki. Mr. Akau elaborates:

> Kahauiki, which lies beside Kamanaiki from mauka to makai, is the other 3rd of the ahupua‘a besides Kamananui and Kamanaiki that had some importance. In ancient times this was where the Makahiki [ancient festival beginning about the middle of October and lasting about four months, with sports and religious festivities and taboo on war] events took place yearly. The schools of cultural arts were situated here, an important landmark. The Pu‘ukapu heiau was here. This is where during Kamehameha’s invasion of O‘ahu, the King of O‘ahu, Kalanikūpule, was captured and killed at Waipi‘o and his body was brought to Pu‘ukapu, prepared and taken Mauka. In 1906, most of Kahauiki was turned over to the U.S. military for the development of Fort Shafter. And in 1957, [a smaller portion of] Kahauiki was opened for the development of fee-simple housing.

Mr. Akau is currently working with Moanalua Gardens Foundation and the Department of Land and Natural Resources (DLNR) in developing a cultural trail in Moanalua Valley with the placement of interpretive signs. He says Moanalua was one of the richest ahupua‘a and Kamananui is the “only pristine valley left that is not developed.” He attributes this to it being under one family for 124 years (the Damon family). “I get to give birth to this place again,” he says, explaining his intentions for sharing his knowledge of the valley. “This is going to be my classroom.”

Recommendations

Mr. Akau believes that there is balance in this life and if protocols are not followed, there are consequences. As he talked with CSH, a group of elementary school students from Kamehameha Schools under the pavilion at Moanalua Valley Park was chanting in Hawaiian and asking for permission to enter the valley. Mr. Akau smiled and nodded as he continued to emphasize the importance of following protocol.

1. Protocol is of upmost importance to Mr. Akau. He stresses the need for the fire station to do some appeasement because of the spirits of the land. Even though the area is already developed and on the surface, no cultural resources may be disturbed, he explains that what matters is under the surface, what existed there before the current fire station and other development occurred. The area is ancient and under the surface are portals that connect it to other areas, including Pu‘uloa.
2. Be patient; do not rush the Project.
3. Be balanced.

5.4 George Downing

CSH talked with Mr. George Downing on June 6, 2011 via telephone. Mr. Downing, has a remarkable career as a renowned surfer, big wave rider, and board shaper. He is also the recipient of a Lifetime Achievement Award from the John Kelly Awards granted by the Surfrider Foundation. SHPD referred CSH to Mr. Downing. He stressed his concern for the marine environment of Moanalua. Mr. Downing is especially concerned about commercial jet ski activities because they disturb fishing and should be restricted to areas beyond the reef. Mr. Downing explained that although Moanalua always had an abundance of fish—citing examples of ō‘io (bonefish) and mullet, this has changed. He also noted the area was famous for its fishponds. Although the Project area is inland, he says, “it’s all connected” and so creating more pollution through development and construction can trickle down into the shore lines. He

encourages the city and state to be aware of and responsible for maintaining the integrity of these marine environments for the long term.

5.5 Ishmael Stagner

Dr. Ishmael W. Stagner II was interviewed by CSH at Windward Community College on March 17, 2011. He was born in Wahiawā on the island of O‘ahu and was raised in Pearl City and Lā‘ie. He was born in June of 1939 and is the son of Panzi Ka‘ula Lehua Akona Stagner and Ishmael Stagner Sr. His mother was a hula dancer; she entertained with Lena Mechado, John Almeida, Alice Namakelua and many others. She also was a clerk for E.O. Hall & Sons, a subsidiary of Theo H. Davies [one of the Big Five trading and agricultural companies in the Territory of Hawaii]. She later became a hula instructor and then a kumu hula which she practiced until her passing. His father was a postal carrier for the U.S.S. Arizona. He was on the ship the evening of December 6, 1941 and was scheduled to pick up the dispatches the morning of December 7. Dr. Stagner was two years old during the bombing of Pearl Harbor by the Japanese Army (December 7, 1941). His house was scraped by the planes and his street bombed. A few of the children in his neighborhood were also killed. As a result his family moved to Lā‘ie with some relatives during this time and after the second attack occurred in March of the next year they decided to stay in Lā‘ie on a semi-permanent basis.

Connections to land

Dr. Stagner later moved back to Pearl City with his family and attended Kaloaloa Elementary which is no longer in existence. “Kaloaloa is the area where this place [Project Area] is located, which is right where the airport is today. It is called Kaloaloa because the area is so flat.” [According to Soehren (2010) Kaloaloa means “the elongated garden plot, as for sweet potatoes.] He recalls that prior to the 1950s the majority of this area had been used for military housing, civilian housing and what was known as Damon Tract. Damon Tract was located just makai of the Project Area, it was called by this name because the Damon family owned the ahupua‘a of Moanalua. This land was given to them by Bernice Pauahi Bishop Estate. Unfortunately, during the development of Moanalua Ahupua‘a, the cultural areas were not preserved, “they [military, developers] simply destroyed everything that they needed to in order to build houses.” This area is now the current airport and freeway which was built in the later part of the 1950s. Many of the people who resided there relocated to the Wai‘anae Coast and Kalama Valley.

Gathering

Access to this area was severely limited due to the saturation of U.S. Military infrastructure, including, houses, storage facilities, depots etc. There were fences that restricted access and signs that deterred entrance. Dr. Stagner recalls signs that said “Private, Kapu”; his friends would joke about who this important Hawaiian was, “Private Kapu, he must be really rich!” He recalls being restricted from entering many of the places in this area when he was growing up.

