

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

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KIRK CALDWELL  
MAYOR



**FEB 23 2013**

JIRO A. SUMADA  
ACTING DIRECTOR

2012/ED-8(ST)  
2012/ELOG-2503

February 4, 2013

Mr. Gary Gill, Acting Director  
Office of Environmental Quality Control  
State Office Tower, Room 702  
235 South Beretania Street  
Honolulu, Hawaii 96813-2437

Dear Mr. Gill:

Subject: Special Management Area (SMA) Ordinance  
Chapter 25, Revised Ordinances of Honolulu  
Final Environmental Assessment (EA)

Recorded Owner/

Applicant: Chevron Products Company  
Agent: URS Corporation  
Location: 91-480 Malakole Street - Kalaeloa  
Tax Map Key: 9-1-14: Portion of 10  
Request: Special Management Area Use Permit  
Proposal: Chevron Refinery Concentrated Solar  
Thermal Process Project – Consisting of the  
construction of a solar reflective mirror array  
within a 15.5 acre portion (makai) of the  
existing petroleum refinery, various piping,  
expansion tanks, and non-fired steam  
generation.

Attached and incorporated by reference is the Final EA prepared by the Applicant for the above project pursuant to Chapter 25, Revised Ordinance of Honolulu. We have determined that the preparation of an Environmental Impact Statement is not required and have issued a Finding of No Significant Impact.

Enclosed is a copy of the Final EA document in pdf format on a compact disk, one hardcopy of the Final EA, and the Publication Form. The Publication Form, including

OFFICE OF ENVIRONMENTAL  
QUALITY CONTROL  
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13 FEB -7 10:46

Mr. Gary Gill, Acting Director  
January 4, 2013  
Page 2

project summary, was also sent via electronic mail to your office. We request publication of a notice in The Environmental Notice.

Very truly yours,

A handwritten signature in black ink, appearing to read "Jiro A. Sumada".

Jiro A. Sumada, Acting Director  
Department of Planning and Permitting

JAS:hd

Attachments

**Applicant Action EA  
Chapter 200, Title 11 HAR  
Publication Form**

**Project Name:** Chevron Hawaii CSP

**Type of Document:** Environmental Assessment

**Island:** Oahu

**District:** Ewa

**TMK:** (1)9-1-014-010

**Permits:** **Potential Permits, Approvals, and Consultations Associated with the Proposed Action**

- **FEDERAL**  
National Historic Preservation Act, Section 106 Consultation
- **STATE of HAWAII**  
National Pollutant Discharge Elimination System Permit  
Community Noise Permit Application
- **LOCAL**  
Chapter 200, Title 11, HAR Environmental Review and Determination  
SMA Permit  
Building Permit

**Applicant:** Chevron  
91-480 Malakole Street  
Kapolei, Oahu, HI 96707  
Chris Cavote, 808-682-2215

**Approving Agency:** City and County of Honolulu  
Department of Planning and Permitting  
650 South King Street, 7<sup>th</sup> Floor  
Honolulu, HI 96813  
Nelson Armitage, 808-768-8014

**Consultant:** URS Corporation  
615 Piikoi Street, Suite 900  
Honolulu Hawaii 96814  
Darla Guerrero, 808-593-1116

**Status:** (Statutory 30-day comment period or FONSI)

**Summary:**

Chevron is developing a demonstration project of solar thermal technology applied in a manufacturing environment. The project will be utilized to offset burning of fossil fuels used to generate heat and steam for internal use.

The area for this project is located within the Chevron Kapolei Refinery, parallel with the shoreline, and is approximately 15.5 acres (460 ft. by 1575 ft.). The site is currently being used to store equipment and as a temporary staging and working area for other projects on the refinery. The site is within the Special Management Area and will require a SMA permit.

The Proposed Action would have no significant impacts to any environmental resource areas. The implementation of standard Best Management Practices will ensure no significant impacts occur to geological and soil resources and water resources. Shielding of exterior lighting will ensure that no significant impacts occur to biological resources. The Proposed Action would not contribute to any significant cumulative impacts or reasonably foreseeable direct or indirect effects on any coastal use or resource of the State's coastal zone.

The Proposed Action would have no indirect, secondary, or cumulative impacts to any environmental resource areas.

**FINAL REPORT**

**FINAL ENVIRONMENTAL ASSESSMENT**

**CHEVRON KAPOLEI REFINERY  
CONCENTRATED SOLAR PROCESS PROJECT  
KAPOLEI, OAHU, HAWAII**



Prepared for:

Chevron Technology Ventures  
6001 Bollinger Canyon Road K1104  
San Ramon, CA 94583

**December 2012**

Prepared by:

URS Corporation  
615 Piikoi Street, #900  
Honolulu, Hawaii 96814

## PROPOSED ACTION

<b>Project:</b>	<b>Chevron Hawaii Concentrated Solar Process</b>
<b>Applicant:</b>	Chevron Technology Ventures 6001 Bollinger Canyon Road K1104 San Ramon, CA 94583 Contact: Don Nelson (925-842-9962)
<b>Recorded Owner of Property</b>	Chevron USA, Incorporated P.O. Box 285 Houston, TX 77001
<b>Approving Agency:</b>	Department of Planning and Permitting City and County of Honolulu 650 South King Street, 7 <sup>th</sup> Floor Honolulu, HI 96813
<b>Location:</b>	Chevron Kapolei Refinery 91-480 Malakole Street Kapolei, HI 96707
<b>Proposed Action:</b>	Construct and Operate a Concentrating Solar Power Thermal system at the Chevron Kapolei Refinery
<b>Associated Actions Requiring Environmental Assessment</b>	Construction within the Special Management Area designated for this region
<b>Tax Map Key:</b>	(1) 9-1-014:010
<b>Parcel Area:</b>	248 acres
<b>Project Area:</b>	15.5 acres
<b>Judicial District:</b>	Kapolei
<b>Community/Development Plan Designation:</b>	Ewa Development Plan and Oahu General Plan
<b>State Land Use District:</b>	Urban
<b>County Zoning:</b>	I-2 Intensive Industrial
<b>Required Permits and Approvals:</b>	Special Management Area Permit National Pollutant Discharge Elimination System – Notice of Intent (Construction) (NPDES-NOI(C)) Minor Modification to Existing Use Permit Grubbing, Grading, and Stockpiling Permit Building Permits
<b>Anticipated Determination:</b>	Finding of No Significant Impact
<b>Parties Consulted:</b>	See Chapter 7
<b>Consultant:</b>	URS Corporation 615 Piikoi Street, #900 Honolulu, HI 96814 Contact: Darla Guerrero (808-593-1116)

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## List of Acronyms and Abbreviations

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°F	Fahrenheit
AAQS	Ambient Air Quality Standards
ACHP	Advisory Council on Historic Preservation
AHJ	Authority Having Jurisdiction
BMPs	Best Management Practices
BWS	Board of Water Supply
CAA	Clean Air Act
CCH	City and County of Honolulu
CFR	Code of Federal Regulations
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2e</sub>	carbon dioxide equivalent
CSH	Cultural Surveys Hawaii
CSP	Concentrated Solar Process
CTV	Chevron Technology Ventures
CWA	Clean Water Act
CZM	Coastal Zone Management Program
DLNR	State of Hawaii Department of Land and Natural Resources
dB	decibals
dBA	A-Weighted Sound Level
DPP	Department of Planning and Permitting
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FTA	Federal Transit Administration
H <sub>2</sub> S	hydrogen sulfide
HAR	Hawaii Administrative Rules

## List of Acronyms and Abbreviations

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HDOH	State of Hawaii Department of Health
HECO	Hawaiian Electric Company
HCEI	Hawaiian Clean Energy Initiative
HPD	Hawaii Preservation District
HRS	Hawaii Revised Statutes
Hz	Hertz
IRBH	Indoor Radiological Health Board (HDOH)
LCA	Life Cycle Assessment
Leq	Equivalent Sound Level
LNAPL	Light Non-Aqueous Phase Liquid
LRFI	Literature Review and Field Inspection
LUO	Land Use Ordinance
m	meter(s)
NAAQS	National Ambient Air Quality Standards
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NO <sub>2</sub>	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSR	New Source Review
O <sub>3</sub>	ozone
OEQC	Office of Environmental Quality Control
Pb	lead
PM <sub>10</sub>	particulate matter with an aerodynamic diameter less than or equal to 10 microns
PM <sub>2.5</sub>	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PPE	Personal Protective Equipment
ppb	Parts Per Billion
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act

## List of Acronyms and Abbreviations

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RO	Reverse Osmosis
ROH	Revised Ordinances of Honolulu
SAAQS	State Ambient Air Quality Standards
SHA	Safe Harbor Agreement
SHPD	State Historic Preservation Division
SLUC	State Land Use Commission
SMA	Special Management Area
SO <sub>2</sub>	sulfur dioxide
SPL	sound pressure level
SSA	Shoreline Setback Area
TMK	Tax Map Key
TSP	Total Suspended Particulates
UFC	Uniform Fire Code
UIC	Underground Injection Control
USACE	United States Army Corps of Engineers
USC	United States Code
USDOT	US Department of Transportation
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
USOSHA	US Occupational Safety and Health Administration
VOC	Volatile Organic Compounds
µg/m <sup>3</sup>	microgram per cubic meter
µPa	micropascals

### EXECUTIVE SUMMARY

This Environmental Assessment (EA) was prepared in accordance with Chapter 25, Revised Ordinances of Honolulu (ROH), in support of a Special Management Area (SMA) Permit application. This EA demonstrates that construction and operation of the Proposed Action would not result in any significant effects to the environment. Pursuant to Special Management Area Law, Section 25-3.3, ROH, should a Finding of No Significant Impact (FONSI) be determined, an Environmental Impact Statement (EIS) would not be required.

The Proposed Action will have no significant impacts to any environmental resources areas. The implementation of standard Best Management Practices (BMPs) will help protect against significant impacts occurring to geological and soil resources and water resources. The Proposed Action will not contribute to any significant cumulative impacts or reasonably foreseeable direct or indirect effects on any coastal use or resource of the State's coastal zone. URS Corporation submitted the Archaeological Literature Review and Field Inspection report for review by the State of Hawaii Preservation Division (SHPD) per the National Historic Preservation Act (NHPA) Section 106. Although a response is pending as of September 18, 2012, the Proposed Action is not anticipated to adversely affect historic properties. This project supports the State of Hawaii Clean Energy Initiative goal of having 70 percent of the State's energy come from renewable sources by 2030.

**Proposed Action.** Chevron Technology Ventures (CTV) proposes to construct and operate a concentrated solar process (CSP) system on a 15.5-acre site that is located within the 248-acre parcel of the Chevron Refinery near Kapolei, Oahu, Hawaii.

**Purpose and Need.** The Proposed Action would be a demonstration project of solar thermal technology applied in a manufacturing environment. The solar technology will utilize reflectors that focus the sun's rays onto pipes carrying water or some other heat transfer fluid. As the fluid flows through the solar field the temperature rises and then the fluid flows through a steam generator where the steam is transferred to the desired process stream in the refinery. The project will offset burning of fossil fuels used to generate steam for the Refinery's internal use.

**Alternatives.** Reasonable alternatives to the Proposed Action included an alternate location on the same 248-acre property (Alternative 1) and the No-Action Alternative. The alternate location considered under Alternative 1 is a 17.1-acre site located in the northwest corner of the Refinery. The environmental consequences of the No Action Alternative are evaluated as a baseline for comparison with the environmental consequences of Alternative 1 and the Proposed Action.

**Environmental Consequences.** The Proposed Action would have beneficial socioeconomic and air quality impacts. No significant adverse impacts are anticipated to biology, noise, geology and soils, land use, socioeconomics and traditional cultural practices, hazardous materials and waste, utilities and public services, and adherence to existing laws and regulations, water or archaeological resources. Moreover, this EA demonstrates that the Proposed Action will not have reasonably foreseeable direct or indirect effects on any coastal use or resource of the State's coastal zone.

**SECTION 1 LOCATION, PURPOSE OF AND NEED FOR ACTION****1.1 SUMMARY OF THE PROPOSED ACTION**

Chevron Technology Ventures is planning on installing and operating a concentrated solar process (CSP) technology to generate process steam for internal refinery use. This technology will be utilized to offset the burning of fossil fuels that are currently being used to generate steam for the refinery. The CSP collectors use mirrors and optics to concentrate energy from the sun. The thermal energy heats a fluid flowing in a pipe at the focal point of each collector. The pipes will be connected to a steam generator that will feed into the current refinery steam system. The collectors will follow the sun east to west throughout the day. The CSP facility is expected to operate during the hours of the year when the sun is bright enough to generate steam, which is approximately 2,500 hours annually.

**1.2 PROJECT LOCATION AND EXISTING USES**

The Proposed Action Site is located approximately two miles southwest of the town of Kapolei on the western side of Oahu. The Proposed Action Site will be located on approximately 15.5-acres within the larger 248-acre property owned by Chevron. The 248-acre property is denoted by TMK Parcel (1) 9-1-014:010 and the 15.5-acre site is located on a portion of an area identified as the Proposed Action Site (see **Figure 1-1**). The site is currently developed and used as a stockpile and storage area for many different construction activities going on within the refinery. The area was previously graded and possibly backfilled, there is no vegetation growing on the site, and there are no existing utilities within the project area.



P:\Chevron\2012 Chevron\26537561\_Solar\_Thermal\Design\01\_Figures\Fig-1-1\_LOC\_MAP\_ENV.dwg 11/29/2012 11:06:15 AM

REFERENCE:  
 Horizons Technology, Inc.  
 Sure Maps Raster  
 U.S.G.S. Topographic Map (1998)  
 Ewa Quadrangle  
 Ewa, Oahu, Hawaii

### LOCATION MAP

Environmental Assessment  
 Chevron Kapolei Refinery, CSP  
 TMK: (1)9-1-014-010  
 Kapolei, Oahu, Hawaii



FIGURE 1-1

**1.3 PURPOSE AND NEED**

The purpose of the proposed action is to generate steam for internal use within the Chevron refinery. Refining of crude oil into products such as gasoline, jet fuel, diesel, and fuel oil is an energy intensive process, requiring large amounts of heat. One of the common forms of heat used in the refinery is steam that is generated by burning crude oil based fuels. The Proposed Action will use solar thermal energy to generate steam that is currently generated through combustion of crude oil based fuels. Based on the expected size of the project, the reduction in carbon dioxide equivalent (CO<sub>2</sub>e) emissions is approximately 5,000 tons per year. The reduction in fossil fuel combustion will be an annual maximum of 10,000 barrels of oil equivalent. This project will provide a source of steam that does not require the use of fossil fuels and will be used to offset combustion based steam sources. In addition to providing steam for the refinery, this project will also serve as a demonstration of this technology for similar applications across Chevron.

The proposed action would also assist the State in reaching the Hawaii Clean Energy Initiative (HCEI) goal of having 70 percent of the State's energy come from renewable resources by 2030. The reduced dependence on fossil fuels for energy generation has the following benefits to Hawaii's environment:

- Reduction in greenhouse gas emissions
- Reduction in dependency on foreign imports of fossil fuel and associated price volatility
- Reduction in the volume of fossil fuel and associated environmental risks during transport and storage

**1.4 REGULATORY OVERVIEW**

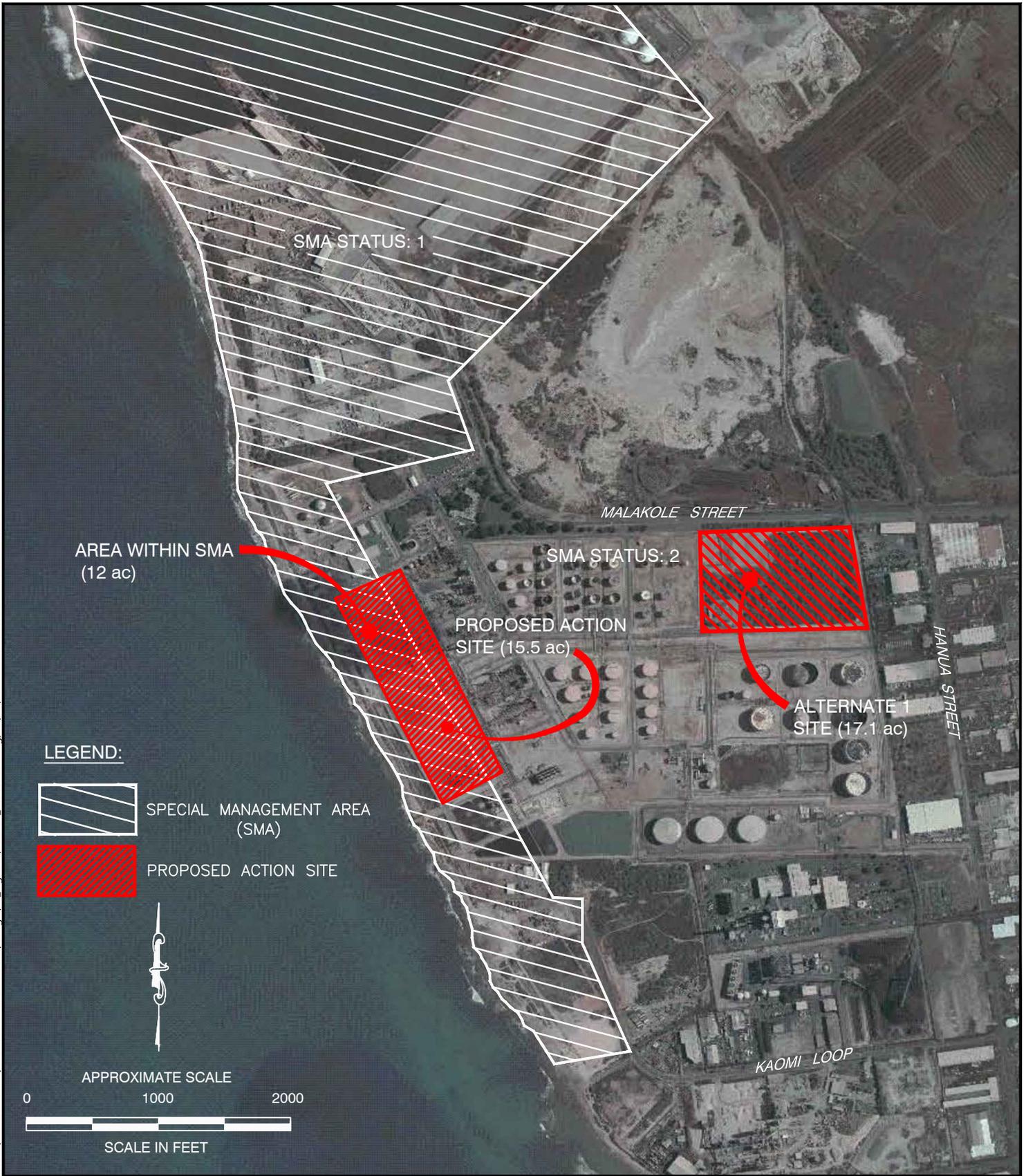
The Proposed Action is subject to the following State and Federal laws and consultations. Compliance of the Proposed Action with applicable laws and consultations is discussed in Sections 4 through 6.

**1.4.1 Chapter 25, Revised Ordinances of Honolulu**

Chapter 25, Revised Ordinances of Honolulu (ROH) provides the regulations and procedures that apply to all lands within the Special Management Area (SMA) of the City and County of Honolulu (CCH) (see **Figure 1-2**). It is CCH's policy to preserve, protect, and where possible, to restore the natural resources of the coastal zone of Hawaii. An applicant must prepare and submit an Environmental Assessment (EA) pursuant to the SMA Law, Section 25-3.3, ROH, and shall identify potential impacts, evaluate potential significance of each impact, and provide detailed study of the significant impacts. After reviewing the EA, the CCH, Department of Planning and Permitting (DPP) shall provide a notice of determination pursuant to Chapter 25, ROH. An action shall be determined to have a significant effect on the environment if it meets one or more of the following criteria:

- Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;
- Curtails the range of beneficial uses of the environment;
- Conflicts with the state's long term environmental policies or goals and guidelines as expressed in Chapter 25, ROH, and any revisions thereto, court decisions, or executive orders;
- Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;
- Substantially affects public health;
- Involves substantial secondary impacts, such as population changes or effects public facilities;
- Involves a substantial degradation of environmental quality;
- Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;
- Substantially affects a rare, threatened, or endangered species, or its habitat;
- Detrimentially affects air or water quality or ambient noise levels;
- Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;
- Substantially affects scenic vistas and viewplanes identified in county or state plans or studies; or,
- Requires substantial energy consumption.