Moanalua was famous for its limu (seaweed), especially līpoa (*Dictyopteris plagiogramma*) and kohu. The gathering of limu continued up until the 1960s prior to the building of the seaplane runway. Some of the sea life that Dr. Stagner remembers growing up with was pāpio (juvenile *Caranx sexfasciatus*), manini (*Acanthurus triostegus*), oysters (*Ostreidae* spp.), mullet (*Mugil cephalus*) and others. He recalls finding momi (pearls) in the oysters. These oysters are

no longer found in this area and the fish that were in abundance during his time may still be there but cannot be harvested. Environmental pollution, including that from industry and the waste water treatment center, make them undesirable.

Past Land Uses

Many of the mo‘olelo about this area were told to Dr. Stagner when he was a young boy by his kūpuna. He remembers their stories of the fishing grounds in the area, the use of Kaloaloa as a battle field and Makahiki grounds, and the place where members of the Kamehameha line once lived. According to Dr. Stagner, both Kamehameha IV Liholiho and Kamehameha V Lot Kapuaiwa lived in Moanalua Mauka. This is why you have Moanalua Gardens and the hula pā (hula platform) that is there today.

The makai area was called Kaloaloa because it was a large open flat area. It is connected in name and function to nearby Kalaeloa. This area was often used as a battle field in ancient times. Warriors from Kaua‘i and other islands would land in this area and prepare for battle. The battles would often start here and then go up into Pearl City and West Loch. Because of this, Dr. Stagner believes there are many burials in this area and has heard many stories about night marchers.

Kaloaloa was also used during the Makahiki season, which is the time of the year dedicated to Lono the god of agriculture. During these four months it was a time of peace, a time to harvest the crops and to play Makahiki games. War was restricted and procreation was the focus. “The fertility of the land was celebrated, but also the fertility of women was celebrated.” Fertility ceremonies were held at Moku‘ume‘ume (Ford Island) during certain moon phases, especially for women of royal bloodlines. Many of the chiefs were born in Moanalua because of the birthing stones in the Valley. Although the birthing areas at Kukaniloko are famous on this island, there were also birthing stones used in Moanalua. Because of the significance of the birthing stones, heiau and other cultural sites in this area, Dr. Stagner was involved in protesting the use of this valley for the H-3 Interstate Highway development which went through Hālawa Valley instead.

Pu‘uloa and Ke‘ehi were also major fishing areas with numerous ko‘a (fishing shrines). These bodies of water are also an impetus for the name Moanalua which means “two waters.” There were large populations that lived mauka and would come down to the ocean to gather and fish and then return mauka. There is also a known luakini heiau in the makai area that was dedicated to the Hawaiian god Kū.

Underground Waterways

There were underground waterways that connected the windward side of the island to the leeward side. Many of these tunnels and waterways were destroyed by the U.S. Military as a result of developmental expedience. O.A. Bushnell, talks about these waterways in his book Ka‘a‘awa, which is based on oral accounts of this knowledge. Today they are used mainly as storage housing for U.S. Military purposes. Dr. Stagner feels that most of these areas are not well known to the general public except for Red Hill, which was used for the storage of large gas tanks. He also feels that it is possible some of them may be known today, although he personally does not have knowledge of existing waterways in use.

Recommendations

Dr. Stagner recommends that the Honolulu Fire Department hold Makahiki Games in this area annually during the Makahiki season. This would perpetuate traditional land-use and cultural education.

Section 6 Cultural Landscape of Project Area

Discussions of specific aspects of traditional Hawaiian culture as they may relate to the Project area and vicinity are presented below. This section integrates information from Sections 3–5 in order to examine cultural resources and practices identified within or in proximity to the Project in the broader context of the encompassing landscape of Moanalua Ahupua‘a.

6.1 Settlement and Habitation

Moanalua was probably settled between 766-1126 A.D. as it would have been appealing to early settlers of O‘ahu with its flowing streams and springs, habitable cave shelters, and protected offshore waters (Ayers 1971:51). Moanalua’s great expanse of level land and reef at the sea were productive for the cultivation and gathering of both plants and fish. According to Luomala (1973:28) Moanalua’s abundant food and diverse flora made it a prize for conquering chiefs of O‘ahu, Maui, and Hawai‘i.

Compared to other areas in Kona District, Moanalua’s upper valley is rich with endemic, indigenous, and Polynesian introduced plants. The lower part of the valley, which had been favored for occupation, was rich with cultivated plants and fish. Moanalua’s valleys, Kamananui and Kamanaiki, were known for the cultivation of taro, coconut, breadfruit, wauke for tapa, and uhi (Handy and Handy 1972:474).

According to Mokumaia’s 1922 article in Kū‘oko‘a, “It is said that this valley, Kamana-iki, had many inhabitants. It is the truth for the stones are still standing there, the coconuts are growing and the trail remains. It seemed that they gained a livelihood by farming” (Sterling and Summers 1978:334). Though the uplands are thought to have been well inhabited and cultivated into the 18th century, the epidemics that followed after Cook’s arrival decreased populations and habitation became concentrated in the lowlands (Luomala 1973:6-7). Similarly, archaeological sites recall and document past subsistence and settlement patterns of the ahupua‘a. Luomala described how archaeologists’ explorations in Moanalua Valley “found sufficient archaeological remains to conclude that large upland settlements once existed with an economy that had shifted from swidden farming to more permanent terraced fields, with fish from protected ponds and wild plants from the higher uplands for raw material and additional food” (1973:6-7). Later these taro lo‘i were converted for rice cultivation.