P:\Chevron\2012 Chevron\26537561 Solar Thermal\Design\01\_Figures\FIG-1-2\_SMA Area.dwg\_11/28/2012 5:14:39 PM



**AERIAL PHOTO:**  
 Courtesy of the U.S. Geological Survey  
<http://www.usgs.gov>

**REFERENCE:**  
 State of Hawaii GIS: <http://gis.hicentral.com>

## SPECIAL MANAGEMENT AREA MAP

Environmental Assessment  
 Chevron Kapolei Refinery, CSP  
 TMK: (1)9-1-014-010  
 Kapolei, Oahu, Hawaii



FIGURE 1-2

### 1.4.2 Chapter 205, Hawaii Revised Statutes – Land Use Law

Chapter 205, Hawaii Revised Statutes (HRS), establishes the State Land Use Commission (SLUC) and gives this body the authority to designate all lands in the State as Urban, Rural, Agricultural, or Conservation District lands. The Counties make all land use decisions within the Urban Districts in accordance with their respective County general plans, development plans, and zoning ordinances. The Counties also regulate land use in the State Rural and Agricultural Districts, but within the limits allowed by Chapter 205.

The Proposed Action is in the State Urban District. Hawaii Administrative Rule (HAR) §15-15-18 characterizes the Urban District as “city like” concentrations of people, structures, streets, urban level of services and other related land issues. The Proposed Action is consistent with the land uses envisioned for the State Urban District.

The total land that would be disturbed by the proposed improvements incorporated in this project is approximately 15.5 acres. Consequently, the project will require coverage under the State of Hawaii National Pollutants Discharge Elimination System (NPDES) General Permit program (HAR §11-55, *Appendix C*)

### 1.4.3 Chapter 343, Hawaii Revised Statutes

Chapter 343, HRS, establishes a system of environmental review at the state and county levels, which shall ensure that environmental concerns are given appropriate consideration in decision making along with economic and technical considerations (State of Hawaii 2011b). The law requires that governments give systematic consideration to the environmental, social, and economic consequences of proposed development projects prior to allowing construction to begin. An applicant must comply with Chapter 343, HRS, when its proposed action requires a discretionary consent or approval that meets one or more of nine types of actions that constitute the triggers identified in the law (Office of Environmental Quality Control [OEQC] 2004).

- Conditions that trigger an EA or EIS submittal are any of the following:
  - Use of state or county lands or funds
  - Use of conservation district lands
  - Use within shoreline setback area
  - Use of historic site or district
  - Use of land in the Waikiki district
  - Amendment to county general plan
  - Reclassification of conservation lands
  - Construction or modification of helicopter facilities
  - Wastewater facility, waste-to-energy facility, landfill, oil refinery, or power-generating facility

Proposed actions meeting one of the above triggers cannot receive discretionary approval and proceed until one of the following takes place:

- The agency with the authority to grant approval makes a finding that the proposed action falls within a certain class of activities that are routine and minor in scope and exempt from the law because it will probably have minimal or no significant effects on the environment;
- If not exempt, an EA must be prepared to determine whether an Environmental Impact Statement (EIS) is required. The agency with the authority to grant approval reviews the EA and issues a FONSI and negative declaration if the action is not likely to have a significant effect on the environment, after which the proposed action may proceed without further study; or
- If the agency with the authority to grant approval reviews the EA and determines that the action may have a significant effect on the environment, the agency must issue an EIS Preparation Notice stating that an EIS will be required. The final EIS must be acceptable to the agency with the authority to grant approval before the action can proceed.

#### 1.4.4 Historic Sites Act of 1935 (16 USC §§ 461-467)

The Historic Sites Act of 1935 establishes a national policy to preserve for public use, historic sites, buildings, and objects of national significance for the inspiration and benefit of the American people (USACE 2011). The act authorizes the designation of national historic sites and landmarks, authorizes interagency efforts to preserve historic resources, and establishes a maximum fine for violations of the act. It authorizes surveys of historic and archaeological sites, buildings, and objects to determine which are significant, and provides for the restoration, reconstruction, rehabilitation, preservation, and maintenance of historic or prehistoric properties of national significance. The Secretary of the Interior (Secretary), through the National Park Service, is authorized to conduct surveys and studies, collect information, and purchase significant historic properties. The Secretary also is authorized to restore, preserve, maintain, and rehabilitate structures and sites.

The act led to the eventual establishment within the National Park Service of the Historic Sites Survey, the Historic American Building Survey, Historic American Engineering Record, and the National Historic Landmarks Program.

#### 1.4.5 National Historic Preservation Act (16 USC § 470 et seq.)

The National Historic Preservation Act (NHPA) establishes the nation's policy for historic preservation, and sets in place a program for the preservation of historic properties by requiring Federal agencies to consider effects to significant cultural resources (i.e., historic properties) prior to undertakings.

##### *1.4.5.1 Section 106 of the Federal Guidelines (16 USC §106)*

Section 106 of the NHPA requires Federal agencies to take in to account the effects of projects on historic properties (resources included in or eligible for the National Register of Historic Places [NRHP]). Section 106 also gives the Advisory Council on Historic Preservation (ACHP) and State Historic Preservation Offices (SHPOs) an opportunity to consult. In most cases, the State of Hawaii Department of

Land and Natural Resources (DLNR), Historic Preservation Division (HPD) acts for the Advisory Council to undertake this review process. The HPD must concur that the proposed action will have no effect on historic properties.

#### **1.4.6 Federal Coastal Zone Management Act (16 USC §1456 (c) (1))**

The Federal Coastal Zone Management Act was enacted to ensure that Federal agencies undertaking an activity within or outside the coastal zone, which affects any land or water use or natural resource of the coastal zone, shall be carried out in a manner consistent with the enforceable policies of state approved management programs. Federal activities, permits, and financial assistance in Hawaii are required to be consistent with the Hawaii Coastal Zone Management (CZM) Program.

#### **1.4.7 Hawaii Coastal Zone Management Program (Chapter 205A, HRS)**

Hawaii enacted the Hawaii CZM Program in 1977. The entire State is considered a coastal zone under the CZM Program, including all marine waters seaward to the extent of the State's policy power and management authority. The CZM Program focuses on policy objectives for: recreation resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection, and marine resources.

The CZM establishes a permit system to control development within Special Management Areas (SMAs) managed at the county level. Shoreline Setback Areas (SSAs) serve as buffers against coastal hazards and erosion, and protect view sheds and marine and coastal resources. SSAs extend not less than 20 feet (6 m) and not more than 40 feet (12 m) from the shoreline. Additionally, SSAs prevent mining of sand or removal of coral or rubble from the shoreline and within 1,000 feet (305 m) seaward from the shoreline or within waters up to 30 feet (9 m) deep. HRS Section 205A-45(a) also states that where counties, through rules adopted pursuant to Chapter 91 or ordinance, may require that shoreline setback lines be established at distances greater than that established in Part III of HRS 205A.

#### **1.4.8 Endangered Species Act of 1973 (16 United States Code § 1531 et seq.; 50 Code of Federal Regulations Parts 17 and 222)**

The Endangered Species Act (ESA) provides broad protection for species of fish, wildlife, and plants listed as threatened or endangered and their determined critical habitats. The United States Fish and Wildlife Service (USFWS) is the Federal agency responsible for administering this act, designating critical habitat, and determining if a change in listing status should occur with a particular species.

#### **1.4.9 Hawaii Endangered Species Law (HI ST §195D -1 - 32)**

Under the Hawaii Endangered Species Law, any aquatic, wildlife, or land plant species listed as endangered pursuant to the ESA is considered an endangered species in Hawaii. Any indigenous aquatic, wildlife, or land plant species listed as threatened under the ESA is considered threatened in Hawaii. Additionally, Hawaii endangered species law empowers the State of Hawaii to determine whether any indigenous species of aquatic life, wildlife, or land plant should be listed as endangered or threatened

species to protect Hawaii's unique ecosystem. Hawaii endangered species law prevents removal, possession, or sale of endangered or threatened species. The State of Hawaii DLNR is the agency responsible for enforcement of the Hawaii Endangered Species Law.

#### **1.4.10 Clean Air Act (42 U.S.C. § 7401 et seq.)**

The Clean Air Act (CAA) is the comprehensive Federal law that regulates air emissions from stationary and mobile sources (US Environmental Protection Agency [EPA] 2011a). Among other things, the CAA authorizes the USEPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of criteria air pollutants as well as hazardous air pollutants. The CAA requires all areas of the country to meet or strive to meet NAAQS for sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), particulate matter (PM) with an aerodynamic diameter less than or equal to 10 microns (PM<sub>10</sub>) and 2.5 microns (PM<sub>2.5</sub>), nitrogen dioxide (NO<sub>2</sub>), lead (Pb), and ozone (O<sub>3</sub>).

The New Source Review (NSR) program is one of the key programs designed to achieve NAAQS. The NSR program is a preconstruction review process for new and modified stationary sources. The Prevention of Significant Deterioration (PSD) program for attainment areas typically requires new or modified sources to install state-of-the-art pollution controls to ensure that the ambient air quality will not be degraded. Different requirements apply to non-attainment areas. Permits are required for new construction or major modifications that substantially increase a facility's emissions of regulated pollutants.

#### **1.4.11 Hawaii Department of Health, Clean Air Branch**

The Hawaii Department of Health (HDOH), Clean Air Branch administers the HAR for Air Pollution Control (Title 11, Chapter 60.1). The following Rules area applicable to the Proposed Action:

- §11-60.1-32 Visible emissions – Presents visible emission restrictions for stationary sources.
- §11-60.1-33 Fugitive dust – Prohibits visible fugitive dust to become airborne without taking reasonable precautions.
- §11-60.1-76 Applications for modifications – Provides guidance on the process to modify a noncovered permit.

#### **1.4.12 Federal Clean Water Act of 1977 (33 United States Code §§ 1251-1376; 30 Code of Federal Regulations § 330.5(a) (26))**

The Clean Water Act of 1977 (CWA) protects wetlands, regulates discharges of pollutants, sets water quality standards for individual pollutants, and provides a framework for permitted pollutant discharge from a point source. The administering Federal agencies for the CWA are the USEPA and United States Army Corps of Engineers (USACE). The CWA authorizes the USEPA to issue NPDES permits and to set pretreatment standards for the purpose of regulating discharges to surface waters. The CWA charges states with setting specific water quality criteria appropriate for their water and developing pollution control programs to meet them. In Hawaii, oversight lies with the HDOH. The HDOH reviews and

certifies NPDES permit applications and the USEPA coordinates, drafts, and issues NPDES permits for storm water and point source pollution discharges.

### 1.4.13 Oahu General Plan and Ewa Development Plan

The Oahu General Plan is a dynamic comprehensive statement of the objectives and policies that is intended to serve as a guide to help plan and improve the physical, environmental, social, and economical concerns of the people of Oahu, and to address the overall development of the island (CCH 2002). The General Plan also states the City and County's vision for Oahu and establishes the strategies to help achieve that vision.

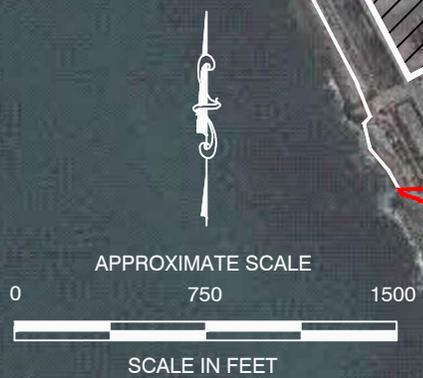
In 1977 Ewa was designated as the location for a Secondary Urban Center for Oahu which was to be centered around Kapolei. The Ewa Development Plan ordinance presents a vision for Ewa's future development and what it should look like when "fully developed". The Plan provides regulations and standards for land development, open space, transit corridor, set limits to development, and updated Open Space, Land Use, and Zoning maps. The Refinery is located within the Campbell Industrial Park and is surrounded by industrial parcels (see **Figure 1-3**).

P:\Chevron\2012 Chevron\26537561\_Solar Thermal\Design\01\_Figures\FIG-1-3\_Neighbor Parcels\_CSB.dwg, 11/28/2012 5:19:06 PM



- LETTERED LOTS:**
- A - Bering Sea Eccotech Inc
  - B - Gerald Ryusaki LLC
  - C - Bering Sea Eccotech Inc
  - D - Ground Transport Inc
  - E - DC Asphalt Services Inc
  - F - KIP Lot 3 LLC
  - G - L C Investments LLC

**LEGEND:**  
 [Red outline symbol] NEIGHBORING PARCEL BOUNDARIES



**NEIGHBORING PARCELS**

Environmental Assessment  
 Chevron Kapolei Refinery, CSP  
 TMK: (1)9-1-014-010  
 Kapolei, Oahu, Hawaii

**AERIAL PHOTO:**  
 Courtesy of the U.S. Geological Survey  
<http://www.usgs.gov>  
**REFERENCE:**  
 State of Hawaii GIS: <http://gis.hicentral.com>



FIGURE 1-3

#### 1.4.14 Noise Regulatory Setting

Title 11, Chapter 46 (Community Noise Control) of the HAR sets maximum permissible A-Weighted Sound Levels (dBA) on sound emission from stationary sources and agricultural, construction, or industrial activities (State of Hawaii 2011a). These thresholds depend on the property zoning designations:

- A: 55 dBA Leq daytime (7 AM to 10 PM) / 45 dBA Leq nighttime (10 PM to 7 AM)
- B: 60 dBA (day) / 50 dBA (night)
- C: 70 dBA (day or night)

Limits on impulsive noises are 10 dBA higher than these thresholds.

Construction projects that are anticipated to exceed these limits are expected to have approved community noise permits and limit construction to specified daytime hours (Monday through Friday between 7 AM and 6 PM and Saturday between 9 AM and 6 PM). Special equipment or activities like pile-driving and impact hammers are limited to Monday through Friday, 9 AM to 5:30 PM. The Oahu edition of the Noise Reference Manual states that an approved community noise permit may be required for construction projects exceeding 78 dBA (DOH 2008). Construction noise anticipated to occur outside of these daytime hours, or on Sundays or holidays, requires application and approval of a variance.

Occupational exposure to noise is regulated by Title 29, CFR, Part 1910.95, which describes that protection against the effects of noise exposure shall be provided when the sound levels exceed an average of 90 dBA for an 8-hour period. When employees are subjected to sound exceeding this limit, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within 90 dBA, personal protective equipment (PPE) shall be provided and used to reduce sound levels within the limits. The employer shall administer a continuing, effective hearing conservation program whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 dBA (measured via slow response). For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with 29 CFR 1910.95 *Appendix A* (noise exposure computation) without regard to any attenuation provided by the use of PPE.

1.4.15 Environmental Permits and Required Approvals

**Table 1-1** lists potential Federal and State and Local environmental permits, approvals, and consultations that are associated with the Proposed Action.

**Table 1-1. Potential Permits, Approvals, and Consultations Associated with the Proposed Action**

Permit/Approval/Consultation	Lead Agency(ies) / Groups
<b>FEDERAL</b>	
NHPA, Section 106 Consultation	State Historic Preservation Officer Office of Hawaiian Affairs
<b>STATE of HAWAII</b>	
Community Noise Permit Application	HDOH, Indoor and Radiological Health Branch IRHB
Application for Permit Modification	HDOH, Clean Air Branch
<b>LOCAL</b>	
Special Management Area Use Permit	Honolulu City Council
Fire Protection	CCH, Honolulu Fire Department
Building and Grading Permit	CCH DPP
Zoning Permit	CCH DPP
Conditional Use Permit Modification, File No. 87/CUP1-14	CCH DPP

## SECTION 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

### 2.1 INTRODUCTION

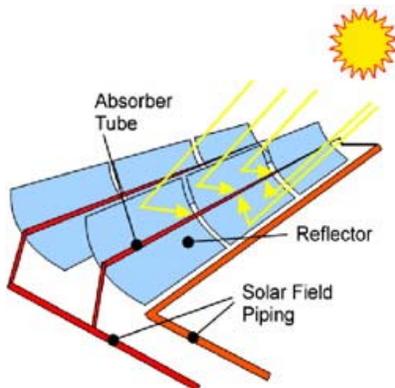
This section describes the Proposed Action and a reasonable alternative that Chevron selected based on the criteria of meeting the project's purpose and need, as described in Section 1.2. The No Action Alternative is also described in this section.

### 2.2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

#### 2.2.1 Proposed Action

The Proposed Action will utilize concentrating solar thermal (CSP) technologies to generate process steam for internal refinery use. CSP technologies utilize mirrors to focus sunlight onto a piping system where heat transfer fluid is heated within a closed system to a high enough temperature to produce steam in a steam generator which will then be fed into the current refinery steam system (see **Figure 2-1**).

One or both of the following technologies will be used for the Proposed Action. The first is a parabolic trough. This system comprises of a U-shaped trough mirror to focus all of the sunlight falling on the trough onto a pipe running along the focal point of the mirror. Heat transfer fluid pumped through the pipe is heated by the concentrated sunlight. The trough tracks the location of the sun through the day to maximize sunlight (see **Figure 2-2**).



*Courtesy of NREL: TroughNet Parabolic Trough Solar Power Network*

**Figure 2-1 Representative Parabolic Trough Concentrated Solar Thermal Process**



*Courtesy of Sopogy – Keahole Solar Power*

**Figure 2-2 Representative Parabolic Trough Concentrated Solar Thermal**

The second technology is compact linear Fresnel reflector. Similar to parabolic trough, it uses mirrors to focus sunlight onto a pipe. In this case, however, the reflectors comprise a number of narrow mirror strips located near the ground that individually move to track the sun and focus the light onto the receiver pipe (see **Figure 2-3**).

Both of these systems will be ground mounted with a height of approximately 12-feet for the parabolic trough system and 15-feet for the linear Fresnel system. The facility will comprise a number of individual modules assembled together to form a complete system. A typical length of a module is 12 to 14-feet with a width of 10-feet for the trough system and 25-feet for the Fresnel. Materials of construction for both technologies include glass or aluminum mirrors, steel piping and aluminum or steel support structures. The solar field may be contained within a chain link fence with a privacy screen to minimize the impact from wind.

Major components in the CSP system include: solar collectors, pumps to circulate the heat transfer fluid and feedwater, expansion tank(s), and a non-fired steam generator. Operation of the field will be from the refinery control room. As the sun rises, the field will begin tracking the sun and heating. When the temperature reaches the necessary point, steam will be generated and delivered to the refinery. Operations and maintenance activities will include monthly to quarterly preventative maintenance such as lubrication and cleaning. There will be no additional needs for infrastructure such as parking.