In the lowlands, productive salt ponds and fish ponds provided other important contributions to subsistence and livelihoods. In 1930 J. Gilbert McAllister of the Bishop Museum explored Moanalua and documented Āliapa‘akai (Salt Lake) and five fishponds. These fishponds, controlled by the ali‘i, greatly increased the productivity of the area and can be seen as evidence of a thriving chiefly class in the ahupua‘a.

6.2 Cultivation, Fishing, and Gathering

Community members who were consulted for this Project also emphasize the importance of fish in the Ahupua‘a. Traditionally, Moanalua was known for its “bounty of fishing – both offshore and in the former fishponds…Certainly, food production whether by fishing or gathering would have been an important part of the culture therein,” as described by Ms. Phyllis

Cayan of SHPD in a letter dated April 12, 2011. Dr. Hughes wrote, “I know that prior to the US Navy taking over Pearl Harbor that there were very large fish ponds in the entire area. Many of these fish ponds belonged to the ali‘i.” Mr. Akau explained that in the 1400s and 1500s the largest fishponds on O‘ahu were created in Moanalua. The most significant were Lelepaua, which was about 350 acres and was just mauka of the current fire and police stations, and Kaihikapu, which was smaller. Dr. Stagner also related mo‘olelo from his kūpuna about the rich marine resources of Moanalua. He remembers it was famous for its limu, especially līpoa and kohu, which were gathered until the 1960s prior to the building of the seaplane runway. Some of the sea life that Dr. Stagner remembers from living in Moanalua include: pāpio, manini, mullet, and oysters –some even had momi. Mr. Damon notes that Lelepaua was being filled in by 1900. In 1910 Salt Lake (Āliamanu) was filled with water by S.M. Damon and the McCandless brothers in order to create a mullet pond, and it is now the site of the Honolulu Country Club, according to Mr. Damon. These once abundant marine resources are no longer available because of habitat loss and degradation, and environmental pollution, according to community participants.

In terms of terrestrial plant gathering, Mr. Akau, a lā’au lapa‘au practitioner trained by Papa Henry Auwae, primarily collects on the outer islands because he says things are less available and more polluted here on O‘ahu. On O‘ahu, he regularly collects in Kamananui Valley, where he “follows in his ancestors’ footsteps.” Although all the plants he collects from Kamananui valley can also be found elsewhere, the plants he collects there are special because he is connected to the place and plants.

Amidst the invasive *Lantana camera, Clidemia hirta, and Psidium cattleianum* CSH also observed valley riches such as mountain apples (*Syzygium malaccense*) and mangos (*Mangifera indica*), which are likely still gathered today by community members.

Kamanaiki Valley basin was used in the early and mid-nineteenth century for cattle ranching and subsequently, that area was used for sugarcane cultivation by the Honolulu Sugar Company.

6.3 Trails

John Papa ‘Ī‘ī described a trail that connected ‘Ewa to the Kona district and passed through the valley of Moanalua. Mr. Akau suggests that it may have been used for salt transport because of its proximity to the salt ponds (Āliapa‘akai). The trail went near Iemi spring, which is now capped, but was used for irrigating taro lo‘i and it was also enjoyed by travelers on the trail from ‘Ewa. According to Mokumaia in 1922, “When those of ‘Ewa came, women carried bundles containing tapas and mats woven from bulrushes…rested beside Iemi spring. There they drank water till their thirst was quenched and then proceeded along to the stream close to a hill, called Keakua-wailele close to the coconut grove of Lapakea” (Sterling and Summers 1978:332). Referencing a 1884 Monsarrat working map that once hung “on the wall at the S.M. Damon Estate offices,” Mr. Damon notes, “ a marked trail several hundred feet to the ‘Ewa side of the Thurston Fire Station which used to run from the Hālawa area down to the fish ponds directly makai of the fire station.”

6.4 Storied Landscape

According to Dr. Stagner, the makai area of Moanalua was called Kaloaloa because it was a large open flat area. It is connected in name and function to nearby Kalaeloa, which was often used as a battle field in ancient times and it was also used during the Makahiki season, which was mentioned by both Dr. Stagner and Mr. Akau.

Describing the fishpond area of the lowlands, Mr. Akau explains “There are a lot of sacred things there.” The fishponds had underground connections to Pu‘uloa had each one had a guardian puhi. Mr. Akau describes Pu‘uloa as a supernatural site that kept the area in balance. His family guarded the caves in the area. He says that there were many heiau, about every 1000 feet, along the coast and special people who lived in the area who were the caretakers of these places. Similarly, Dr. Stagner identifies Pu‘uloa and Ke‘ehi as major fishing areas with numerous ko‘a. He says there were large populations that lived mauka who would come down to the ocean to gather and fish and then return mauka.

Dr. Stagner also referred to underground waterways that connected the windward side of the island to the leeward side. Many of these tunnels and waterways were destroyed by the U.S. Military as a result of developmental expedience. Today they are used mainly as storage housing for U.S. Military purposes. Dr. Stagner believes that most of these areas are not well known to the general public. Mr. Akau is also aware of these underground connections and he described how they traverse from the fishponds to Pu‘uloa, to Alia Pa‘akai, and Kamananui’s shark pond, Keanaakamano, in the back of Kamananui Valley.

The creation of Āliapa‘akai and the nearby adjacent Āliamanu Crater are associated with the goddess Pele who settled for a time in Moanalua in her search for a home. Āliapa‘akai also provided salt which was harvested for export and supported a thriving commercial trade up to the nineteenth century.

The cultural significance of Moanalua valley is further evidenced by petroglyphs and heiau. Kamananui has multiple known petroglyph stones. One of the most well-known is Pōhaku ka luahine, which is still near the trail and stream crossing in Moanalua valley. Mr. Akau took CSH to view Pōhaku ka luahine and explained that it relates a supernatural story. The other well-known petroglyph from Moanalua was originally found near Pu‘u o Ma‘o, and is now at the Bishop Museum. It is unique in that it has raised rather than incised figures (Stokes 1908, cited in Barrère 1971:60). In addition to these significant features, McAllister (1933) also recorded include four heiau: Wakaina, Paliuli, Koaloa, and an unnamed "probable" heiau.

Mr. Akau told CSH the story of the journey to Pali Uli by Kahikilaulani, who he describes as a princess from Kahiki that became the first ancestor of Moanalua. She sailed north, “searching for the Pali Uli, the paradise” which she found as she sailed along the Ke‘ehi channel. “There she noticed the blue black mountains of Pali Uli, the paradise. She asked the guardian shark, Makali‘i, for permission to enter its channel. The alters of Pali Uli stood up high upon her approach to Kamananui at the beginning of the valley. This hill top area was known as the most exalted place in Moanalua.”

Kamananui Valley is home to a legendary ancestor of Moanalua, a shark-man who dwelled at Keanaakamano (cave of the shark man). Based on Gertrude Damon’s notebooks, Barrère says

that the Moanalua shark-man lived in a cave at Manō which is “on the ‘Ewa side of the middle ridge that divides the upper waters at the head of the valley” in a cave that was washed out by floods. Mr. Akau’s third great grand uncle was known as Kimona the Shark Man of Moanalua. He used to ride a shark named Makali‘i who lived in Ke‘ehi and roamed waters from Waianae to Maunalua Bay in Hawai‘i Kai.

Today, more contemporary (i.e., not ancient) cultural sites exist and are preserved at Moanalua Gardens as described by Mr. Damon. These include Kamehameha V’s cottage (built in 1853), Chinese Hall (built by 1905), and Moanalua Gardens themselves.

Figure 24. Lot Kamehameha's cottage, now at Moanalua Gardens (CSH May, 2011)

Burials

There is no documented evidence from archaeological surveys, historical records or oral traditions of ilina, burial caves or iwi kūpuna within the Project area. Based on community consultation and archaeological research (e.g., Anderson and Bouthillier 1996; Hammatt and Shideler 2011; Jourdane and Dye 2006), there are no burials expected to be found in the Project area. Mr. Damon concludes his statement by saying, “This is not to say that some artifacts won‘t be dug up, as the area was in the vicinity of fish ponds and salt pans. But it is likely that the soil there had been plowed more than 100 years ago.”

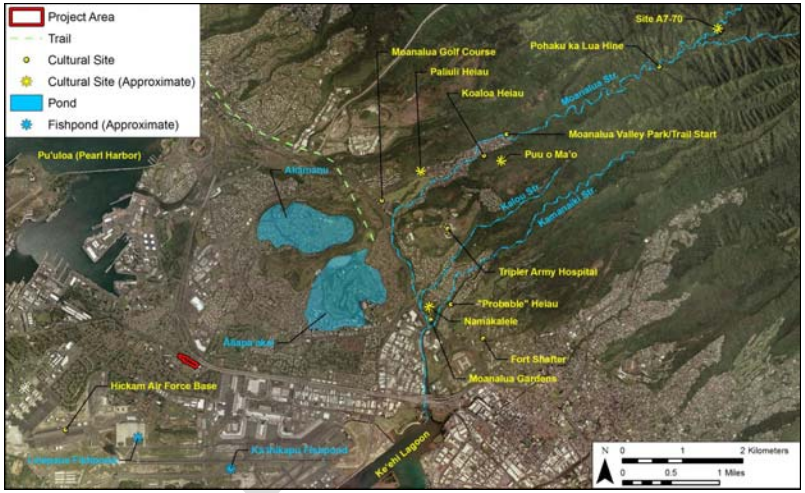

Figure 25. Cultural Landscape Map

Section 7 Summary and Recommendations

CSH undertook this CIA at the request of Group 70 International, Inc.. The cultural survey broadly included the entire ahupua‘a of Moanalua including the following specific parcel: TMK: [1] 1-1-002:012