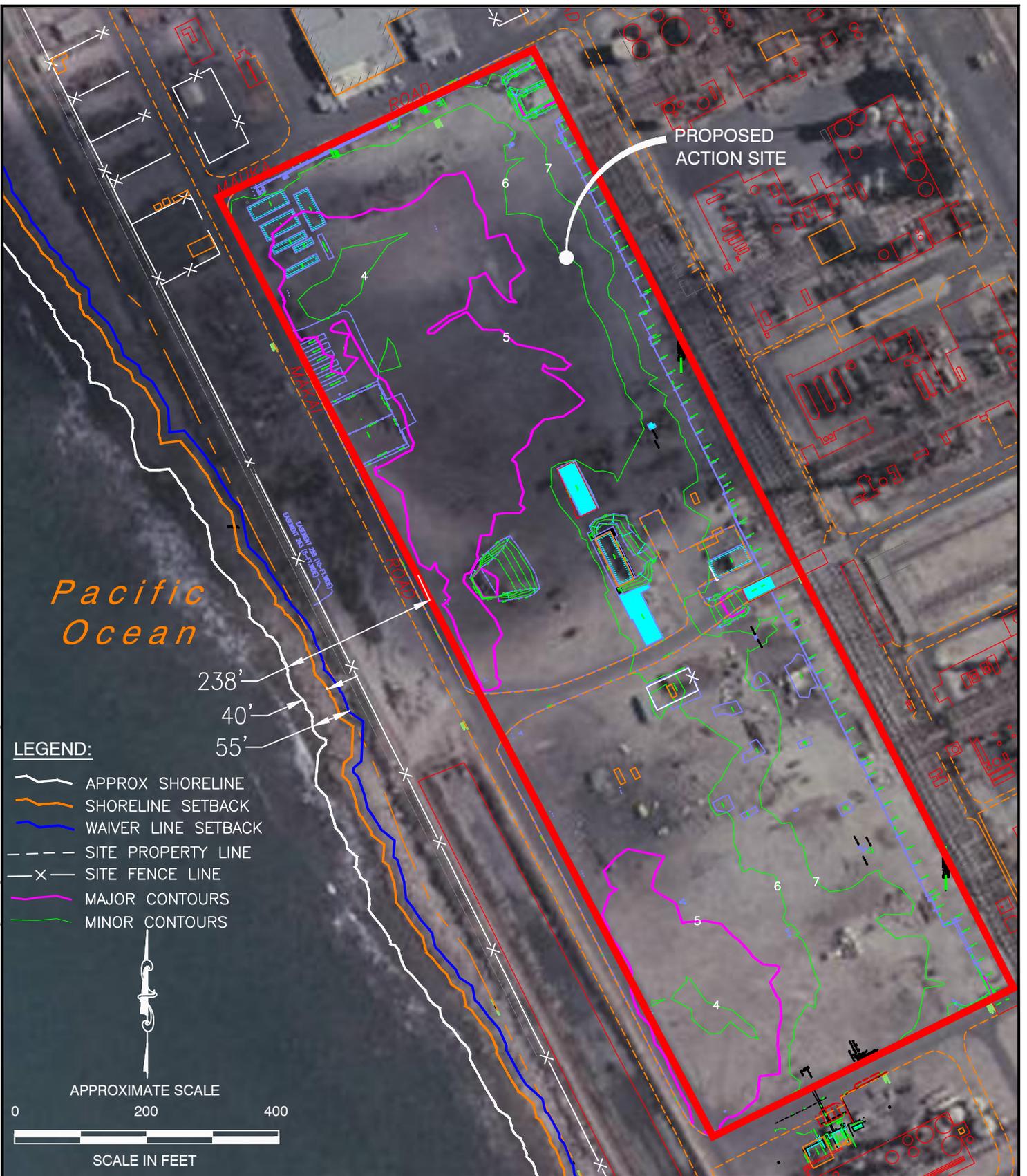


**Figure 2-3 Representative Compact Linear Fresnel Concentrated Solar Thermal**

### 2.2.2 Project Location

The Proposed Action Site is located approximately two miles southwest of the town of Kapolei on the western side of Oahu. The Chevron Refinery is located within the Campbell Industrial Park. The Proposed Action will be located on approximately 15.5-acres that are within the larger 248-acre property owned by Chevron. The 248-acre property is denoted by TMK Parcel (1) 9-1-014:010, and the 15.5-acre site is identified as Proposed Action (see **Figure 2-4**). A portion of the Proposed Action site also lies within the Special Management Area as depicted in **Figure 1-2**, which is approximately 12 acres.

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- LEGEND:**
- APPROX SHORELINE
  - SHORELINE SETBACK
  - WAIVER LINE SETBACK
  - SITE PROPERTY LINE
  - SITE FENCE LINE
  - MAJOR CONTOURS
  - MINOR CONTOURS



**AERIAL PHOTO:**  
 Courtesy of the U.S. Geological Survey  
<http://www.usgs.gov>

**REFERENCE:**  
 Survey prepared by Park Engineering  
 for Chevron May 3, 2012

**SHORELINE SETBACK**  
 Environmental Assessment  
 Chevron Kapolei Refinery, CSP  
 TMK: (1)9-1-014-010  
 Kapolei, Oahu, Hawaii



FIGURE 2-4

The Proposed Action Site is bounded by an asphalt drive aisle that runs north-south along the west side of the site, an asphalt drive aisle that runs east-west along the north and south sides and several rows of pipelines that run north-south along the east side of the site. The Pacific Ocean shoreline runs parallel with the westerly side of the site, approximately 1,575 feet (480 m), and is approximately 200 feet (see **Figure 2-5**) to the southwest of the site at an elevation of 12 feet above mean sea level. The Proposed Action Site is generally level and drains towards the southwest.



Figure 2-5 Proposed Action and Alternate 1 Site Locations

### 2.2.2.1 Project Site

The Proposed Action will be located on a vacant, approximately 15.5-acre site that is cleared of vegetation (see **Figure 2-6**). In addition to its central location, Chevron selected the Proposed Action Site for its generally level terrain and minimal environmental resources. The Proposed Action Site is characterized by fill material which may have been the result of leveling operations or old construction excavation backfill. The fill material consists of coral-derived light gray sandy gravel with silt. Below the fill generally there are coral limestone formations and several locations where there are coral outcroppings.



Figure 2-6 Proposed Action Site

### 2.2.2.2 Project Site Access

There are existing asphalt drive aisles bordering the Proposed Action Site on three of the four sides and through the middle as shown in **Figure 2-7**. These drive aisles will serve as maintenance access points for the CSP systems.



Figure 2-7 Proposed Action Site Access

### 2.2.3 Alternatives

An EA must consider alternatives to the Proposed Action in accordance with Chapter 25, ROH. However, detailed analysis is only required for those alternatives determined to be reasonable.

Reasonable alternatives are alternatives that could attain the purpose and need of the Proposed Action, regardless of cost. This EA identifies and evaluates the environmental impacts of an alternative location on the same 248-acre property (Alternative 1) capable of attaining the purpose and need of the Proposed Action. Additionally, this EA evaluates environmental consequences of the alternative of no action as a baseline for comparison with the environmental effects of Alternative 1 and the Proposed Action.

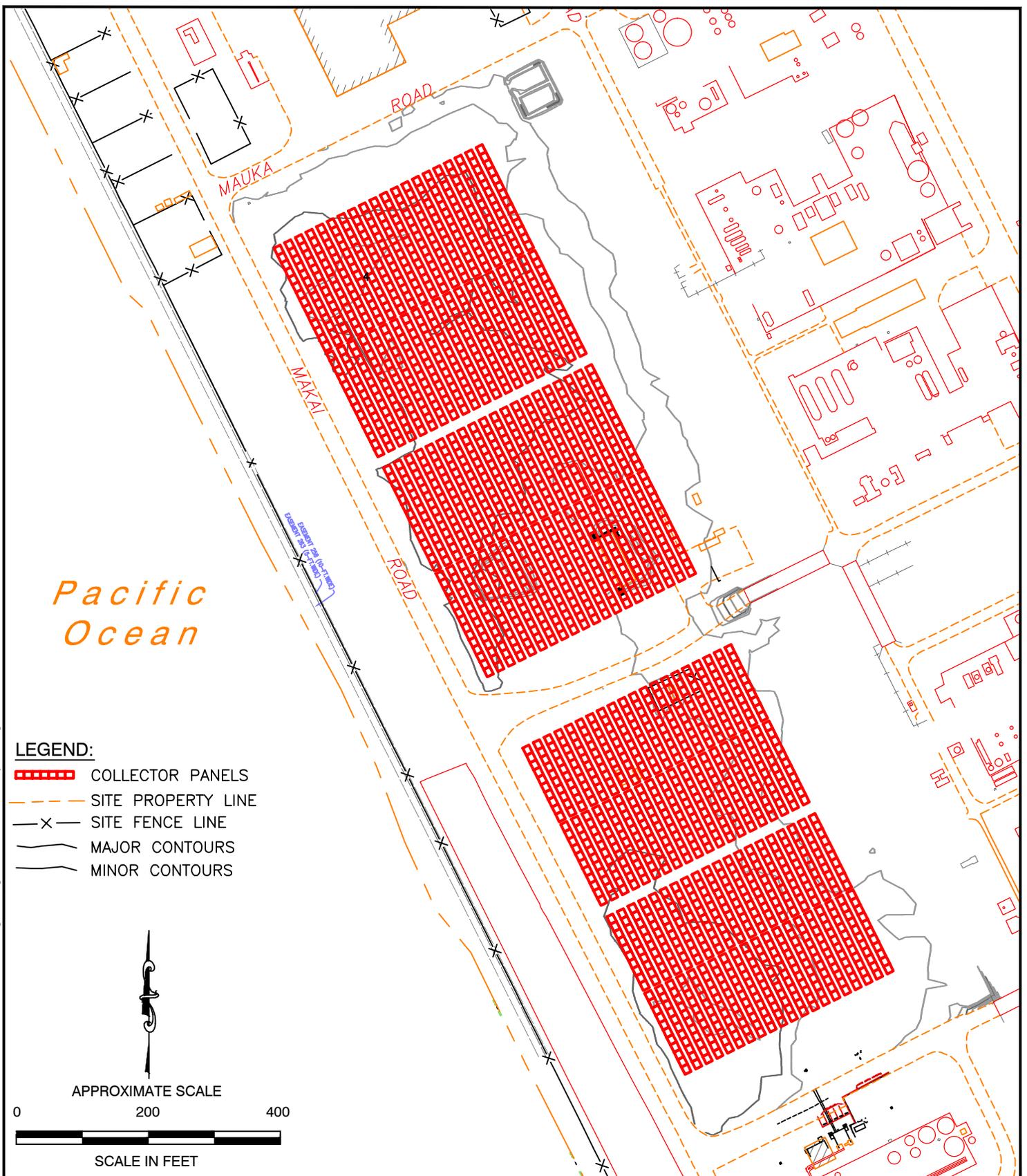
#### *2.2.3.1 Alternative 1*

Under Alternative 1, the CSP system would be constructed and operated on the 17.1-acre site located northeast of the Proposed Action as depicted in **Figure 2-5**. Alternative 1 would be located on the same 248-acre property owned by Chevron (TMK Parcel (1) 9-1-014:010). Alternate 1 is capable of attaining the purpose and need of the Proposed Action. The site is currently heavily wooded and would not be enhancing environmental quality or avoiding, reducing, or minimizing adverse environmental effects, costs, and risks associated with the clearing and grading of the site relative to the Proposed Action. Alternate 1 site is not located in close enough proximity to the refinery interconnection point, and consequently, would have resulted in a less efficient transfer of the heat to the refinery. Also, the site does not have an effective dimension or orientation for this type of technology. The solar panels work more efficiently where they are oriented in a north-south direction and arranged in long rows, which is the case of panel layout in the Proposed Action Site (see **Figure 2-8**).

#### *2.2.3.2 No Action Alternative*

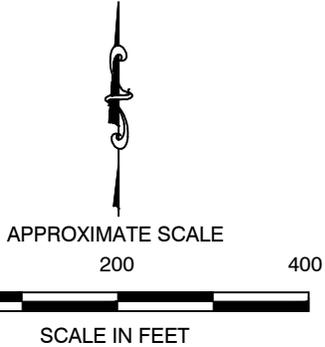
Under the No Action Alternative, the Proposed Action would not be developed. The refinery would not benefit from the reduction in its use of crude oil that it currently is using to produce steam. There would be a lost opportunity to assist the State in reaching the HCEI goal of having 70 percent of the State's energy come from renewable resources by 2030. In addition, there would be a lost opportunity for the refinery to reduce its CO<sub>2</sub>e emissions by approximately 5,000 tons per year and a reduction in fossil fuel combustion of an annual maximum of 10,000 barrels of oil equivalent. The No Action alternative does not meet the purpose and need and is not a feasible alternative. It represents existing conditions and is useful as a baseline, against which to measure the impacts of the proposed action.

P:\Chevron\2012 Chevron\26537561\_Solar Thermal\Design\01\_Figures\FIG-2.7\_Panel Layout.dwg, 11/28/2012 5:49:15 PM



**LEGEND:**

- COLLECTOR PANELS
- SITE PROPERTY LINE
- X SITE FENCE LINE
- MAJOR CONTOURS
- MINOR CONTOURS



**REFERENCE:**  
 Survey prepared by  
 Park Engineering  
 for Chevron May 3, 2012

## PANEL LAYOUT - PROPOSED ACTION SITE

Environmental Assessment  
 Chevron Kapolei Refinery, CSP  
 TMK: (1)9-1-014-010  
 Kapolei, Oahu, Hawaii



**FIGURE 2-8**

**2.3 ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION AND ALTERNATIVES**

**Table 2-1** summarizes the environmental effects of the Proposed Action, Alternative 1, and the No-Action Alternative. This table summarizes the conclusions of the environmental impact analysis provided in Section 4, Environmental Consequences.

**Table 2-1. Summary of Environmental Effects of the Proposed Action, Alternative 1, and No-Action Alternative**

Environmental Resource	Proposed Action	Alternative 1	No-Action Alternative
Air Quality	No Significant Impact	No Significant Impact	No Impact
Noise	No Significant Impact	No Significant Impact	No Impact
Infrastructure	No Significant Impact	No Significant Impact	No Impact
Climate	No Significant Impact	No Significant Impact	No Impact
Visual Resources	No Significant Impact	No Significant Impact	No Impact
Hazardous Materials and Waste	No Significant Impact	No Significant Impact	No Impact
Recreational Resources	No Significant Impact	No Significant Impact	No Impact
Geology and Soils	No Significant Impact with implementation of Best Management Practices (BMPs)	No Significant Impact with implementation of Best Management Practices (BMPs)	No Impact
Water Resources	No Significant Impact with Implementation of BMPs	No Significant Impact with implementation of BMPs	No Impact
Biological Resources	No Significant Impact	No Significant Impact	No Impact
Cultural Resources	No Significant Impact	No Significant Impact	No Impact
Land Use	No Significant Impact	No Significant Impact	No Impact
Socioeconomic Resources	No Significant Impact	No Significant Impact	No Impact
Cumulative Impacts	No Significant Impact	No Significant Impact	No Impact

## SECTION 3 AFFECTED ENVIRONMENT

This section describes the existing environmental setting and baseline conditions in the areas that would be affected by the Proposed Action and alternatives under consideration. The description of the affected environment serves as the basis of comparison for analysis of potential environmental effects of the Proposed Action.

### 3.1 AIR QUALITY

#### 3.1.1 Definition of Resource

Air quality is defined by ambient air concentrations of specific pollutants of concern with respect to the health and welfare of the general public. Air quality is generated by many different sources. “Stationary sources” can include factories, power plants, and refineries. “Mobile sources” include automobiles, buses, planes, truck, and train. “Natural sources” are usually events such as wildfires, windblown dust, and volcanic eruptions. “Fugitive dust generation” is usually from construction and site preparation.

The USEPA, under the requirements of the CAA, as amended in 1977 and 1990 (CAA Amendments), has established NAAQS for six contaminants, referred to as criteria pollutants (40 Code of Federal Regulations [CFR] 50): CO, NO<sub>2</sub>, O<sub>3</sub> (with nitrogen oxides [NO<sub>x</sub>] and volatile organic compounds [VOCs] as precursors), PM<sub>10</sub> – less than 10 microns in particle diameter; PM<sub>2.5</sub> – less than 2.5 microns in particle diameter, Pb, and SO<sub>2</sub>. Areas where concentration levels are below the NAAQS for a criteria pollutant are designated as being in “attainment.” Areas where a criteria pollutant level equals or exceeds the NAAQS are designated as being in “nonattainment.”

In addition to NAAQS, the HDOH established State Ambient Air Quality Standards (SAAQS) to further protect human health. SAAQS exist for the following pollutants: CO, NO<sub>2</sub>, O<sub>3</sub>, PM<sub>10</sub>, Pb, hydrogen sulfide (H<sub>2</sub>S), and SO<sub>2</sub>. Performance standards exist for VOC and total suspended particulates (TSP) within HAR and are controlled by permit.

#### 3.1.2 Affected Environment

Based on air quality data collected and published by the HDOH, the State of Hawaii meets or exceeds the standards of the CAA, including the NAAQS and SAAQS. Campbell Industrial Park is likely the largest source of stationary air emissions on the Island of Oahu, yet due to the consistent trade winds, the regulated air pollutants are within the air quality limits established by the CAA. There are currently three (3) air monitoring stations near Campbell Industrial Park, Kapolei which monitors CO, NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub>, and West Beach, which monitors NO<sub>2</sub>, SO<sub>2</sub>, and PM<sub>10</sub> and Makaiwa, which monitors SO<sub>2</sub>, as well as wind speed and direction. Air quality data collected at these sites and downtown Honolulu during 2009 are presented in **Table 3-1**. As shown by these data, air quality in the area never exceeded the short-term or long-term State or National standards for PM<sub>10</sub>, H<sub>2</sub>S or CO (the two pollutants that could be released during construction of the proposed project) during the period of measurement.

Table 3-1 State and National Ambient Air Quality Standards

Pollutant	Unit	Averaging Period	NAAQS	SAAQs
CO	ppm <sup>a</sup>	1-hour	35 <sup>c</sup>	9
		8-hour	9 <sup>c</sup>	4.4
Pb	µg/m <sup>3</sup>	Quarterly	1.5 <sup>h</sup>	1.5
NO <sub>2</sub>	ppb	1-hour	100	None
	ppm	Annual	0.053 <sup>d</sup>	0.04
H <sub>2</sub> S	ppm	1-hour	None	0.025
PM <sub>10</sub>	µg/m <sup>3</sup>	24-hour	150 <sup>c</sup>	150
		Annual	None <sup>f</sup>	50
PM <sub>2.5</sub>	µg/m <sup>3</sup>	24-hour block average	35	None
		Annual	15 <sup>g</sup>	None
O <sub>3</sub>	ppm	8-hour rolling average	0.075 <sup>h</sup>	0.08
SO <sub>2</sub>	ppm	3-hour	0.5 <sup>b</sup>	0.5
		24-hour	0.14 <sup>c</sup>	0.14
		Annual	0.03 <sup>d</sup>	0.03
Notes:				
a. Parts Per Million.				
b. Federal Secondary Standard.				
c. Not to be exceeded more than once per year.				
d. Average of all 1-hour values in the year may not exceed the level of the standard.				
e. May not be exceeded more than one day per year.				
f. EPA revoked the annual PM <sub>10</sub> standard effective December 17, 2006 due to lack of evidence linking health problems to long-term exposure. The State still has an annual standard.				
g. The 3-year average of 24-hour values must not exceed the level of the standard.				
h. The 3-year average of the fourth highest daily maximum value must not exceed the level of the standard.				
i. Average of all 24-hour values in any calendar quarter may not exceed the level of the standard.				
Source: DOH (2010)				

Based on the expected size of the project, the reduction in CO<sub>2</sub>e emissions is approximately 5,000 tons per year. The reduction in fossil fuel combustion will be an annual maximum of 10,000 barrels of oil equivalent.

The marginal increase in emissions from construction activities will occur over a temporary, short-term period of 2 to 6 months. Use of water as-needed for dust control during construction will minimize the potential for visible emissions HAR §11-60.1-32. The Proposed Action will comply with the provisions of HAR §11-60.1-33 on fugitive dust. The contractor will be required to select appropriate measures to comply with fugitive dust requirements.

**3.2 NOISE****3.2.1 Definition of Resource**

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although prolonged exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise; the perceived importance of the noise, and its appropriateness in the setting; the time of day and the type of activity during which the noise occurs; and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of the sound and is measured in Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. The minimum change in the sound level of individual events that an average human ear can detect is about 1 to 2 dB. A 3 to 5 dB change is readily perceived. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or if -10 dB, halving) of the sound's loudness.

Sound level is usually expressed by reference to a known standard. This EA refers to sound pressure level (SPL, or Lp), with a reference value of 20 micropascals ( $\mu\text{Pa}$ ). Most sounds one hears in the environment do not consist of a single frequency and instead are composed of a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that reflects the typical frequency-dependent sensitivity of average healthy human hearing. This is called "A-weighting," and the decibel level measured is called the dBA. Although sound level value may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (Leq) may be used to describe sound that is changing in level. Leq is the energy-mean dBA during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured.

The maximum permissible sound levels specified in HAR §11-46-4(b) apply to any excessive noise source emanating within the specified zoning district, and at any point at, or beyond the property line of the premises in a manner deemed appropriate by the Director of the HDOH. Mobile noise sources, such as construction equipment or motor vehicles are not required to meet the 70 dBA noise limit (See **Table 3-2**).

**Table 3-2 Hawai'i Administrative Rules §11-46 Noise Limits**

Zoning District	Noise Limit (in dBA)	
	Daytime (7:00 am to 10:00 pm)	Nighttime (10:00 pm to 7:00 am)
Class A: Areas equivalent to lands zoned residential, conservation, preservation, public space, open space, or similar type.	55	45
Class B: All Areas equivalent to lands zoned for multifamily dwellings, apartment, business, commercial, hotel, resort, or similar type.	60	50
Class C: All Areas equivalent to lands zoned agriculture, country, industrial, or similar type.	70	70
Source: HAR §11-46 "Community Noise Control"		

Construction noise is generated by the use of heavy equipment and portable powered tools on job sites and is generally considered temporary, but can vary greatly in overall duration and aggregate magnitude depending on the construction processes or activities being conducted, the type and condition of equipment used, the layout of the construction site and the proximity of sensitive receptors. Generally, construction noise levels primarily represent the acoustical contribution of two categories of dominant sources: impact devices (e.g., jackhammers, pile drivers) that produce high amplitude impulsive or intermittent noise, and large fossil-fueled engine-driven equipment and vehicles (e.g., bulldozers, backhoes, dump trucks) that produce noise as they idle, move, or utilize engine power to perform a function.

Operation and maintenance noise refers to the sounds produced by the completed project (i.e., post-construction) under typical conditions and includes activities, equipment, and building systems that may occur during the day, night, or continuously.

### 3.2.2 Affected Environment

The existing environment is characterized by relatively high noise levels associated with the petroleum refinery, other intensive industrial uses in the area, traffic volumes along nearby roadways, and aircraft at the nearby Kalaeloa Airport (approximately 2 miles to the east at its nearest point).

Grading and construction will involve the use of excavators, trucks, and other heavy equipment. Some of the construction equipment is inherently noisy. Construction related noise will be short term, less than 2 to 6 months. Since most of the construction is on the back side of the refinery, away from the street, none would likely generate noise in excess of the property line noise limits from Malakole Street.

The greatest source of typical day and nighttime noise is generated by regular vehicular traffic on Kalaeloa Boulevard. (State Route 95, or SR-95) and Malakole Street. Assuming this two-lane surface transportation routes would be considered an “other roadway” per Table 5-7 of the Federal Transit Administration (FTA) guidance manual *Transit Noise and Vibration Impact Assessment* (FTA, 2006), the existing ambient sound level in the vicinity of the project site is likely to be 50 to 60 dBA Leq during the day and 40 to 50 dBA at night, depending on proximity to SR-95.

The affected environment for the Proposed Action, from a noise perspective is farther away from the street and behind the noise generated from the refinery.

## 3.3 INFRASTRUCTURE

### 3.3.1 Definition of Resource

Infrastructure is the basic structure of the affected environment, including utilities, transportation facilities, drinking water, and wastewater systems.

### 3.3.2 Affected Environment

Interstate H-1 runs from Kapolei to Kahala (just east of Honolulu), it is the main roadway linking the west side of the island with Honolulu. Employees and guests use H-1 to drive from Honolulu or from the east side to get to the refinery. Access to the Proposed Action from the H-1 is southerly along Kalaeloa Boulevard (State Route 95), then west on Malakole Street approximately 0.8 mile to the big bend in Malakole Street is where the refinery is located. Both of these roads are heavily travelled with trucks and delivery vehicles due to business at Campbell Industrial Park, which begins at the intersection of Kalaeloa and Malakole.

The Proposed Action will be using Reverse Osmosis (RO) demineralized recycled water from the Board of Water Supply (BWS). The refinery currently gets its RO demineralized recycled water to generate steam from the BWS and uses their potable water as a supplemental source. There will be no additional RO demineralized recycled water volume except for the initial filling of the system. The potable water will be used for the occasional mirror cleaning. Methods to minimize the volume of water use will be employed. The existing feed line will be extended above ground from the current refinery location to the solar field. The connection point will occur near the northeast corner of the site.

The Proposed Action will use potable water to potentially clean the panels and from intermittent blow-down which keeps the steam drum from scaling. The net increase in water usage is approximately 500 gal/day.

The Proposed Action will not be using the existing sanitary sewer, owned and maintained by CCH. The electrical services, currently supplied by HECO, will be connected to the refinery electrical. The electrical need is minimal, mainly for the pumps that circulate the heat transfer fluid in the CSP. The CCH manages stormwater runoff and flood hazards through Department of Environmental Services, Storm Water Management Plan and the Flood Control Ordinance. Stormwater will be allowed to infiltrate at its current location. Solid waste is recycled or disposed of at Waimanalo Gulch Landfill. Hazardous waste and materials are discussed in Section 3.6.

Access roads will be provided for fire protection (hydrants) such that any portion of the facility is within 150 feet as measured by an approved route. Where the facility is in excess of 150 feet a water supply capable of supplying the required fire flow for fire protection will be available.

## **3.4 CLIMATE**

### **3.4.1 Definition of Resource**

Climate refers to meteorological conditions, such as the temperature range, precipitation levels, and wind conditions in a particular region. Due to their connection with precipitation levels, flooding hazards are addressed under climate for purposes of this EA.

### 3.4.2 Affected Environment

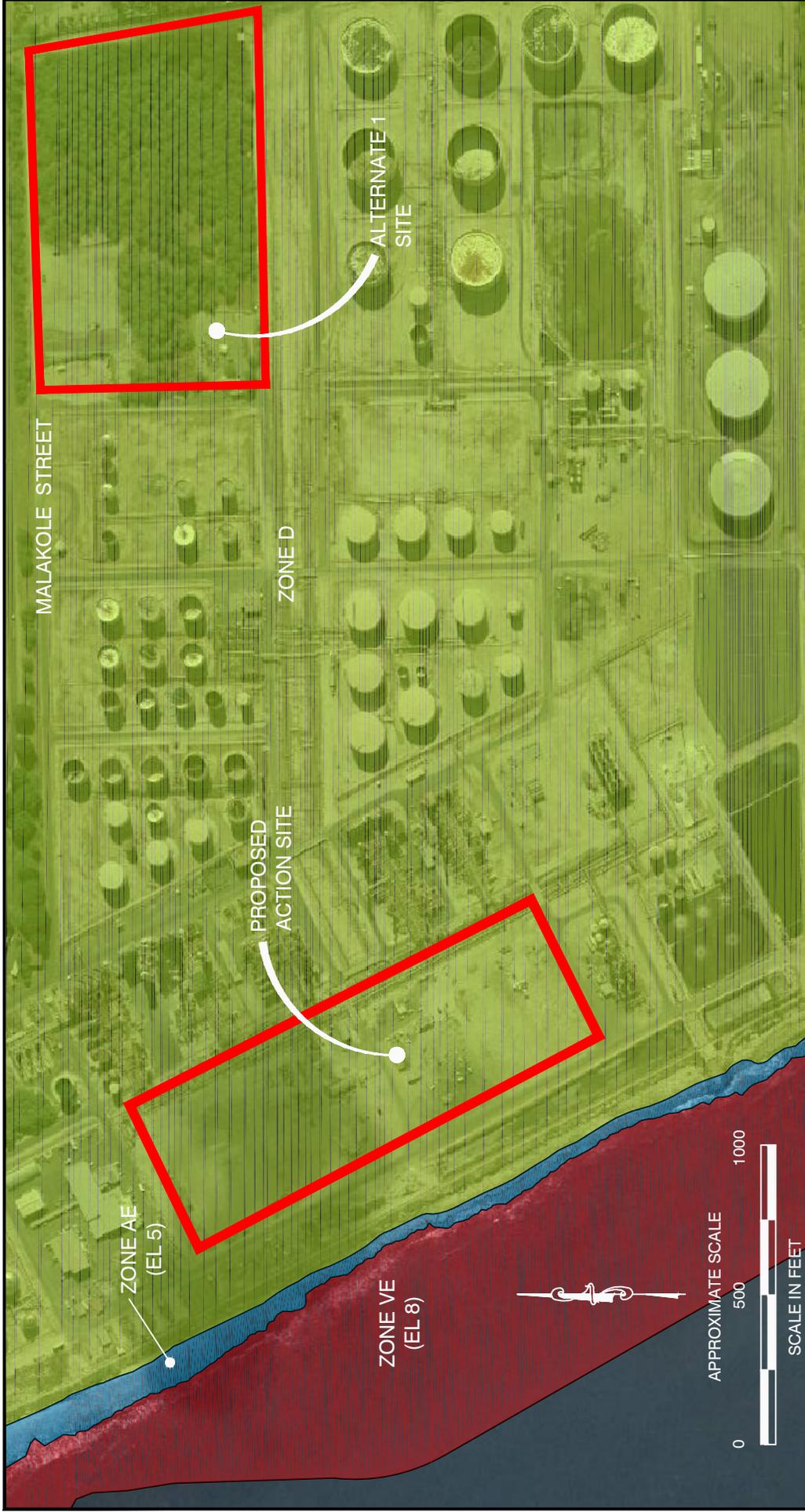
Oahu lies just south of the Tropic of Cancer in the belt of the northeast trade winds. Its climate is generally mild and consistent. The annual average temperature is 76 degrees Fahrenheit (°F), although temperatures occasionally exceed 88 °F. Annual rainfall is less than 20 inches near Honolulu, and is approximately 5 inches in Kapolei, also known as the leeward side of Oahu, which is the dry side of the island. In comparison, average annual rainfall is 45 inches on the North Shore and 400 inches on Waianae Mountain Range on the leeward side of the island. Trade winds prevail about 80 percent of the time and generally blow from the northeast at 5 to 15 miles per hour. Departures from normal trade wind weather, known as Kona storms, tend to occur during winter months. Such storms are characterized by several day variable winds blowing from the south and west.

According to the Hawaii-National Flood Insurance Program Flood Hazard Assessment Tool, the areas that would be affected by the Proposed Action and alternatives under consideration are designated Zone D, which denotes areas where there are possible but undetermined flood hazards, as no flood hazards has been conducted (Hawaii National Flood Insurance Program, 2011) (**Figure 3-1**). Additionally, the Proposed Action is located within the tsunami hazard zone identified by the Oahu Civil Defense Agency (CCH Civil Defense Agency 2011) (**Figure 3-2**).

## 3.5 VISUAL RESOURCES

### 3.5.1 Definition of Resource

Visual resources are public in nature and include views of a project to and from neighboring scenic resources. When evaluating scenic quality, both natural and manmade components of the existing visual environment should be collectively considered. These components may be evaluated in terms of whether each contributes or detracts to the overall scenic landscape character. In turn, this evaluation contributes to the assessment of scenic quality levels, which are established by evaluating the distinctiveness and diversity of a particular landscape setting. Public concern over adverse visual impacts is also an important part of the visual impact assessment process. Public concerns over the visual impacts associated with a project are often directly connected to the size and scale of a project. Additionally, the number and presence of people or activities nearby will further inform the level of concern for impacts to the existing scenic quality of the area. Visual impacts associated with a project can be evaluated in the following objective terms: form, line, color and texture. Such terms are used to measure the existing scenic quality and proposed scenic quality with the addition of the project. This methodology allows for an objective assessment of visual resources. The visibility of a project determines how the Project will be seen from particular viewing areas, which directly relates to the level of concern nearby viewers will have. In general, however, perception of details relating to form, line, color, and texture diminishes with increasing distance.



- ZONE D: UNSTUDIED AREAS WHERE FLOOD HAZARDS ARE UNDETERMINED, BUT FLOODING IS POSSIBLE.
- ZONE AE: STUDIED AREAS WHERE FLOOD HAZARDS ARE DETERMINED; BFE DETERMINED.
- ZONE VE: COASTAL FLOOD ZONE WITH VELOCITY HAZARD (WAVE ACTION); BFE DETERMINED.

**FLOOD INSURANCE RATE MAP**

Environmental Assessment  
 Chevron Kapolei Refinery, CSP  
 TMK: (1)9-1-014-010  
 Kapolei, Oahu, Hawaii

AERIAL PHOTO:  
 Courtesy of the U.S. Geological Survey  
<http://www.usgs.gov>  
 REFERENCE:  
 State of Hawaii GIS: <http://gis.hicentral.com>



FIGURE 3-1



ALTERNATE 1 SITE

PROPOSED ACTION SITE

**LEGEND:**

TSUNAMI EVACUATION ZONE

**TSUNAMI EVACUATION ZONE**  
 Environmental Assessment  
 Chevron Kapolei Refinery, CSP  
 TMK: (1)9-1-014-010  
 Kapolei, Oahu, Hawaii

**URS**

AERIAL PHOTO:  
 Courtesy of the U.S. Geological Survey  
<http://www.usgs.gov>  
 REFERENCE:  
 State of Hawaii GIS: <http://gis.hicentral.com>

FIGURE 3-2

### 3.5.2 Affected Environment

The Proposed Action is currently used for industrial purposes, and is part of the refinery's property. As a result, vegetation within the site boundaries is sparse. The topography of the site is relatively flat and the site is located adjacent to the shoreline. Although the Proposed Action is located along the shoreline, there is a berm that runs parallel with the west side of the area and is approximately 10-12 feet tall which makes the view of the ocean impossible from sea level.

The proposed development will have a relatively low profile. At peak elevation the panels will be no more than 12-15 feet above ground level. These panels will not be seen from outside of the refinery, as the refinery stacks and structures block the view from the mauka side. When the panels are rotated to a vertical position they may be partially seen from the makai side.

## 3.6 HAZARDOUS MATERIALS AND WASTE

### 3.6.1 Definition of Resource

In general, materials and waste are considered hazardous when they pose a threat to human health or the environment. The federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) define hazardous substances as substances that are severely harmful to human health and the environment. Many substances defined as hazardous are harmless in their normal uses but dangerous when released. Hazardous waste is defined under the federal Resource Conservation and Recovery Act (RCRA) as a solid waste which, because of its quality, concentration, or other characteristic, may cause or contribute to serious impacts to human health or the environment that are specified in the law. Substances are defined as hazardous under CERCLA, RCRA, and other federal laws.

### 3.6.2 Affected Environment

Hazardous substances are controlled in the US primarily by laws and regulations administered by the USEPA, the US Occupational Safety and Health Administration (USOSHA), and the US Department of Transportation (USDOT). Each agency incorporates hazardous substance safeguards according to its unique Congressional mandate. USEPA regulations focus on the protection of human health and the environment. OSHA regulations primarily protect employee and workplace health and safety. USDOT regulations promote the safe transportation of hazardous substances used in commerce.

Currently the project area has a light non-aqueous phase hydrocarbon (LNAPL) plume that is being monitored with groundwater monitoring wells. The plume seems to be located on the water table which is about six (6) feet below the ground surface. The footings for the solar panels will not be deep enough to penetrate the ground water table, keeping above the plume.

**3.7 RECREATIONAL RESOURCES****3.7.1 Definition of Resource**

Recreational resources offer opportunities for residents and visitors to engage in leisurely activities. Recreational resources include parks and open space as well as other infrastructure facilitating leisurely activities on land or water, such as piers and harbors. Recreational resources offer opportunities such as hiking, fishing, beachcombing, spelunking, and boating. Recreational opportunities and resources are important to economic activity and quality of life.

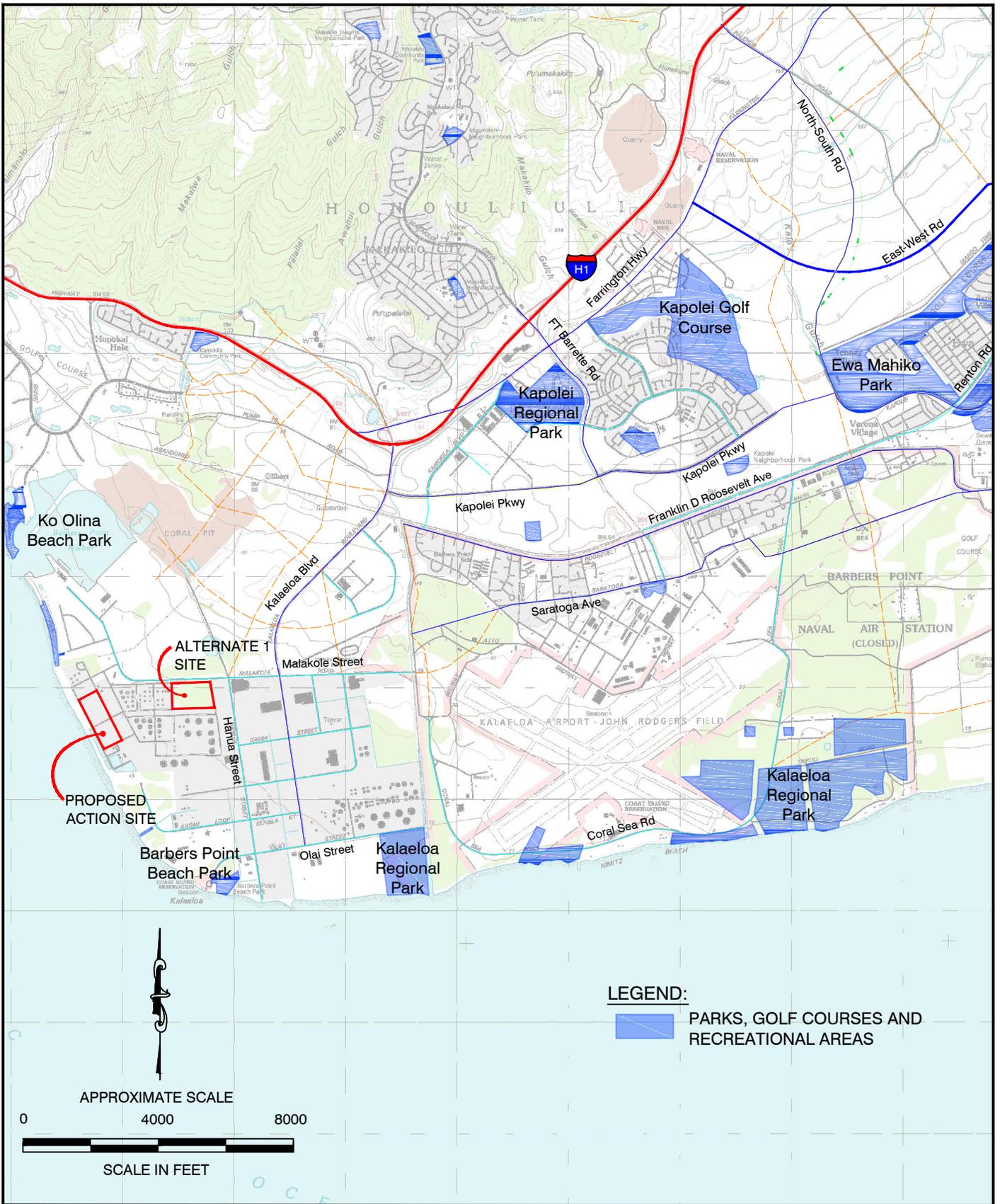
**3.7.2 Affected Environment**

Recreational resources in the vicinity of the Proposed Action and alternatives under consideration include the following parks and other recreational infrastructure (**Figure 3-3**) within the nearby towns of Kapolei and Ewa and along the shoreline (distances provided are relative to the Proposed Action):

- Barber’s Point Harbor (0.5 mile to the north);
- Barber’s Point Beach Park (1.0 mile southeast);
- Ko’Olina Beach Park (1.1 miles to the northwest);
- Kalaeloa Regional Park (1.9 miles to the southeast);
- Ko’Olina Golf Club (1.9 miles to the north);
- Kamokila Community Park (2.1 miles to the north);
- Kapolei Golf Course (2.1 miles to the northeast);
- Wet n Wild Water Park (2.3 miles to the northeast);
- Makaiwa Beach Park (2.3 miles to the north); and
- Kapolei Park (2.4 miles to the northeast).

The Ewa Development Plan and Oahu General Plan emphasize outdoor recreation and cultural tours of the mountains and ocean as part of Vision 2020 for the west side of Oahu.