7.1 Results of Background Research

1. Moanalua is an ahupua‘a rich in natural and cultural resources and has been favored by Hawaiian ali‘i (chiefs) and revered valley chiefs. The ahupua‘a has protected offshore waters, flowing streams and springs, and habitable cave shelters, which made it attractive to early settlers. The upland valleys, Kamananui and Kamanaiki, are known for their endemic flora and their culturally significant features.
2. Although there is evidence that the uplands were occupied initially, the lower valleys were the focus for occupation. In the lower valleys taro, coconut, banana, breadfruit, and bark cloth were traditionally cultivated. The lowlands are also known for their extensive fishponds and salt ponds, which produced important resources. At the time of the Mahele (Land Division) at mid-nineteenth century, activity was based in the lowlands, which were used for wetland taro farming or lo‘i; house lots or pā hale; kula or dry land agriculture; loko or fishponds; and ‘auwai also known as irrigation ditches. Wetland taro fields made up 88% of the Land Commission Award (LCA) parcels and 84% of the acreage (Rigler 1990:110). No commoner land commission awards are known in the vicinity of the present Project area. It was common for the aristocracy and/or their konohiki (overseers) to retain fishponds and unique cultural resources such as the coastline at the mouth of Pu‘uloa (Pearl Harbor).
3. Taro fields were converted to rice cultivation; and by the end of the Nineteenth Century land use in other areas shifted to ranching and sugar plantations. A map of the Honolulu Plantation Company lands circa 1930 (Figure 15) indicates that the entire Project area was in commercial sugar cane fields.
4. The development of infrastructure and facilities for military and industrial use were significant factors in the transformation in Moanalua in the twentieth century with, for example, Rogers Airport, Pearl Harbor, Hickam Air Force Base, Tripler Army Hospital, and Fort Shafter.
5. In terms of cultural resources, Moanalua has had at least four documented heiau (temples), not all are intact; four petroglyph stones; and five fishponds. Other important wahi pana (storied places) include the house of bones, Keanaakamano (cave of the shark man), and Namakalele a place known for the “flying eyes” of the woman who once lived there.
6. The ahupua‘a was first held by ancient valley chiefs, then seized by Maui chiefs, and later seized by Kamehameha of Hawai‘i Island. He divided it between two uncles. One died in 1880, and passed it onto his son, Hoapili. When the other died in 1884, the land reverted back to Kamehameha and his wife Ka‘ahumanu. In 1839 Hoapili leased land to

the first foreigner, Captain William Sumner who, under the Mahele, was one of two major awardees. The other major awardee was Lot Kamehameha (who was Hoapili’s heir). Princess Ruth inherited Moanalua from Lot Kamehameha in 1872 and then Princess Pauahi Bishop inherited it from her. In 1883, Princess Pauahi bequeathed Moanalua Ahupua‘a to Samuel Mills Damon. The Damon estate included Moanalua and also spanned throughout the Hawaiian Islands. Samuel Mills Damon developed Moanalua for residential, agricultural, and industrial use. A relatively smaller portion of it was preserved as what is now known as Moanalua Gardens and there is also conservation land (under the Department of Land and Natural Resources) in the back of the valley. Beginning in the 1800s, the United States (US) began acquiring (through land condemnation) portions of the Damon Estate in Moanalua and developing it for military purposes. The current Project area was once Navy land but is now under the Hawaii Fire Department.

7. The Project area is in an indicated zone of “low” probability of archaeological and cultural resources, based on Anderson and Bouthillier (1996) and Hammatt and Shideler (2011).

7.2 Results of Community Consultation

CSH attempted to contact 32 community members and government agency and community organization representatives. Of the 15 people that responded, four kūpuna (elders) and/or kama‘āina (Native-born) participated in formal interviews for more in-depth contributions to the CIA.

This community consultation indicates:

1. Mo‘olelo (oral traditions) indicate that Moanalua is a place with deep ancestral and historical significance for community participants. They unanimously describe Moanalua as a special place with a richness of natural, cultural, and spiritual resources. Mr. Roddy Akau describes Moanalua as one of the richest ahupua‘a on O‘ahu.
2. According to oral and written history, Moanalua was revered by some of the earliest Polynesians, by mountain chiefs, and later by Hawaiian ali‘i. Mr. Akau describes how Papa and Wākea (ancestors of the Hawaiian people) produced Kamawaelualani who married Kahikilaulani, a princess from Kahiki. Her search for the Pali Uli (translated as a “paradise” by Mr. Akau), brought her to Kamananui, to “a hill top area [that] was known as the most exalted place in Moanalua. She continued to sail to the back of the valley and stopped at Kulanaahane and presented her future husband, Kamawaelualani, a gift: an ‘ō‘ō bird (honey creeper) perched on a branch of an ‘ōhi‘a lehua tree with its bottom wrapped in earth.” Their unity produced ancient valley chiefs. Mr. Akau and Mr. Dwight Damon note the association of Moanalua with the Kamehameha line. Mr. Akau’s connection is personal as his family name is Kapahi‘kaua o Kamehameha, “the battle sword of Kamehameha” and derives from his fourth great grandfather who was born in 1795 during Kamehameha’s battle with Kalanikūpule (then King of O‘ahu). As Kamehameha’s troops were battling below Moanalua Valley and he rested at a sacred

spring, he learned of a baby born of Kamananui valley chiefs. He went to see the baby and gifted him with his sword; thus the family name Kapahi‘kaua o Kamehameha. Mr. Damon relates how Kamehameha the Great “came to Moanalua after consolidating the islands…The history of Moanalua and the Kamehameha line is this: King Kamehameha the Great gave the ahupua‘a to Kame‘eiamoku who gave it to his son Hoapili who made Prince Lot (later Kamehameha V) his future heir, who willed it to Princess Ruth, who willed it to Princess Bernice Pauahi in May 1883. In October, 1884, Mrs. Bishop willed the ahupua‘a of Moanalua to her friend, S.M. Damon [Samuel Mills Damon].”

3. All community consultants described the fishponds and fisheries of Moanalua as an incredible resource of the past. In a letter dated April 12, 2011, Ms. Phyllis Cayan of SHPD commented, “This area was part of O‘ahu’s bounty of fishing – both offshore and in the former fishpond…Certainly, food production whether by fishing or gathering would have been an important part of the culture therein.” Mr. George Downing explains that Moanalua had an abundance of fish – citing examples of ō‘io (bonefish) (see Appendix B Common and Scientific Names for Plants and Animals Mentioned by Community Consultants) and mullet. Dr. Ishmael Stagner relates mo‘olelo from his kūpuna about the rich marine resources of Moanalua such as limu līpoa and limu kohu (species of seaweeds), which were gathered until the 1960s prior to the building of the seaplane runway. Growing up he also remembers: pāpio (juvenile big eye jack), manini (convict tang), mullet, and oysters–even some with momi (pearls). Mr. Akau says that in the 1400s and 1500s the largest fishponds on O‘ahu were created in Moanalua. He identifies the most significant as Lelepaua, which was about 350 acres and was just mauka (inland, mountain) of the current fire and police stations, and Kaihikapu, which was smaller but also near the Project area. Mr. Damon notes that Lelepaua is “mentioned in a Moanalua place-name chant named ‘Kahikilaulani ka Makani’” and in Gertrude Damon’s unpublished notebooks that recorded ethnographic information on Moanalua. Mr. Damon notes that Lelepaua was being filled in by 1900. In 1910 Salt Lake (Āliamanu) was filled with water by S.M. Damon and the McCandless brothers in order to create a mullet pond, and it is now the site of the Honolulu Country Club, according to Mr. Damon.
4. Mr. Damon describes changing land use of the area noting that in the mid to late 1800s, the lowlands of Moanalua, specifically the “basin of Kamananui Valley” were used for cattle ranching by William Sumner and J.I. Dowsett. By the late 1800s Mr. S.M. Damon took over these leases, and leased to the Honolulu Plantation Company who cultivated sugar cane in “Āliamanu, Salt Lake and Makalapa areas, which include the area where the Thurston Fire Station is located on Valkenburgh St[reet].” Mr. Damon notes that makai (lowland, ocean) areas of Kaloaloa became known as Damon Tract, “where locals leased residential and farm land from the Damon Estate at what is now a light industrial district and Honolulu International Airport.”
5. Community participants describe numerous cultural sites in Moanalua. In proximity to the Project area are the fishponds and the salt ponds. Mr. Damon suggests that the Project may uncover artifacts “as the area was in the vicinity of fish ponds and salt pans. But it is likely that the soil there had been plowed more than 100 years ago.” Mr. Akau and Dr.

Stagner both describe the use of the flat lands (areas including Kaloaloa or Kahauiki) as Makahiki (ancient festival beginning about the middle of October and lasting about four months, with sports and religious festivities and taboo on war) grounds. Mr. Damon explains that Prince Lot’s (later Kamehameha V) cottage, which was “built to entertain foreign dignitaries,” was originally erected “between the present-day ‘Ōlelo building and Pu‘uloa Road,” and by 1960 was moved to Moanalua Gardens where it still stands. Important ancient sites farther mauka include Pali Uli heiau and Pōhaku Luahine, noted by Mr. Akau.

6. The community consultants who participated in this study do not anticipate direct cultural impacts will result from the proposed Project; however, they have recommendations for proceeding in a culturally and environmentally pono (correct, just) manner: Mr. Stagner recommends that the Honolulu Fire Department hold Makahiki Games in this area annually during the Makahiki season. This would perpetuate traditional land-use and cultural education. Mr. Akau recommends following protocol and offering appeasement to the spirits of the land, which has ancient cultural significance, even though the area is already developed on the surface. Mr. Downing is primarily concerned with the marine environment and says that although the Project area is inland, “it’s all connected” and so creating more pollution through development and construction can also trickle down into the shore lines. He encourages the city and state to be aware of and responsible for maintaining the integrity of these marine environments for the long term.

7.3 Recommendations

Based on the information gathered for the cultural and historic background and community consultation detailed in this CIA report, CSH foresees no potential direct impacts of the proposed Project on Native Hawaiian or other ethnic groups’ cultural practices customarily and traditionally exercised for subsistence, cultural or religious purposes.

1. They are not expected; however, land-disturbing activities may uncover burials or other cultural resources. Although previous archaeological surveys in proximity to the Project did not locate any cultural sites, should historic, cultural or burial sites or artifacts be identified during ground disturbance, the Project should immediately cease all work and the appropriate agencies notified pursuant to applicable law.
2. CSH recommends the Project proponents take measures to minimize environmental impacts during construction, taking into account the mauka-makai connections and concerns for the near shore waters.
3. CSH recommends the Project proponents consider the suggestions (detailed above) from community participants.

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Appendix A Glossary

To highlight the various and complex meanings of Hawaiian words, the complete translations from Pukui and Elbert (1986) are used unless otherwise noted. In some cases, alternate translations may resonate stronger with Hawaiians today; these are placed prior to the Pukui and Elbert (1986) translations and marked with “(common).”

Diacritical markings used in the Hawaiian words are the ‘okina and the kahakō. The ‘okina, or glottal stop, is only found between two vowels or at the beginning of a word that starts with a vowel. A break in speech is created between the sounds of the two vowels. The pronunciation of the ‘okina is similar to saying “oh-oh.” The ‘okina is written as a backwards apostrophe. The kahakō is only found above a vowel. It stresses or elongates a vowel sound from one beat to two beats. The kahakō is written as a line above a vowel.