P:\Chevron\2012 Chevron\26537561\_Solar Thermal\Design\01\_Figures\FIG-3-3\_Recreational Res.dwg\_11/29/2012 9:13:44 AM



REFERENCE:  
 Horizons Technology, Inc.  
 Sure Maps Raster  
 U.S.G.S. Topographic Map (1998)  
 Ewa Quadrangle  
 Ewa, Oahu, Hawaii

## RECREATIONAL RESOURCES

Environmental Assessment  
 Chevron Kapolei Refinery, CSP  
 TMK: (1)9-1-014-010  
 Kapolei, Oahu, Hawaii



FIGURE 3-3

## 3.8 GEOLOGY AND SOILS

### 3.8.1 Definition of Resource

Geology refers to the surface and subsurface materials of which a land area is composed, including soils and rocks. Important geologic characteristics of soils and underlying rocks include stability, slope, compatibility, shear strength, and productivity. Discussions of geology and soils typically identify existing conditions and determine how the Proposed Action and alternatives under consideration would likely affect, and be affected by, geology and soils.

### 3.8.2 Affected Environment

The project area is located along the Ewa Coastal Plain of southwest Oahu, Hawaii and lies within the near shore coastal outwash plain of the Ewa Caprock. The Ewa Coastal Plain covers an area of approximately 28 square miles and consists of an exposed, emergent limestone reef composed of sequences of relatively flat marine sedimentary deposits (calcareous silts, sands and gravels and reef limestone layers) intercalated with terrestrial alluvium deposits (silts and clays derived from the upslope volcanics). Marine limestone and calcareous deposits are 100 to 200 feet thick throughout most of the plain. The sediments of the Ewa Caprock occur as a wedge starting several miles inland and increase in thickness to a maximum of about 1000 feet at the coastline. The inland boundary is approximately parallel to Farrington Highway. The caprock thins northward toward the Waianae Volcano where it interfingers with the alluvium and underlying weathered volcanics.

The Proposed Action is located on Pleistocene emerged reef deposits, which are composed of calcareous marine sediments (Sterns and Valsvik, 1935). These reef forming deposits were formed during numerous cycles of transgression and regression of sea level during the Pleistocene epoch. These formations are primarily constructed of coral reef material composed of coral heads, coralline algae, and coral beach sand cemented by a lime matrix. This classification of calcareous reef rock and marine sediment is found subaerially on Oahu only although similar deposits are found as active and extinct submarine reefs that ring all the islands (Sherrod et al, 2007). The maximum thickness of the reef deposits above sea level is approximately 90 feet. However, Sterns and Valsvik (1935) encountered numerous thicker submerged reefs in deep wells.

The site is generally flat and level with coral outcropping (**Figure 3-4**). The proposed project will not change the soils composition of the property, nor will it impact any significant geologic features or resources. Small portions of the project elements, such as footings and storm drainage will require excavation that may encounter soft rock that will have to be removed using heavy equipment during construction. This material does not have any notable natural resource value and it is not suitable for agriculture or other productive uses. All of the soils and underlying rock that would be affected by the proposed projects are suitable for construction of the proposed facilities as they are designed.

Routine operation and maintenance of the proposed solar system does not have the potential to affect geological or soil resources.

P:\Chevron\2012 Chevron\26537561 Solar Thermal\Design\01\_Figures\FIG-3-4\_Soil Map.dwg, 11/29/2012 9:41:26 AM



**AERIAL PHOTO:**

Courtesy of the U.S. Geological Survey  
<http://www.usgs.gov>

**REFERENCE:**

State of Hawaii GIS: <http://gis.hicentral.com>

### Soil Map

Environmental Assessment  
Chevron Kapolei Refinery, CSP  
TMK: (1)9-1-014-010  
Kapolei, Oahu, Hawaii



FIGURE 3-4

### 3.9 WATER RESOURCES

#### 3.9.1 Definition of Resource

Water resources is a broad term that encompasses surface water, groundwater, near-shore water, wetlands, and other sources of water that support a variety of human activities, plant and wildlife species, habitats, and ecosystems (**Figure 3-5**). Surface water resources typically include stormwater, lakes, streams, and rivers, while water located beneath the ground surface within soil pore spaces or the fractures of rock formations is known as groundwater. Near-shore water is generally considered the area extending seaward from the shoreline beyond the surf zone. A wetland is an area of land that is saturated with water either permanently or seasonally. Water within wetlands can be saltwater, freshwater, or brackish. Examples of wetlands include marshes and swamps. Services performed by wetlands include water purification, shoreline stability, and habitat for plant and wildlife species.

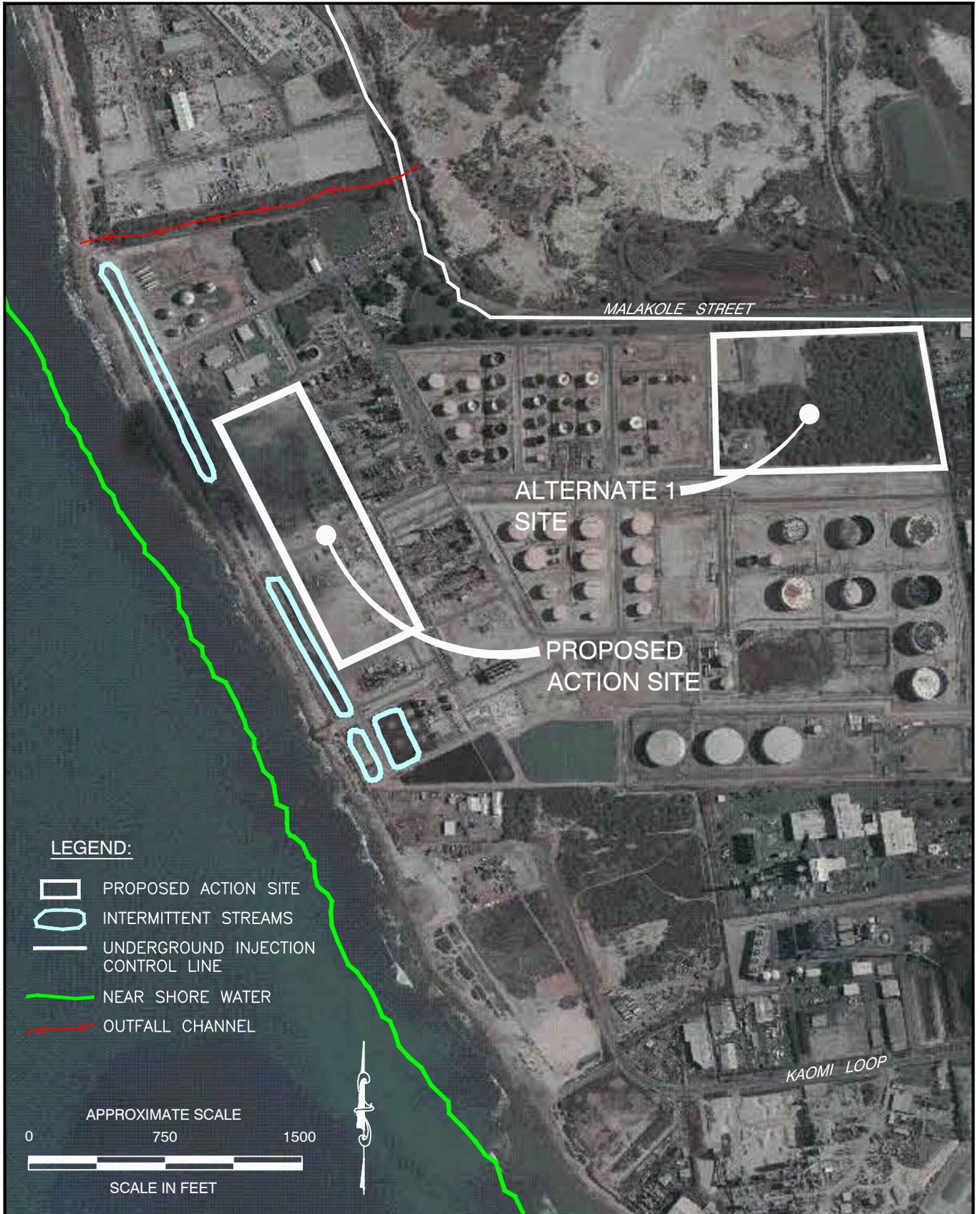
#### 3.9.2 Affected Environment

##### *3.9.2.1 Surface Water*

The Proposed Action is within the Palailai subbasin, part of the Ewa watershed, which is 1.71 miles in length, with a maximum elevation of 2,200 feet. The direction of runoff is towards the southwest. The basin runoff flows down the gulch, then under the H-1, and into a drainage channel which eventually outfalls into the Pacific Ocean. The channel is along the north property line of the refinery.

There are no water bodies located onsite with the exception of the settling ponds. The Proposed Action is approximately 200 feet east of the Pacific Ocean shoreline (**Figure 2-4**). Coastal waters are classified as Class “A” Open Coastal Marine Waters. The site is within the Oahu Civil Defense Tsunami inundation zone (**Figure 3-2**).

The Proposed Action lies within the Federal Emergency Management Agency (FEMA)’s Federal Insurance Rate Map (FIRM) Panel 15003C0304G, effective date January 19, 2011. The FIRM Panel illustrates that the Proposed Action is in “Other Flood Areas” Zone D, which is designated as “unstudied areas where flood hazards are undetermined, but flooding is possible” (**Figure 3-1**).



**LEGEND:**

-  PROPOSED ACTION SITE
-  INTERMITTENT STREAMS
-  UNDERGROUND INJECTION CONTROL LINE
-  NEAR SHORE WATER
-  OUTFALL CHANNEL



**AERIAL PHOTO:**

Courtesy of the U.S. Geological Survey  
<http://www.usgs.gov>

**REFERENCE:**

State of Hawaii GIS: <http://gis.hicentral.com>

## WATER RESOURCES

Environmental Assessment  
Chevron Kapolei Refinery, CSP  
TMK: (1)9-1-014-010  
Kapolei, Oahu, Hawaii



FIGURE 3-5

### *3.9.2.2 Groundwater*

The Proposed Action is within the Ewa aquifer system of the Pearl Harbor Aquifer sector. There is a deeper confined aquifer in a deep layer of basalt and a shallow unconfined aquifer in the overlying caprock. The groundwater in the confined aquifer is brackish with a chloride content ranging from 250 to 1,000 milligrams per liter. The underlying aquifer meets Federal but not the State of Hawaii drinking water standards, thus it is not used as potable water. Groundwater depth at the project site is approximately six feet below ground surface and may vary with tidal conditions.

The boundary between non-drinking water aquifers and underground sources of drinking water is generally referred to as the “Underground Injection Control (UIC) Line” as depicted in **Figure 3-5**. Restrictions on injection wells differ, depending on whether the area is above (mauka) or below (makai) of the UIC line. The project site is below the UIC line. UIC maps are available on the HDOH website at: (<http://hawaii.gov/health/environmental/water/sdwb/uic/uicprogrm.html>).

### *3.9.2.3 Wetlands*

Historically, the Ewa Plain was primarily characterized by sugar plantations. There are no wetlands on the Proposed Action site. The nearest wetlands are Honouliuli National Wildlife Refuge, Apokaa Ponds and Batis Salt Marsh at Ewa Marina. The Honouliuli National Wildlife Refuge is approximately 37 acres and borders the West Loch, which is about 6 miles to the east from the Proposed Action and Alternate 1 Sites. The refuge is a freshwater wetland and is extensively managed for a variety of water birds including Hawaii’s endangered water birds and migrant waterfowl. Apokaa Ponds and the Batis Salt Marsh at Ewa Marina are located about 6 miles to the east, also near West Loch. The settling ponds south of the Proposed Action site has potential to attract birds foraging for food. When present, other standing bodies of water also will have potential to attract birds foraging for food.

### *3.9.2.4 Near-Shore Water*

Near-Shore waters closest to the Proposed Action are classified as Class A, Open Coastal Waters. It is the objective of Class A waters that their use for recreational purposes and aesthetic enjoyment be protected. In addition, Class A waters shall not act as receiving waters for any discharge that has not received the best degree of treatment of control compatible with the criteria established for Class A water (Chapter 11-54-3, HAR).

## 3.10 BIOLOGICAL RESOURCES

### 3.10.1 Definition of Resource

Biological resources include species of vegetation, wildlife, and fisheries, and habitat. Biological resources discussed in this section include botanical, avian, or mammalian resources of special concern, particularly species listed under federal or state endangered species law. Also discussed are species considered sensitive, protected, or proposed for protection.

### 3.10.2 Affected Environment

The affected environment for biological resources described below is based on the biological resources survey report prepared for this EA unless otherwise noted (SWCA Environmental Engineers 2012).

#### 3.10.2.1 Botanical Resources

The Proposed Action site currently has very little vegetation on the site. The plants currently present on the site are primarily weedy species. Vegetation is sparse because of the current use on the Proposed Action site (**Figure 3-6**). The Alternate site is currently sparsely wooded with Ki'awe trees and scrub brush.



Figure 3-6 Vegetation on Proposed Action Site

### 3.10.2.2 Mammalian and Avian Resources

A total of 3 species of bird and 0 species of mammal was observed or detected in the Proposed Action site. Only 1 of the 3 species detected is native to the Hawaiian Islands. The other 2 species are introduced to the Hawaiian Islands and are common throughout the Hawaiian Islands, particularly in areas of human habitation. House sparrow (*Passer domesticus*) was the most common species observed, and Zebra doves (*Geophila straiata*) made up of 90 percent of the 10 birds observed. There are no nesting colonies, nor is there appropriate nesting habitat for seabird species, within or in the vicinity of the site. No migratory shorebirds were recorded during the biological resources survey.

No Mammal species were observed during the biological survey of the Proposed Action site and surrounding area (SWCA Environmental Engineers, 2012).

### 3.10.2.3 Special Status Species

According to the biological resources survey report (**Appendix A**), the Proposed Action site does not contain any plant or mammal species protected or proposed for protection under either federal or state endangered species programs. No federally-designated critical habitat is present on or adjacent to the site. There is no equivalent statute designating critical habitat under state law (SWCA Environmental Engineers, 2012).

## 3.11 CULTURAL RESOURCES

### 3.11.1 Definition of Resource

Significant cultural resources are defined by the NHPA and Chapter 343 of the HRS. According to the NHPA, a historic resource is defined as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register...” According to Chapter 343 of the HRS, cultural resources are defined as “cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups.” Chapter 343 requires that the EA process account for cultural resources in determining the significance of impacts that could occur as a result of a proposed action.

### 3.11.2 Affected Environment

#### 3.11.2.1 Historical Context

Various legends and early historical accounts indicate that the *ahupua'a* of Honouliuli was once heavily populated by pre-contact Hawaiians. This substantial settlement is attributable for the most part to the plentiful marine and estuarine resources available at the coast. The Hawaiian *ali'i* was also attracted to this region. One historical account of particular interest refers to an *ali'i* residing in Ko'olina, approximately 0.9 miles north of the current project area (Cultural Surveys Hawai'i, 2012). Ko'olina is in Waimanalo near the boundary of Ewa and Waianae. This was a vacationing place for chief Kakuhihewa and the priest Napuaikamao was the caretaker of the place.

Other early historical accounts of the general region refer to the more populated eastern portion of the Ewa district, where missions and schools were established and subsistence resources were perceived to be greater. The presence of archaeological sites along the barren coral plains and coast of southwest Honouliuli Ahupua'a indicate that pre-contact and early post-contact populations also adapted to less inviting areas, despite the environmental hardships.

In 1871 most of the ahupua'a was used for stock running and grazing, until 1877 when James Campbell purchased most of Honouliuli *ahupua'a* and drove off the cattle that belonged to Dowsett, Meek and James Robinson. He constructed a fence around the outer boundary and the property prospered as a cattle ranch. Then in 1889 Campbell leased his property to Benjamin Dillingham who formed the Oahu Railway and Land Company. To attract business to his new railroad system, he subleased all land below 200 feet to William Castle who in turn sublet the area to the Ewa Plantation Company for sugar cane cultivation. Ewa Plantation Co. grew quickly and continued in full operation up unto modern times.

### 3.11.2.2 *Historical Research and Field Check*

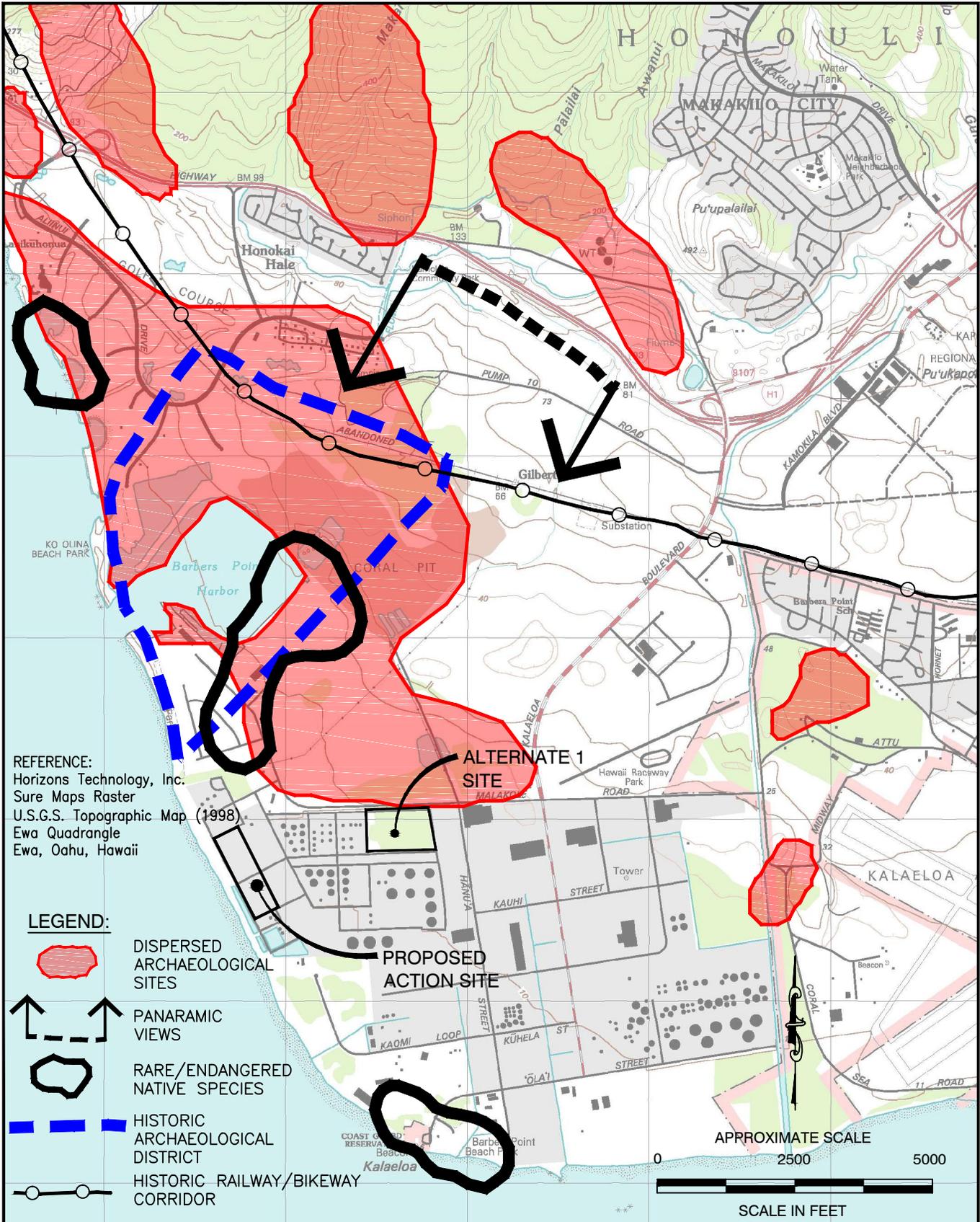
An Archaeological Literature Review and Field Inspection (LRFI) of the proposed project site was completed March 12, 2012 by Cultural Surveys Hawai'i, Inc. A technical report was completed for this study and this report serves as the primary source for summary information provided in this section. The cultural resources survey report is located in **Appendix B**. The purpose of the LRFI was to identify, as feasible, the presence of cultural resources within the defined project site as a result of historical research and a limited field investigation. Documents reviewed included archival sources, historic maps, LCA requests, and previous archaeological reports. A technical report was completed to present the results of the LRFI and to identify any sensitive areas within the project site that may need further investigation or mitigation.