Hawaiian Word	English Translation
ahupua‘a	Land division usually extending from the uplands to the sea, so called because the boundary was marked by a heap (ahu) of stones surmounted by an image of a pig (pua‘a), or because a pig or other tribute was laid on the altar as tax to the chief.
ala hele	Pathway, route, road, way to go, itinerary, trail, highway, means of transportation.
ali‘i	Chief, chiefess, officer, ruler, monarch, peer, headman, noble, aristocrat, king, queen, commander.
‘āpana	Piece, slice, portion, fragment, section, segment, installment, part, land parcel, lot, district, sector, ward, precinct; chop, as of lamb. A kuleana, land division, may consist of several ‘āpana, Cf. *kapa ‘āpana*. Kōmike komo‘āpana, visiting committee, as of a church. (PCP (k)a(a)pana: cf. Marquesan apana.)
‘auwai	Ditch, canal.
heiau	Pre-Christian place of worship, shrine; some heiau were elaborately constructed stone platforms, others simple earth terraces. Many are preserved today.
‘ili	Land section, next in importance to ahupua‘a and usually a subdivision of an ahupua‘a.
ilina	Grave, tomb, sepulcher, cemetery, mausoleum, plot in a cemetery.
iwi kūpuna	Ancestral bone remains (common).
kahuna	Priest, sorcerer, magician, wizard, minister, expert in any profession. Kāhuna—plural of kahuna
kahuna lā‘au lapa‘au	Medicinal plant specialist.
kalana	Division of land smaller than a moku or district; county.

Hawaiian Word	English Translation
kama‘āina	Native-born, one born in a place, host; native plant; acquainted, familiar, Lit., land child.
kapu	Taboo, prohibition; special privilege or exemption from ordinary taboo; sacredness; prohibited, forbidden; sacred, holy, consecrated; no trespassing, keep out.
ko‘a	Shrine, often consisting of circular piles of coral or stone, built along the shore or by ponds or streams, used in ceremonies as to make fish multiply; also built on bird islands, and used in ceremonies to make birds multiply.
konohiki	Headman of an ahupua‘a land division under the chief; land or fishing rights under control of the konohiki; such rights are sometimes called konohiki rights. (PPN tongafiti.)
kuleana	Right, privilege, concern, responsibility, title, business, property, estate, portion, jurisdiction, authority, liability, interest, claim, ownership, tenure, affair, province.
kupuna	Grandparent, ancestor, relative or close friend of the grandparent's generation, grandaunt, granduncle. Kūpuna—plural of kupuna.
limu	n. A general name for all kinds of plants living under water, both fresh and salt, also algae growing in any damp place in the air, as on the ground, on rocks, and on other plants; also mosses, liverworts, lichens.
lo‘i	Irrigated terrace, especially for taro, but also for rice; paddy.
loko i‘a	Fishpond (common).
mahele	Portion, division, section, zone, lot, piece, quota, installment, bureau, department, precinct, category, scene or act in a play; share, as of stocks; measure in music; land division of 1848 (the great mahele); part or organ, as of the body; section or wing (military, see *mokuna*); denominator, in fractions; to divide, apportion, cut into parts, deal.
maka‘āinana	Commoner, populace, people in general; citizen, subject. Cf. lunamaka‘āinana. *Lit.*, people that attend the land. (PNP matakainanga.)
makai	Ocean, lowland.
makahiki	Ancient festival beginning about the middle of October and lasting about four months, with sports and religious festivities and taboo on war
makana	Gift, present.
mana	Supernatural or divine power.
mana‘o	Thought, idea, belief, opinion, theory, thesis, intention, meaning,

Hawaiian Word	English Translation
	suggestion, mind (Mat. 22.37), desire, want; to think, estimate, anticipate, expect (see ex., *lele'oi*), suppose, mediate, deem, consider (not the intellectual process of no'ono'o).
mauka	Mountain, inland.
mele	Song, anthem, or chant of any kind; poem, poetry; to sing, chant.
moku	District, island, islet, section
mo‘olelo	Story, tale, myth, history, tradition, literature, legend, journal, log, yarn, fable, essay, chronicle, record, article; minutes, as of a meeting. (From mo‘o ‘ōlelo, succession of talk; all stories were oral, not written).
nā	Plural definite article. Nā lani, the chiefs.
‘ohana	Family, relative, kin group; related. ‘Ohana holo'oko'a, ‘ohana nui, extended family, clan
‘ōlelo no‘eau	Proverb, wise saying, traditional saying.
oli	Chant that was not danced to, especially with prolonged phrases chanted in one breath, often with a trill at the end of each phrase; to chant thus.
pā hale	House lot, yard, fence.
pōhaku	Rock, stone, mineral, tablet; sinker (see ex., *pīkoi* 3); thunder; rocky, stony
pono	Goodness, uprightness, morality, moral qualities, correct or proper procedure, excellence, well-being, prosperity, welfare, benefit, behalf, equity, sake, true condition or nature, duty; moral, fitting, proper, righteous, right, upright, just, virtuous, fair, beneficial, successful, in perfect order, accurate, correct, eased, relieved; should, ought, must, necessary. Pono ‘ole, unjust, unrighteous, dishonest, unprincipled, unfair, wrong.
tapa (kapa)	Tapa, as made from wauke or māmaki bark; formerly clothes of any kind or bedclothes; quilt
wahi pana	Storied place (common). Legendary place.