Results indicate that no previous archaeological studies had been completed in the project site, though several previous archaeological studies have been completed in the surrounding vicinity. Previous studies have identified burial caves, human burials, habitation features, agricultural features, and sink holes (**Figure 3-7**). No prehistoric or plantation-era sites were identified in the subject property; nor were historic-period buildings or structures observed.

In 2007, Cultural Surveys Hawai'i undertook an archaeological LRFI for a proposed Chevron Refinery Fencing Project. The fencing project area was observed to have been almost entirely, if not entirely, previously graded raised reef limestone hard pan. No surface historic properties were observed within or in the immediate vicinity of the fencing project area.

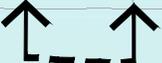
Most of the project site had already been disturbed with previous activity for storage and stockpile purposes. The combination of the installation of an oil pipeline related to the refinery and decades of previous cultivation has likely significantly impacted or destroyed any surface or subsurface materials that may have existed within the project site.

P:\Chevron\2012 Chevron\26537561 Solar Thermal\Design\01\_Figures\FIG-3-7\_NHSR MAP.dwg, 11/29/2012 10:00:21 AM



REFERENCE:  
 Horizons Technology, Inc.  
 Sure Maps Raster  
 U.S.G.S. Topographic Map (1998)  
 Ewa Quadrangle  
 Ewa, Oahu, Hawaii

**LEGEND:**

-  DISPERSED ARCHAEOLOGICAL SITES
-  PANARAMIC VIEWS
-  RARE/ENDANGERED NATIVE SPECIES
-  HISTORIC ARCHAEOLOGICAL DISTRICT
-  HISTORIC RAILWAY/BIKEWAY CORRIDOR

APPROXIMATE SCALE  
 0 2500 5000  
 SCALE IN FEET

RESOURCE:  
 Exhibit 3.2, Ewa  
 Development Plan  
 8-1997 (Revised May 2000)

**NATURAL, HISTORIC AND SCENIC RESOURCES MAP**

Environmental Assessment  
 Chevron Kapolei Refinery, CSP  
 TMK: (1)9-1-014-010  
 Kapolei, Oahu, Hawaii



FIGURE 3-7

**3.12 LAND USE****3.12.1 Definition of Resource**

Land use includes the past, present, and planned land uses and government policies governing the preservation and development of land.

**3.12.2 Affected Environment**

The site is in an area zoned Intensive Industrial (**Figure 3-8**). According to the Ewa Development Plan, Campbell Industrial Park (**Figure 3-9**), Barber's Point Harbor, Kenai Industrial Park and Kapolei Business Park should continue to grow as one of Oahu and the State's most important industrial areas. Campbell Industrial Park is one of the State's largest heavy industrial areas and an important industrial harbor and fuel transfer points in Oahu.

The Proposed Action is located on the west side of Oahu on the Ewa Plain. The Oahu General Plan defines the west side as the secondary urban center at Kapolei and the Ewa urban-fringe areas to relieve developmental pressures in the remaining urban-fringe and rural areas and to meet housing needs not readily provided in the primary urban center.

The Ewa Development Plan concentrates primary employment activities at industrial, resort areas, government services, and higher education centers around Kapolei so that secondary markets are created for office and retail activities. By 2020, Ewa is expected to have experienced tremendous growth with the population growing from 43,000 in 1990 to almost 125,000 people.

The surrounding area is primarily industrial, much of which has been developed into industrial parks similar to Campbell Industrial Park. The expansion of industrial uses at Barber's Point Deep Draft Harbor, Kapolei Business Park, and growth of the Ko'Olina Resort will provide additional jobs for the increase in population in the area. Also present are commercial businesses and recreational resources including Ewa Marina, several parks and golf courses. Waimanalo Landfill is located 2.5 miles to the north of the Proposed Action site. Approximately one mile to the north is Kapolei, with a population of 15,186 (U.S. Census 2010). The Honolulu airport is approximately 20 miles to the east. Parks and other recreational resources in the surrounding area are discussed in Section 3.11.

The Proposed Action is located within the SMA and under the Hawaii CZM Program (see Section 1.4.7 for discussion of the Hawaii CZM Program).

P:\Chevron\2012 Chevron\26537561\_Solar Thermal\Design\01\_Figures\Fig-3-8\_Zoning Map.dwg, 11/29/2012 10:06:54 AM



**LEGEND:**

- ZONE AREAS
- AG-2** GENERAL AGRICULTURE
- I-2** INTENSIVE INDUSTRIAL
- I-3** WATERFRONT INDUSTRIAL
- P-2** GENERAL PRESERVATION
- F-1** FEDERAL AND MILITARY PRESERVATION

**AERIAL PHOTO:**  
 Courtesy of the U.S. Geological Survey  
<http://www.usgs.gov>  
**REFERENCE:**  
 State of Hawaii GIS: <http://gis.hicentral.com>

**ZONING MAP**

Environmental Assessment  
 Chevron Kapolei Refinery, CSP  
 TMK: (1)9-1-014-010  
 Kapolei, Oahu, Hawaii



FIGURE 3-8



**LEGEND:**

- INDUSTRIAL
- AGRICULTURAL AND PRESERVATION
- PARK
- CAMPBELL INDUSTRIAL PARK BOUNDARY



APPROXIMATE SCALE  
0 1500 3000

SCALE IN FEET

**AERIAL PHOTO:**  
Courtesy of the U.S. Geological Survey  
<http://www.usgs.gov>  
**REFERENCE:**  
State of Hawaii GIS: <http://gis.hicentral.com>

**CAMPBELL INDUSTRIAL PARK MASTER PLAN LAND USE MAP**

Environmental Assessment  
Chevron Kapolei Refinery, CSP  
TMK: (1)9-1-014-010  
Kapolei, Oahu, Hawaii



**FIGURE 3-9**

**3.13 SOCIOECONOMIC RESOURCES****3.13.1 Definition of Resource**

Socioeconomic resources refer to the social and economic qualities of the human environment, such as demographic characteristics, employment and income-generating activities, and the ways in which people live, relate to one another, organize to meet their needs, and engage in leisurely activities.

**3.13.2 Affected Environment**

The population of Oahu was 953,207 in 2010 (U.S. Census 2010). The town nearest the Proposed Action is Kapolei, located approximately 1.5 miles to the north. The population of Kapolei was 15,186 in 2010 (U.S. Census 2010). Approximately 31 percent of the population is 17 years or younger, and approximately 6 percent is 65 years or older. Median age is approximately 40 years. There are 4,343 total housing units in Kapolei, approximately 77 percent of which are occupied (3,383 units). Average household size is 3.56 persons. Median household income is \$91,528.

Kapolei is racially diverse with no majority group. Asians represent 34.4 percent of the population, 13.0 percent are White, 14.6 percent are Native Hawaiian and other Pacific Islander, and 35.1 percent are two or more races. Black or African American, American Indian and Alaska Native, and other Race represent the remaining 2.9 percent of the population.

**SECTION 4 ENVIRONMENTAL CONSEQUENCES**

This section evaluates the direct and indirect, short- and long-term impacts of the Proposed Action, Alternative 1, and the No-Action Alternative on the surrounding environment and community. Also evaluated are cumulative impacts that could result from the incremental effects of the Proposed Action or alternatives under consideration when considered together with similar effects from past, present, and reasonably foreseeable future actions. As explained in Sections 4.1 through 4.14, no direct, indirect, or cumulatively significant effects would occur as a result of the Proposed Action, Alternative 1, or the No-Action Alternative.

**4.1 AIR QUALITY****4.1.1 Proposed Action**

Construction of the Proposed Action will temporarily affect air quality on the site and in the immediate vicinity by marginally increasing air pollutant emissions associated with dust generation, equipment use, and vehicle use. In general, fugitive dust generation is expected to result from minor site preparation, ground disturbance, and grading activities, as well as installation of footings for solar reflectors. The Contractor shall implement a Dust Control Plan prior to initiating construction. Equipment used to prepare the site and construct the solar thermal system will result in air pollutant emissions associated with fossil fuel combustion. Vehicles used to transport construction workers, equipment, and materials to and from the site also will result in air pollutant emissions associated with fossil fuel combustion. Up to a maximum of 50 construction workers will be on-site during the most intensive periods of construction. Fewer construction workers will be present during relatively less intensive periods of construction. The marginal increase in emissions from these sources will occur over a temporary, short-term period of 2 to 6 months. Use of water as-needed for dust control during construction will minimize the potential for visible emissions HAR §11-60.1-32. The Proposed Action shall comply with the provisions of HAR §11-60.1-33 on fugitive dust. The contractor shall select appropriate measures to comply with fugitive dust requirements. The following dust control measures can substantially reduce fugitive dust:

- Planning the different phases of construction in an effort to minimize land disturbance,
- Use watering trucks to moisten disturbed soils and locating potential dust-generating equipment in areas of the least impact,
- Use low emission equipment when feasible,
- Cover loads when hauling dirt, controlling dust from daily operations of material being processed, and hauled to and from the facility
- Cover soil stockpiles if exposed for long periods of time,
- Use windbreaks to prevent accidental dust pollution,
- Limit the number of vehicular paths and stabilize temporary roads,
- Maintain stabilized construction area ingress/egress areas,
- Wash and clean trucks prior to leaving construction sites,

- Minimize unnecessary vehicular activities.

Mobile-source pollution can be reduced by minimizing unnecessary vehicular and machinery activities and limiting traffic disruptions, particularly during peak travel periods. All State and Local regulations for dust control and other air quality emission reduction controls will be followed.

Operation of the Proposed Action would result in lower long-term air pollutant emissions relative to existing conditions. Existing operations do not exceed USEPA or HDOH air quality emissions limitations. The Proposed Action will use solar thermal energy to generate steam that is currently generated through combustion of crude oil based fuels. Based on the expected size of the project, the reduction in CO<sub>2</sub>e emissions is approximately 5,000 tons per year. The reduction in fossil fuel combustion will be an annual maximum of 10,000 barrels of oil equivalent. Air pollutant emissions associated with combustion of crude oil based fuels to generate steam will be reduced because of the Proposed Action. The current combustion process will be used as a short-term backup method to generate steam during times the solar thermal system cannot provide needed steam to the refinery, such as nighttime and overcast days. Under this scenario, air pollutant emissions would be similar to existing conditions. But over the long-term, solar thermal energy will be used to generate steam and result in lower air pollutant emissions. The applicant will submit an Application for a Minor Modification to a Covered Source to the Hawaii Department of Health, Clean Air Branch, and comply with all applicable requirements thereof.

Operation of the Proposed Action will be serviced by existing workers on the site for activities like cleaning and maintenance. Therefore, no additional worker vehicle trips and associated air pollutant emissions will be generated by operation of the Proposed Action. If the Proposed Action uses a heat transfer fluid other than water, such as mineral oil, that fluid will be delivered to the site via truck. Truck deliveries will be infrequent during operation and associated air pollutant emissions will be minimal. In addition, the Proposed Action will use electricity for panels to track the sun and to control pumps for fluid circulation, which will not adversely affect air quality on the site or in the vicinity. Overall, the Proposed Action will have a beneficial, long-term effect on air quality. The Proposed Action would have no significant impacts on air quality.

#### **4.1.2 Alternative 1**

Compared to the Proposed Action, Alternative 1 would generate the same amount of air emissions in the same general area. Therefore, air quality impacts under Alternative 1 will be the same as the Proposed Action. There would be no significant impacts to air quality under Alternative 1.

#### **4.1.3 No-Action Alternative**

Under the No-Action Alternative, existing environmental conditions would not change. As a result, no impacts to air quality would occur.

## 4.2 NOISE

### 4.2.1 Proposed Action

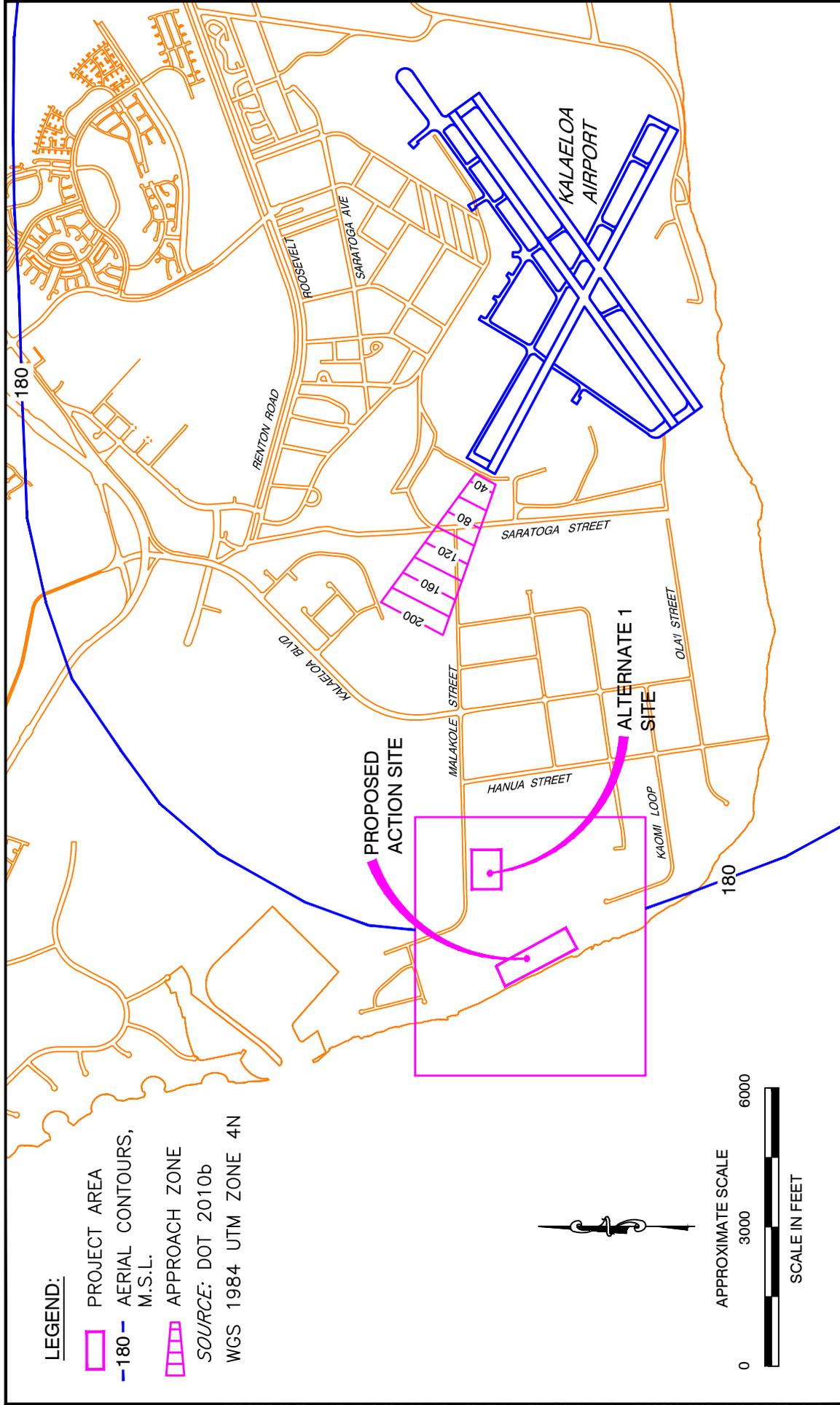
Project construction activity will involve an assortment of noise-generating equipment (e.g., excavators, trucks) for typical construction phases such as minor site preparation, ground disturbance, and grading activities, as well as installation of footings for solar reflectors, and site clean-up. The types of equipment used for construction of the Proposed Action are expected to exceed 78 dBA.<sup>1</sup> As a result, the Proposed Action will be required to obtain a Community Noise Permit from HDOH, IRHB (the Proposed Action's cost of greater than \$250,000 also triggers the requirements for a Community Noise Permit). The permit allows construction to occur from 7:00 AM to 6:00 PM, Monday through Friday and 9:00 AM to 6:00 PM on Saturdays. The use of certain demolition and construction equipment (such as pile drivers, hydraulic hammer, and jackhammers) is limited to 9:00 AM to 5:30 PM, Monday through Friday. The Proposed Action will not exceed maximum permissible sound levels before 7:00 AM and after 6:00 PM, Monday through Friday, or before 9:00 AM and after 6:00 PM on Saturdays, or at any time on Sundays and holidays. Therefore, a Community Noise Variance is not required.

Vehicles used to transport construction workers, equipment, and materials to and from the site also will generate noise at the proposed action site, in the vicinity, and along roadways to the site, including State Route 95 and Malakole Street. Up to a maximum 50 construction workers will be on-site during the most intensive periods of construction. Fewer construction workers will be present during relatively less intensive periods of construction. Trucks also will deliver equipment and materials to the site.

Construction equipment and vehicles would result in minor noise generation on the site over a temporary, short-term period of 2 to 6 months. Because the affected environment is characterized by relatively high noise levels associated with the petroleum refinery adjacent to the site, other intensive industrial uses in the vicinity, traffic volumes along nearby roadways, and aircraft at the nearby Kalaeloa Airport, approximately 2 miles to the east at its nearest point (**Figure 4-1**), construction of the Proposed Action will not generate a significant increase in noise levels on the proposed action site or in the vicinity. Moreover, because the site is surrounded by industrial land uses, there are no sensitive noise receptors that could be adversely affected by construction noise. Vehicles used to transport workers, materials, and equipment to the site will not create a perceptible noise increase relative to existing conditions on surrounding roadways. Surrounding roadways are already heavily travelled by heavy-duty trucks and delivery vehicles travelling to and from Campbell Industrial Park. Construction workers exposed to average noise levels of 85 dBA or more for eight or more hours will be protected through implementation of a Hearing Conservation Program and appropriate controls (e.g., administrative, engineering, and application of Personal Protective Equipment (PPE)).

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<sup>1</sup> Federal Highway Administration (FHWA), Construction Equipment Noise Levels and Ranges. Available at: [http://www.fhwa.dot.gov/environment/noise/construction\\_noise/special\\_report/hcn06.cfm](http://www.fhwa.dot.gov/environment/noise/construction_noise/special_report/hcn06.cfm)



**LEGEND:**

-  PROJECT AREA
  -  -180 AERIAL CONTOURS, M.S.L.
  -  APPROACH ZONE
- SOURCE: DOT 2010b  
WGS 1984 UTM ZONE 4N

REFERENCE:  
State of Hawaii GIS: <http://gis.hicentral.com>

**AIRPORT CONSTRAINTS**

Environmental Assessment  
Chevron Kapolei Refinery, CSP  
TMK: (1)9-1-014-010  
Kapolei, Oahu, Hawaii



P:\Chevron\2012 Chevron\26537561 Solar Thermal\Design\01 Figures\Fig-4-1 Airport Constraints.dwg, 11/29/2012 10:25:05 AM

Operation of the Proposed Action would result in similar if not lower long-term noise levels relative to existing conditions. The Proposed Action will use solar thermal energy to generate steam that is currently generated through combustion of crude oil. Noise generation associated with combustion of crude oil to generate steam will no longer occur because of the Proposed Action. While not expected, crude oil combustion will be used as a short-term backup method to generate steam in the unlikely event solar thermal cannot provide needed steam to the refinery. Under this scenario, noise levels would be similar to existing conditions for a short-term period. But over the long-term, solar thermal energy will be used to generate steam and result in similar if not lower noise levels on the site and in the vicinity. Operation of the Proposed Action does not require a noise permit.

Operation of the Proposed Action will be serviced by existing workers on the site for activities like cleaning and maintenance. Therefore, the Proposed Action will not add additional worker vehicle trips and associated noise increases to nearby roadways. If the Proposed Action uses a heat transfer fluid other than water, such as mineral oil, that fluid will be delivered to the site via truck. Truck deliveries will be infrequent during operation and associated noise generation would also be minimal and infrequent. In addition, the Proposed Action will use electricity for panels to track the sun and to control pumps for fluid circulation, which will not substantively change noise levels on the site or in the vicinity. Overall, the Proposed Action will have a neutral effect on noise levels. The Proposed Action would have no significant noise impacts.

#### **4.2.2 Alternative 1**

Alternative 1, approximately 0.4 mile east of the Proposed Action site, would situate the project site closer to noise sources like Malakole Street and Kalaeloa Airport, but generally within an environment having similar ambient sound to that of the Proposed Action: intensive industrial land uses, as well as vehicle traffic and aircraft departures and arrivals are the dominant noise sources. The construction and operation noise of the Proposed Action would also apply to Alternative 1, and similarly no significant impact from noise would be expected. Alternative 1 is located along the fenceline, which is also the right-of-way line of Malakole Street and is also in close proximity to vehicle traffic along State Route 95 and Malakole Street, which is expected to be the dominant source of noise in the affected environment.

#### **4.2.3 No-Action Alternative**

Under the No-Action Alternative, existing environmental conditions would not change. As a result, no impacts from noise would occur.

### **4.3 INFRASTRUCTURE**

#### **4.3.1 Proposed Action**

Construction and operation of the Proposed Action will rely on infrastructure systems on the site and in the vicinity of the Proposed Action, including Kalaeloa Boulevard and Malakola Street, HECO, water from a supplier of clean water with city water used as back-up, wastewater, Waimanalo Gulch Landfill, and storm water.

The Proposed Action will extend an existing boiler feed water line to the northeast corner of the site. The extension will be above ground. The Proposed Action will be using RO demineralized recycled water from the boiler feed line. The refinery currently gets its RO demineralized recycled water to generate steam from the Board of Water Supply (BWS) and uses their potable water as a supplemental source. There will be no additional RO demineralized recycled water volume except for the initial filling of the system. The estimate for the amount required to fill the system, which is dependent of the supplier used, will be less than 30,000 gallons. The potable water will be used for the occasional mirror cleaning, possibly twice a year. The Proposed Action will use potable water to potentially clean the panels and from intermittent blow-down which keeps the steam drum from scaling. The net increase in water usage is approximately 500 gal/day. Methods to minimize the volume of water use will be employed. Therefore total water consumption at the refinery will not increase as a result of the Proposed Action.

Construction will marginally increase passenger vehicle trips due to the maximum of 50 construction workers, heavy-duty truck trips for delivery of equipment and materials, water consumption for dust control and workers, wastewater associated with the workers, storm water runoff, and solid waste generation due to site clean-up and removal of waste and debris. Short-term construction activities are not expected to affect the electricity system. Long-term operations will marginally increase electricity consumption associated with solar thermal system processes and storm water runoff leaving the site. Operation may involve infrequent heavy-duty truck trips, and is not expected to result in increased passenger vehicle trips or generation of wastewater and solid waste since the Proposed Action will not result in additional workers on the site or at the refinery. Hazardous waste and materials are discussed in Section 4.6.

The marginal increase in demand on transportation, electricity, wastewater, storm water, and solid waste infrastructure associated with the Proposed Action would not adversely affect any of these systems. Water consumption would not increase. These infrastructure systems have adequate capacity to accommodate the marginal effects associated with construction and operation of the Proposed Action. With the exception of the minor above ground extension of the boiler feed water line to the site and connection of the steam generator to the refinery steam system, the Proposed Action would not require any new infrastructure or upgrades of existing infrastructure at the site or in the vicinity. Storm water runoff would be managed in accordance with applicable standards as discussed in Section 4.9. The Proposed Action would not result in any significant effects to infrastructure.

The Project will provide the Fire Department access roads that will be located not more than 150 feet from the farthest point of the facility. The access roads will comply with the National Fire Protection Association (NFPA) 1; Uniform Fire Code (UFC) <sup>TM</sup>, 2006 Edition, Section 18.2.3.2.2. A water supply approved by the county will be capable of supplying the required fire flow for fire protection, and shall be provided where the facility is in excess of 150 feet from a water supply. This will be measured by an approved route around the exterior of the facility. On-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the Authority Having Jurisdiction (AHJ).

### 4.3.2 Alternative 1

The solar thermal system proposed under Alternative 1 would be substantially the same as the Proposed Action. Minimal alterations to the layout would be made where necessary due to the different orientation and dimensions of the Alternative 1 site relative to the Proposed Action site. Alternative 1 would use the same transportation, water, electric, and solid waste infrastructure. However, the Alternative 1 site would require a significantly longer water line extension than the Proposed Action, and would require the extension of electricity. Nevertheless, Alternative 1 would affect the capacity of the water and electricity infrastructure systems in substantially the same manner as the Proposed Action. It would comply with County standards for stormwater. As a result, marginal increases in demand for infrastructure under Alternative 1 would be substantially the same as under the Proposed Action. Alternative 1 would not result in any significant effects to infrastructure.

### 4.3.3 No-Action Alternative

The No-Action Alternative would not change existing levels of infrastructure demand. Therefore, significant effects to infrastructure would not result.

## 4.4 CLIMATE

### 4.4.1 Proposed Action

As described in Section 4.1, the Proposed Action would have a beneficial long-term effect on air quality at the site and in the vicinity. The climate of the west side of Oahu would not be adversely affected by the Proposed Action.

According to the Hawaii-NFIP Flood Hazard Assessment Tool, the Proposed Action is located within Zone D, which denotes areas in which flood hazards are possible but undetermined since the area has not been studied (2012) (see **Figure 3-1**). Additionally, the Proposed Action is located within a tsunami evacuation zone identified by the Oahu Civil Defense Agency (CCH Civil Defense Agency 2011). The CCH Flood Control Ordinance does not promulgate flood protection regulations for development within Zone D beyond the general requirements of the building code ROH, Article 11 Section 21-9. The Proposed Action will comply with applicable sections of ROH (ROH, Article 11 Section 16-11) regarding floodproofing, waterproofing, and structural requirements for buildings and structures potentially subject to coastal flood waters due to tsunami. Moreover, there is a major berm (approximately 10-12 feet in height) along the *makai* edge of the refinery property, which buffers the Proposed Action site from the ocean.

The Proposed Action would involve up to a maximum of 50 construction workers on the site in the tsunami evacuation zone during the temporary construction period of 2 to 6 months. Existing workers already employed at the refinery would work on the Proposed Action site during operations (e.g., cleaning of panels, conducting maintenance). Chevron would implement the existing policies and procedures in place for notification or evacuation of any workers or visitors on the Proposed Action site in the event a tsunami watch, warning, or evacuation advisory or order is issued by the Honolulu Department of

Emergency Management. As a result, the Proposed Action would not result in significant impacts to people or property due to a flooding hazard, including hazards related to coastal flooding due to a tsunami.

#### **4.4.2 Alternative 1**

The solar thermal system proposed under Alternative 1 would be substantially the same as the Proposed Action. Minimal alterations to the layout would be made where necessary due to the different orientation and dimensions of the Alternative 1 site relative to the Proposed Action site.

As a result, marginal increases in air emissions under Alternative 1 would be substantially the same as under the Proposed Action. Alternative 1 would not result in any significant effects to the climate of the west side of Oahu. Additionally, Alternative 1 is not located within a 100-year flood plain or tsunami hazard zone and would not be subject to flooding hazards, including hazards related to coastal flooding due to a tsunami.

#### **4.4.3 No-Action Alternative**

Under the No-Action Alternative, existing environmental conditions would not change. Therefore, no impacts associated with the climate of the west side of Oahu or flooding hazards would occur.

### **4.5 VISUAL RESOURCES**

#### **4.5.1 Proposed Action**

The project site is currently used for industrial purposes, and is part of the refinery's property. As a result, vegetation within the site boundaries is sparse. The topography of the site is relatively flat and is located adjacent to the shoreline. A berm runs parallel with the west side of the area and is approximately 10-12 feet tall, which completely obstructs views of the ocean from ground level.

Short-term and localized visual changes would occur on the site and in the vicinity from the presence of construction equipment, vehicles, and workers during construction. However, because of the temporary nature of the construction activities and the location on a heavily disturbed site within the existing refinery, visual changes as a result of construction will not have an adverse effect on the aesthetics of the area or scenic quality.

Long-term, the development of a solar thermal system on a heavily disturbed site will change the visual appearance of the site. The proposed development will have a relatively low profile. At peak elevation the panels will be no more than 12-15 feet above ground level. However, because the site may be surrounded by and enclosed within a chain link fence with a privacy screen, the Proposed Action will, for the most part, not be visible from outside of the site. The approximately 10-12 feet in height to the west of the site, combined with the site's approximately 12 foot elevation above mean sea level, will substantially screen the Proposed Action from the ocean, although the uppermost portions of the panels may still be visible to some viewers. The chain link with privacy screen and the berm also will shield

nearby viewers from possible glint and glare from the panels. Proposed action components located outside of the site, including the steam pipe connection to the refinery and the above ground water line extension, will be consistent with the existing industrial visual character of the refinery.

Because the Proposed Action site is approximately two miles from the nearest portion of a runway at Kalaeloa Airport (**Figure 4-1**), glint and glare from the solar panels would not adversely affect arriving or departing aircraft. A Notice of Proposed Construction or alteration (Form 7460-1) has been submitted to FAA for their airspace review.

Therefore, the long-term visual changes associated with the Proposed Action will not adversely affect the visual environment. No significant visual impacts will occur.

## 4.5.2 Alternative 1

Due to the location of Alternative 1 and its visual compatibility with the surrounding existing petroleum refinery within a larger industrial area, and the installation of a chain link fence with privacy screen around the perimeter of the site, impacts to visual resources would be similar to those described under the Proposed Action. Alternative 1 would be located approximately 1.5 miles from the nearest portion of a runway at Kalaeloa Airport, glint and glare from the solar panels would not adversely affect arriving or departing aircraft. No significant impacts to visual resources would occur as a result of Alternative 1.

## 4.5.3 No-Action Alternative

Under the No-Action Alternative, existing environmental conditions would remain the same. As a result, no impacts to visual resources would occur.

**TABLE 4-1 Visual Impacts For Each Viewshed**

<b>Viewshed No.</b>	<b>Location</b>	<b>Description of Visual Impact</b>
1	Makakilo - Panama Street	The primary objects in view from this perspective are the refinery holding tanks and stacks. The proposed solar panels will not be visible from this location, and the visual impact is considered very low.
2	Malakole Street	The primary objects in view from this perspective are the refinery holding tanks and stacks. The proposed solar panels will not be visible from this location, and the visual impact is considered very low.
3	Hanua Street	The primary objects in view from this perspective are the refinery holding tanks. The proposed solar panels will not be visible from this location, and the visual impact is considered very low.
4	Kaomi Loop (end)	The primary objects in view from this perspective are the refinery holding tanks and stacks and HECO structures. The proposed solar panels will not be visible from this location, and the visual impact is considered very low.
5	Kaiholo Street	The primary objects in view from this perspective are the refinery holding tanks and stacks and HECO structures. The proposed solar panels will not be visible from this location, and the visual impact is considered very low.
6 and 7	Beach	The primary objects in view from this perspective are the refinery holding tanks and stacks. The proposed solar panels will not be visible from this location as the berm is high enough that the refinery is hidden, and the visual impact is considered very low.
8	Aerial	The primary objects in view from this perspective are the refinery holding tanks and stacks and HECO structures within the Campbell Industrial Park. The proposed solar panels will be visible from this location, but the visual impact is considered very low.



Figure 4-2 Various Viewpoints and Directions from Adjacent Locations



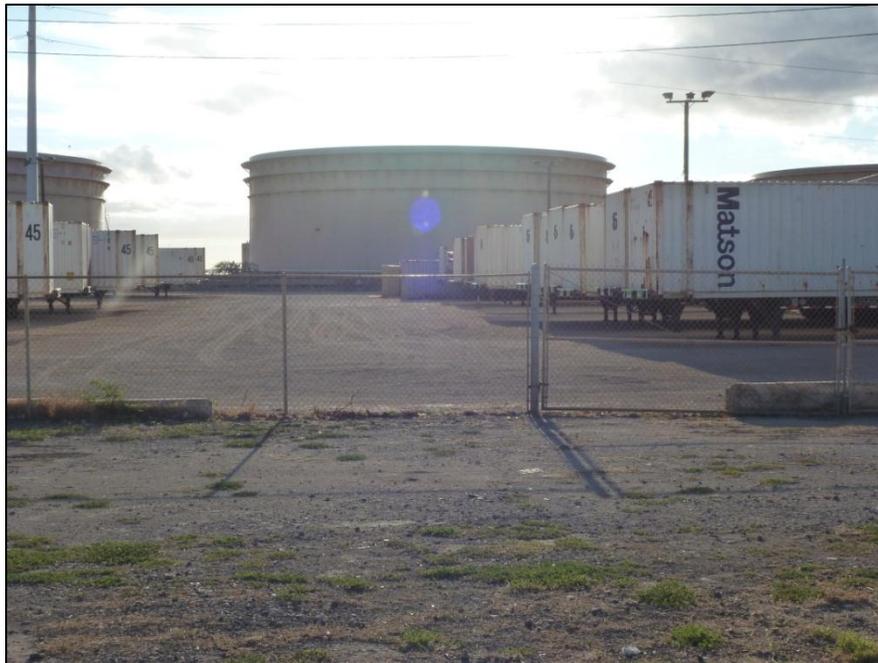
**Site Photo #1**



**Site Photo #2**

**Viewshed #1 – Makakilo Viewpoint – Panama Street  
Viewshed #2 – Malakole Street**

**Figure 4-3**



**Site Photo #3**



**Site Photo #4**

**Viewshed #3 – Hanua Street  
Viewshed #4 – Kaomi Loop – End of Road**

**Figure 4-4**



**Site Photo #5**



**Site Photo #6**

**Viewshed #5 – Kaiholo Street**

**Viewshed #6 – Looking North from the Beach**

**Figure 4-5**



**Site Photo #7**

**Viewshed #7 – Looking South from the Beach**

**Figure 4-6**



**Before View of Site Photo #8**



**After View of Site Photo #8**

**Viewshed #8 – Aerial View**

**Figure 4-7**

**4.6 HAZARDOUS MATERIALS AND WASTE****4.6.1 Proposed Action**

There is no evidence of hazardous materials or waste on or adjacent to the Proposed Action site, with the exception of a light non-aqueous phase hydrocarbon (LNAPL) plume that is being monitored with groundwater monitoring wells. The plume seems to be located on the water table, which is about six feet below the ground surface. The plume is located beneath the eastern portion of the Proposed Action Site. Installation of solar footings would not exceed three feet below ground surface. As a result, impacted groundwater will not be encountered during construction of the Proposed Action. The nine groundwater monitoring wells on the site will not be altered and will remain accessible during operation of the Proposed Action. Also see Sections 3.9 and 4.9 for discussion of groundwater.

Hazardous materials or wastes are not expected to be encountered or released during construction or operation of the Proposed Action. The Proposed Action, including solar panels and other components and materials, do not include hazardous materials that pose a threat to human health or the environment. If the Proposed Action utilizes mineral oil rather than water to generate steam, the mineral oil will be stored in an expansion tank on the site. Mineral oil, if used, will be handled, transported, and stored in compliance with existing regulations. While not expected, if such materials or wastes are discovered or released during construction or operations they will be handled, removed, and disposed of in accordance with applicable state and federal laws, regulations, ordinances, and standards. No significant effects associated with hazardous materials or waste would occur.

**4.6.2 Alternative 1**

Similar to the Proposed Action, there is no evidence of hazardous materials or waste on or adjacent to Alternative 1, and hazardous materials and wastes are not expected be encountered or released during construction or operation. A portion of the LNAPL plume underlies the western portion of the Alternative 1 site. Installation of solar footings would not exceed three feet below ground surface. As a result, impacted groundwater would not be encountered during construction on the Alternative 1 site. While not expected, if such materials or wastes are discovered or released during construction or operations they would be handled, removed, and disposed of in accordance with applicable state and federal laws, regulations, ordinances, and standards. No significant effects associated with hazardous materials or waste would occur.

**4.6.3 No-Action Alternative**

Under the No-Action Alternative, existing environmental conditions would not change. No significant effects associated with hazardous materials or waste would occur.

## 4.7 RECREATIONAL RESOURCES

### 4.7.1 Proposed Action

The Proposed Action would be located on a heavily disturbed site at an existing petroleum refinery within a larger industrial area. A 10-12 foot berm (**Figure 4-8**) separates the Proposed Action Site from the shoreline. There are no recreational resources on or adjacent to the Proposed Action Site. The nearest recreational resource is Barber's Point Harbor, located 0.5 miles to the north. Other resources are located at least 1.0 mile away. The Proposed Action would not adversely affect any recreational resources. The Proposed Action would not affect access to any recreational resources. No significant effects to recreational resources would occur.



Figure 4-8 Fenceline and Berm – Looking South

### 4.7.2 Alternative 1

Similar to the Proposed Action site, the Proposed Action would be located at an existing petroleum refinery within a larger industrial area. There are no recreational resources on or adjacent to Alternative 1. Similar to Alternative 1, the nearest recreational resource is located approximately 0.5 miles from the Proposed Action Site. Alternative 1 would not adversely affect any recreational resources, nor access to any recreational resources. No significant effects to recreational resources would occur.

### 4.7.3 No-Action Alternative

Under the No-Action Alternative, existing environmental conditions would not change. Therefore, no significant effects to recreational resources would occur.

## 4.8 GEOLOGY AND SOILS

### 4.8.1 Proposed Action

The Proposed Action site consists almost entirely, if not entirely, of previously graded raised reef limestone hard pan. The Proposed Action site is generally level terrain that drains to the southwest. The entire site has been drastically altered by historic modern land use including grubbing and grading during initial and ongoing construction within the refinery property. A major berm (approximately 10-12 feet

tall) along the *makai* edge of the refinery property is composed of bulldozer push from the grading and grubbing of the site. In general, the site is covered within a thin (less than 3.9 inches thick) layer of coral silt and gravel. There are occasional coral outcrops, which appear to have been graded flat. There are also occasional very small pit cave features (popularly but erroneously called “sink holes”), but none of these were as large as 23.6 inches in diameter (**Figure 4-9**). Construction of the Proposed Action would involve minor site preparation, grading, and ground disturbance that would minimally alter the topography of the site. Installation of solar footings would not exceed three feet below ground surface. Soils and underlying rock on the site are suitable for construction of the Proposed Action. The site does not contain significant geologic features or natural resources that could be affected by the Proposed Action. The Proposed Action shall be consistent with drainage standards established by the CCH, Department of Environmental Services, Storm Water Management Plan. Implementation of BMPs for erosion and sediment controls during construction will ensure that geologic or soil hazards and adverse effects to water quality do not occur. Because the site does not contain soils suitable for agriculture, the Proposed Action will not affect agricultural productivity. The Proposed Action would not result in significant effects associated with geology and soils.



**Figure 4-9 Small Pit Caves – Sink Hole**

### 4.8.2 Alternative 1

Like the Proposed Action, Alternative 1 features generally level terrain. The site also features soil and geology similar to the Proposed Action. The Alternative 1 site contains a significant amount of vegetation that would need to be cleared prior to construction. Alternative 1 would minimally alter the topography of the site, comply with applicable drainage standards, and implement BMPs for erosion and sediment controls during construction. While the removal of vegetation would result in greater soils impacts relative to the Proposed Action, Alternative 1 would not result in significant effects associated with geology and soils.

### 4.8.3 No-Action Alternative

Under the No-Action Alternative, existing environmental conditions would not change. No significant effects associated with geology and soils would occur.

**4.9 WATER RESOURCES****4.9.1 Proposed Action**

The Proposed Action would implement standard construction phase BMPs during construction of the Proposed Action (USEPA 2010). These BMPs would ensure that stormwater runoff from construction does not reach the drainage channel that eventually outfalls into the Pacific Ocean located north of the property line of the refinery. With implementation of construction BMPs, surface water would not be impacted by the Proposed Action. Construction disturbing greater than one acre requires a National Pollutant Discharge Elimination System (NPDES) Permit to monitor runoff and protect water resources during the construction process. Since greater than one acre would be disturbed, an NPDES permit would be obtained for the Proposed Action.

During operations, the Proposed Action will use infiltration as a stormwater control method to ensure that no stormwater is discharged into the Class A near shore waters. If unable to be retained within the site, stormwater discharge to the drainage channel which ultimately outfalls into Class A near shore is permitted so long as the discharge meets the basic water quality requirements specified in Chapter 11-54-4 HAR and applicable requirements specified in Chapter 11-55 HAR.