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Appendix B Common and Scientific Names for Plants and Animals Mentioned by Community Consultants

Common Names		Possible Scientific Names		Source
Hawaiian	**Other**	**Genus**	**Species**	
limu līpoa	seaweed, algae	*Dictyopteris*	*plagiogramma*	Abbott and Williamson 1974**
limu kohu	seaweed, algae	*Asparagopsis*	*taxiformis*	Abbott and Williamson 1974
manini	convict tang	*Acanthurus*	*triostegus*	Hoover 2003
manō	Shark	Multiple families		
mokihana		*Melicope*	*oahuensis*	University of Hawaii St. John Herbarium
‘ōhi‘a lehua		*Metrosideros*	spp.	Pukui and Elbert 1986
ō‘io	Bonefish	*Albula*	sp.	Hoover 1993
‘ō‘ō	black honey eater	*Moho*	*nobilis*	Pukui and Elbert 1986
pāpio	juvenile bigeye jack	*Caranx*	*sexfasciatus*	Hoover 1993
puhi	eel	Multiple genus		
	mullet	*Mugil*	*cephalus*	Hoover 1993
	oysters	*Ostreidae* spp.		

* spp. = multiple species

**= source for correct Hawaiian Spelling - Pukui and Elbert 1986

Appendix C Authorization and Release

Cultural Surveys Hawai‘i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai‘i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950
Job code:MOANALUA 12 hmcmillen@culturalsurveys.com www.culturalsurveys.com

AUTHORIZATION AND RELEASE FORM

Cultural Surveys Hawai‘i (CSH) appreciates the generosity of the *kūpuna* and *kama‘āina* who are sharing their knowledge of cultural and historic properties, and experiences of past and present cultural practices for the Cultural Impact Assessment for the *ahupua‘a* of Moanalua.

We understand our responsibility in respecting the wishes and concerns of the interviewees participating in our study. Here are the procedures we promise to follow:

1. The interview will not be tape-recorded without your knowledge and explicit permission.
2. If recorded, you will have the opportunity to review the written transcript of our interview with you. At that time you may make any additions, deletions or corrections you wish.
3. If recorded, you will be given a copy of the interview notes for your records.
4. You will be given a copy of this release form for your records.
5. You will be given any photographs taken of you during the interview.

For your protection, we need your written confirmation that:

1. You consent to the use of the complete transcript and/or interview quotes for reports on cultural sites and practices, historic documentation, and/or academic purposes.
2. You agree that the interview shall be made available to the public.
3. If a photograph is taken during the interview, you consent to the photograph being included in any report/s or publication/s generated by this cultural study.
4. If you have been interviewed previously by CHS, you consent for that interview to also be used for this report.

I, _____, agree to the procedures outlined above and, by my
(Please print your name here)
signature, give my consent and release for this interview to be used as specified.

_____
(Signature)

_____
(Date)

Appendix D Community Consultation Letter

Cultural Surveys Hawai'i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai'i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950

Job code: MOANALUA 12 hmcmillen@culturalsurveys.com www.culturalsurveys.com

February 20, 2011

Aloha kāua ,

At the request of Group 70 International, Inc., Cultural Surveys Hawai'i (CSH) is conducting a Cultural Impact Assessment (CIA) for the proposed expansion of the HFD Fire Training Facility Project. The 5.16 acre Project area is located in Moanalua Ahupua'a, Kona District, O'ahu Island (TMK: [1] 1-1-002:012).

The Charles H. Thurston Fire Training Center, is located near the airport on Valkenburgh Street and serves as the primary venue for the training and education of Honolulu's firefighters. The training facility's 5.16-acre property has been conveyed from the Navy to the City. Surrounding uses include military family housing, the Assets School, and Trinity Missionary Baptist Church to the west, Lynch Park to the southwest, Holy Family Catholic Church and Academy to the south, Fleet Reserve Association Branch 46 to the southeast, and Nimitz Highway to the north.

Improvements to the training center will enhance the quality of the HFD's training program and will create a modern and well-equipped training environment for new recruits, as well as new facilities for incumbent fire fighters. With the proposed improvements the facility will become a Regional Training Center, providing critical training to firefighters from locations throughout the Pacific.

The existing training center includes classrooms and administrative offices, an inoperable burn model training tower, a library, a fitness area with locker and showers, a 24/7 fire investigation section, a medical services office, and storage. These existing facilities are inadequate to meet the current needs of the HFD fire training program. The property also includes HFD's Mokulele Fire Station.

The HFD training center expansion is planned to occur in three phases. Phase I will include the construction of a new recruit academy, a 100-stall parking lot, and upgrades to the existing training tower site. Phase II will include the construction of a new incumbent building, and 99 parking spaces. Finally, Phase III will include a single engine company core concept prototype fire station to replace the existing fire station, future expansion of the new recruit academy, and expansion of the incumbent training building, and additional parking.

The purpose of the CIA is to gather information about the Project area and its surroundings through research and interviews with individuals that are knowledgeable about this area in order to assess potential impacts to the cultural resources, cultural practices and beliefs identified as a result of the planned Project. We are seeking your *kōkua* (assistance) and guidance regarding the following aspects of our study:

- **General history and present and past land use of the Project area**
- **Knowledge of cultural sites which may be impacted by future development of the Project area - for example, historic sites, archaeological sites, and burials**
- **Knowledge of traditional gathering practices in the Project area both past and ongoing**
- **Cultural associations of the Project area, such as legends and traditional uses**

- **Referrals of *kūpuna* or elders and *kama'āina* who might be willing to share their cultural knowledge of the Project area and the surrounding *ahupua'a* lands**
- **Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the Project area**

In advance, we appreciate your assistance in our research effort. If you have any information you would like to share, we invite you to contact Heather McMillen at hmcmillen@culturalsurveys.com or by phone at (808) 262-9972.

Mahalo nui,

Heather McMillen
CSH Cultural Researcher

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