Installation of solar footings would not exceed three feet below ground surface. Groundwater depth at the site is approximately six feet below ground surface. As a result, construction activities are not expected to reach the underlying groundwater. Additionally, the Proposed Action will not involve any substances, materials, or processes that would adversely affect groundwater quality beneath the site; therefore, groundwater would not be impacted by the Proposed Action.

The Proposed Action lies within the FEMA's FIRM Panel 15003C0304G, effective date January 19, 2011. The FIRM Panel illustrates that the Proposed Action is in "Other Areas" Zone D, which is designated as "unstudied areas where flood hazards are undetermined, but flooding is possible" (Figure 3-0). The nearest wetland is approximately six miles to the east and will not be affected by the Proposed Action.

The CCH Flood Control Ordinance does not promulgate flood protection regulations for development within Zone D beyond the general requirements of the building code (ROH, Article 11 Section 21-9). The Proposed Action will comply with applicable sections of ROH (ROH, Article 11 Section 16-11) regarding flood-proofing, waterproofing, and structural requirements for buildings and structures. Therefore, no significant impacts related to flooding hazards would occur. No significant environmental consequences associated with water resources would result from the Proposed Action.

**4.9.2 Alternative 1**

The Alternative 1 site also lies within FEMA's FIRM Panel 15003C0304G, effective date January 19, 2011. Therefore, flooding hazards would be similar to the Proposed Action, and no significant impacts related to flooding hazards would occur. In addition to flooding hazards, other impacts to water resources

would be the same as those previously described under the Proposed Action. There would be no significant impacts to surface water, ground water, or wetland resources under Alternative 1.

#### 4.9.3 No-Action Alternative

Under the No-Action Alternative, existing environmental conditions would not change. Therefore, no impacts to surface water, groundwater, wetlands, or near-shore waters would occur.

### 4.10 BIOLOGICAL RESOURCES

#### 4.10.1 Proposed Action

The entire site has been intensively disturbed and highly altered by human activity. The Proposed Action will not result in adverse impacts to any plant or animal species currently listed or proposed for listing under federal or state endangered species statutes, because no such species have been found on or near the site according to recent surveys of the Proposed Action Site and Campbell Industrial Park. The site includes one native plant (*Heliotropium curassavicum*), which is common throughout coastal areas of Oahu and the main Hawaiian Islands. This plant is not protected by federal or state endangered special statutes, therefore removal would not be considered a significant biological resources impact. Three bird species, including one native bird species, the migratory Pacific golden-plover (*Pluvialis fulva*), were observed transiting the project area. The Pacific golden-plover does not nest in Hawaii and therefore is not likely to be affected by the Proposed Action. Neither the endangered Hawaiian stilt (*Himantopus mexicanus knudseni*) or the Hawaiian coot (*Fulica alai*) was observed at or in the vicinity of the Proposed Action site.

The Proposed Action would not affect the 2005 SHA among DLNR, USFWS, and Chevron Hawaii Refinery to provide habitat for and protect the Hawaiian stilt and the Hawaiian coot. The site does not contain habitat, food, water, or other features that could attract these water bird species.

The Proposed Action site does not include, and would not affect, USFWS critical habitat. The Proposed Action does not extend to the potentially jurisdictional water feature located adjacent to the site and would not directly impact this feature. There would be no significant impact to biological resources under the Proposed Action.

#### 4.10.2 Alternative 1

Like the Proposed Action, the Alternative 1 site is part of the existing refinery. Alternative 1 is located approximately 0.4 mile to the east of the Proposed Action on the same property. While the Alternative 1 site contains a large amount of vegetation, it is not expected to include any special status biological resources. As discussed in Section 4.10.1 and the attached biological resources technical report, previous surveys in Campbell Industrial Park have not detected any plant or animal species currently listed or proposed for listing under federal or state endangered species statutes. Same as the Proposed Action, Alternative 1 would not affect the 2005 SHA among DLNR, USFWS, and Chevron Hawaii Refinery to

provide habitat for and protect the Hawaiian stilt and the Hawaiian coot. The site is not expected to attract the water bird species covered by the SHA.

USFWS critical habitat is not located or adjacent to the site. Alternative 1 will not extend to any potentially jurisdictional water feature. Impacts to biological resources under Alternative 1 will be similar to the impacts under the Proposed Action. There would be no significant impacts to biological resources under Alternative 1.

#### 4.10.3 No-Action Alternative

Under the No-Action Alternative, existing environmental conditions would not change. Therefore, no impacts to biological resources would occur.

### 4.11 CULTURAL RESOURCES

#### 4.11.1 Proposed Action

Unless otherwise noted this section is based on the *Archaeological Assessment For a Proposed Solar Site Project Within the Chevron Refinery* prepared by CSH, April 2012 (see **Appendix B**). The archaeological assessment completed by CSH supports the Proposed Action's historic preservation review under HRS Chapter 6E-42 and HAR Chapter 13-13-284, as well as the Project's environmental review under HRS Chapter 343. The archaeological assessment also supports project-related historic preservation consultation with state and county stakeholder agencies and interested Native Hawaiian and community groups. CSH performed a field inspection, historical research, and reviewed past archaeological and paleontological studies.

The Proposed Action site consists almost entirely, if not entirely, of previously graded raised reef limestone hard pan. The entire site has been drastically altered by historic modern land use including grubbing and grading during initial and ongoing construction within the refinery property. A major berm (approximately 10-12 feet tall) along the *makai* (seaward) edge of the refinery property is composed of bulldozer push from the grading and grubbing of the site. In general, the site is covered by a thin (less than 3.9 inches thick) layer of coral silt and gravel. Occasional coral outcrops were observed, which appeared to have been graded flat. Occasional very small pit cave features (popularly but erroneously called "sink holes"), which have the potential to include burials or other cultural deposits, were observed but none of these were as large as 23.6 inches in diameter (experience indicates that such small pit caves have little potential for significant archaeological or paleontological deposits). Due to their small size and exposure to significant previous disturbance, the pit cave features identified on the site hold little promise of containing cultural resources. No surface historic properties were observed within or in the immediate vicinity of the Proposed Action. No intact sinkholes, sand dune deposits, or cultural material were observed within the project area, and none are believed to be present. Moreover, while the Proposed Action site is located within the Chevron Refinery property in the James Campbell Industrial Park, which includes heavy and medium industrial developments and the State's only two oil refineries, there are no historic-period built environment resources, which are over 50 years old within the Proposed Action site.

As a result, the Proposed Action is not anticipated to adversely affect any historic properties. Furthermore, the Proposed Action would have no significant impact on historic properties.

Further consultation with the SHPD will be necessary to establish appropriate mitigation measures should unidentified cultural resources be inadvertently discovered. In the unlikely instance that cultural resources, including but not limited to limestone sinkholes of three feet in diameter or greater or other significant cultural deposits, are encountered, work in the immediate area would cease and notification of the proper authorities, including the SHPD, would occur immediately according to applicable law.

The Archaeological Assessment was submitted to the State of Hawaii Historic Preservation offices for their review and concurrence. The EA will be updated as soon as notification is provided.

## 4.11.2 Alternative 1

Cursory online research of the general location of Alternative 1 did not identify any sites eligible for the NRHP. In addition, no historic properties were identified on the site using the SHPD Data Resource Internet Site. However, previous archaeological surveys summarized in the Archaeological Assessment indicate that the vicinity of Alternative 1 includes sinks, some of which contain the remains of extinct species (see page 29, Sinoto 1979 and Hammatt and Folk 1981, fifth and eighth paragraphs, respectively). If cultural resources were present under Alternative 1, appropriate mitigation measures would be established through consultation with the SHPD, and if encountered, work in the immediate area would cease and notification of the proper authorities, including the SHPD, would occur immediately according to applicable law. Therefore, similar to the Proposed Action, there would be no significant impacts to cultural resources under Alternative 1.

## 4.11.3 No-Action Alternative

Under the No-Action Alternative, existing environmental conditions would not change. Therefore, no impacts to cultural resources would occur.

## 4.12 LAND USE

### 4.12.1 Proposed Action

The Proposed Action would occur on land zoned for Intensive Industrial development. The Proposed Action is consistent with this zoning designation. Moreover, the Proposed Action would be consistent with the vision of the Ewa Development Plan for Campbell Industrial Park and the surrounding area to continue to grow as one of the most important industrial areas in Oahu and the State. The site is located approximately 2 miles west of the Kalaeloa Airport and will not affect operations as described in Section 4.5.

As shown in **Figure 1-2**, the Proposed Action is located within the SMA and subject to the Hawaii CZM Program. The Proposed Action is not within the SSA. With a cost of greater than \$500,000 a SMA Use permit is required for the Proposed Action. The Proposed Action will comply with the requirements for a

special management area use permit as set forth in Chapter 25 of the ROH and the SMA Guidelines set forth in HRS §205A-26. No significant land use impacts would occur.

#### 4.12.2 Alternative 1

Similar to the Proposed Action, Alternative 1 would be consistent with its Intensive Industrial zoning designation and surrounding industrial land uses. Moreover, development on the Alternative 1 site would be consistent with the vision of the Ewa Development Plan for Campbell Industrial Park and the surrounding area to continue to grow as one of the most important industrial areas in Oahu and the State. Alternative 1 is not located within an SMA or SSA. The Alternative 1 site is located approximately 1.5 miles west of the Kalaeloa Airport and will not affect operations as described in Section 4.5. Similar to the Proposed Action, no significant land use impacts would occur under Alternative 1.

#### 4.12.3 No-Action Alternative

Under the No-Action Alternative, existing environmental conditions would not change. No significant land use impacts would occur.

### 4.13 SOCIOECONOMIC RESOURCES

#### 4.13.1 Proposed Action

Up to a maximum of 50 construction workers will be on-site during the most intensive periods of construction. Fewer construction workers will be present during relatively less intensive periods of construction. Operation of the Proposed Action will be serviced by existing workers on the site for activities like cleaning and maintenance. Operation of the Proposed Action will not increase the number of workers at the refinery. Adverse effects to population, employment levels, and the local economy would not occur. The Proposed Action would not result in direct or indirect effects that could adversely affect cultural practices of nearby communities, Oahu, or Hawaii.

Moreover, the Proposed Action is located at an existing petroleum refinery within a larger industrial area. The Proposed Action would not be located in close proximity to any human populations, and, as described throughout this EA, the Proposed Action would not create substantial risks to public health or safety. Therefore, no populations would be disproportionately affected by the Proposed Action, including children, minority, and disadvantaged groups. No significant socioeconomic impacts would occur.

#### 4.13.2 Alternative 1

Since Alternative 1 is located approximately 0.4 mile east of the Proposed Action in the same community, socioeconomic resources impacts to the surrounding community would be substantially the same under both scenarios. No significant socioeconomic impacts would occur under Alternative 1.

#### 4.13.3 No-Action Alternative

Under the No-Action Alternative, existing environmental conditions would not change. Therefore, no socioeconomic resources impacts would occur.

### **4.14 CUMULATIVE IMPACTS**

#### 4.14.1 Proposed Action

No other present or planned projects have been identified within the vicinity of the site in which the environmental effects of other projects could combine with the environmental consequences of the Proposed Action. Moreover, the Proposed Action would not result in significant impacts for any environmental issue evaluated in this EA. As described in Sections 4.1 and 4.2, the Proposed Action would have beneficial effects on cumulative air quality, greenhouse gas emissions, and noise levels. The incremental effects of the Proposed Action would not be compounded or increased by the incremental effects of other projects in the vicinity. In addition, the incremental effects of the Proposed Action would not contribute to cumulatively considerable effects when considered together with similar effects from past projects. The incremental effects of the Proposed Action would not contribute to cumulatively considerable effects for any environmental resource evaluated in this EA. No significant cumulative impacts would occur.

#### 4.14.2 Alternative 1

Since Alternative 1 would be located 0.4 mile east of the Proposed Action, the potential for cumulative impacts under Alternative 1 would be substantially the same as the Proposed Action. No significant cumulative impacts would occur.

#### 4.14.3 No-Action Alternative

Under the No-Action Alternative, the affected environment would not change. The No-Action Alternative would not have any incremental effects that could combine with similar effects from past, present, or future projects to result in cumulatively considerable effects. Therefore, no significant cumulative impacts would occur.

### **4.15 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

Irreversible and irretrievable resources cannot be recovered once committed. Non-renewable resources that would be irretrievably lost if the Proposed Action or Alternative 1 were implemented include gasoline, diesel, water, and electricity from non-renewable sources consumed during construction and operations. However, the Proposed Action would utilize solar energy to generate steam for refinery processes that is currently generated through fossil fuel consumption. The Proposed Action will substantially reduce fossil fuel consumption at the refinery. Human labor during construction and operation also would be irretrievable. No cultural, biological, or other natural resources would be lost or

irretrievably committed by the Proposed Action or Alternative 1. Neither the Proposed Action nor Alternative 1 would irreversibly curtail the range of potential uses of the environment, including but not limited to cultivation of crops and agricultural uses.

#### **4.16 RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY**

This section describes the relationship between local short-term uses of humanity's environment and the maintenance and enhancement of long-term productivity. Trade-offs between short-term and long-term gains and losses are discussed.

As described in Sections 4.1 to 4.14, neither the Proposed Action nor Alternative 1 would result in significant effects to the environment or long-term risks to health or safety. Under the Proposed Action, a solar thermal process facility would be constructed on disturbed land, while construction under Alternative 1 would require removal of existing vegetation. Both sites are located at the existing refinery.

Marginal increases in air emissions, noise levels, and traffic would occur during construction. Construction will use fossil fuel-powered equipment and vehicles. The Proposed Action would not increase overall water consumption at the refinery, with the exception of occasional mirror cleaning, but an above ground boiler feed water line would be extended to the site. Neither the Proposed Action or Alternative 1 sites are available for cultivation. Development on either site would alter the visual appearance of each site, although not adversely.

In contrast with the relatively minor uses of the environment described above, the Proposed Action and Alternative 1 would each result in major long-term productivity benefits, particularly with respect to fossil fuel consumption, greenhouse gas emissions, and air quality. Based on the expected size of the proposed solar facility, the reduction in CO<sub>2</sub>e emissions would be approximately 5,000 tons per year. The reduction in fossil fuel combustion would be an annual maximum of 10,000 barrels of oil equivalent. Both the Proposed Action and Alternative 1 would assist the State in reaching the HCEI goal of having 70 percent of the State's energy come from renewable resources by 2030. Moreover, the Proposed Action and Alternative 1 would each develop an industrial facility on an undeveloped parcel consistent with the vision of the Ewa Development Plan for Campbell Industrial Park and the surrounding area to continue to grow as one of the most important industrial areas in Oahu and the State.

# **SECTION FIVE Compliance With Chapter 25, Revised Ordinances Of Honolulu**

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## **SECTION 5 COMPLIANCE WITH CHAPTER 25, REVISED ORDINANCES OF HONOLULU**

### **5.1 ANTICIPATED DETERMINATION**

This EA was prepared in accordance with Chapter 25, ROH. This EA demonstrates that construction and operation of the Proposed Action would not result in any significant environmental effects. Therefore, pursuant to Chapter 25, ROH, should a Finding of No Significant Impact be determined, an EIS would not be required.

### **5.2 FINDINGS AND REASONS SUPPORTING THE ANTICIPATED DETERMINATION**

The anticipated negative determination was based on review and analysis of the significance criteria specified in § 11-200-12, HAR, which states, “In determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action shall be determined to have a significant effect on the environment if it...” meets any one of the following criteria:

- **Involve an irrevocable commitment or loss of or destruction of natural or cultural resources.** The Proposed Action will not impact or cause the loss of sensitive or protected natural plant communities or animal species. Furthermore, the Proposed Action will not cause the destruction of any known historic, archeological, or cultural resources.
- **Curtail the range of beneficial uses of the environment.** The Proposed Action will not curtail the range of beneficial uses of the environment at the project site or surrounding area. It will contribute to a beneficial use through renewable energy, decrease the amount of fossil fuel used, and construct something useful on property that is unbuildable due to impacted soil conditions.
- **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 order.** As outlined in specific resource evaluations of this document, the Proposed Action will be consistent with the State’s long-term environmental goals and policies, as well as the specific policies and guidelines outlined in Chapter 344, HRS.
- **Substantially affect the economic welfare, social welfare, and cultural practices of the community or State.** The Proposed Action will not adversely affect population levels, employment levels, or the local economy. Furthermore, the Proposed Action will not adversely affect cultural practices of any nearby communities in the CCH or the State of Hawaii as evidenced in the cultural resource analysis section of this document.
- **Substantially affect public health.** The Proposed Action will not create substantial impacts to public health. The Proposed Action will not create significant impacts to air quality or noise as it will not generate substantial pollutants or unreasonably increase ambient noise levels. Additionally, the Proposed Action will not introduce any hazardous materials, nor will it degrade the site and surrounding geological resources, or impact overall water quality. The Proposed

## **SECTION FIVE Compliance With Chapter 25, Revised Ordinances Of Honolulu**

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Action is also located outside the 0.1% annual chance floodplain, and is therefore not subject to frequent flooding.

- **Involve substantial secondary impacts, such as population changes or effect public facilities.** The Proposed Action will not induce substantial secondary impacts to population counts or negatively affect existing public facilities / infrastructure. The Proposed Action will not add to or use existing public facilities/infrastructure for its operation.
- **Involve a substantial degradation of environmental quality.** The Proposed Action will not substantially degrade or impact existing air quality, biological resources, visual resources, soils, or water quality. The Proposed Action will not create additional emissions that would substantially degrade air quality levels. Furthermore, it will not degrade any sensitive habitat for plant and animal species. No sensitive view-sheds have been identified in the surrounding area. Soil and water quality levels will also remain largely unaffected by the addition of the Proposed Action.
- **Is individually limited and cumulatively has considerable effect upon the environment, or involves a commitment for larger actions.** The Proposed Action will not create a cumulatively considerable impact on the environment, or require the commitment for larger action. While marginal increases in air emissions and noise levels would occur during construction, these are not considered cumulatively considerable. Furthermore, marginal increases in vehicle trips on and near the sites would occur during construction and operation, but are also not identified as cumulatively considerable.
- **Substantially affect a rare, threatened, or endangered species or its habitat.** The Proposed Action will not impact any rare, threatened or endangered natural plant community or animal species.
- **Detrimentially affect air or water quality or ambient noise levels.** The Proposed Action will not detrimentally affect air, or water quality, or ambient noise levels. Though the Proposed Action will introduce noise from construction and operation related actions, such activities will not significantly increase ambient noise levels. Consequently, no detrimental impacts to noise levels would occur. Likewise, the Proposed Action will comply with all State and Federal agency permitting requirements and will not degrade existing water quality levels. Air quality levels will not be degraded as the Proposed Action will not add significant air pollutants, but may reduce levels.
- **Affect, or is likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.** The Proposed Action is not in the 100-year floodplain, geologically hazardous land, or erosion-prone area and would not affect wetlands, coastal waters, or beaches. The Proposed Action is located in the tsunami zone.
- **Substantially affect a scenic vista or viewplanes identified in county or State plans or studies.** The Proposed Action will not affect a scenic vista or viewplane (**Figures 4-2 to 4-7**) as identified in the Ewa Development Plan. No scenic vistas or viewplanes were identified within the viewshed of the Proposed Action.
- **Require substantial energy consumption.** The Proposed Action will not require substantial energy to construct or operate. While construction will cause the irreversible and irretrievable loss of resources such as electricity, gasoline, and diesel fuels, consumption of these resources will not be collectively substantial. Operation of the system will reduce the consumption of fossil fuels (crude oil) and require very little electricity to operate.

## **SECTION 6 SPECIAL MANAGEMENT AREA PERMIT ASSESSMENT APPLICATION**

### **6.1 SPECIAL MANAGEMENT AREA**

The Proposed Action will be constructed within the SMA. The SMA extends about three-quarters of the way into the project area. The Proposed Action site is 15.5 acres in size and approximately 12 acres if it is within the SMA.

### **6.2 SHORELINE SETBACK**

The Proposed Action will be 200 feet from the shoreline (**Figure 6-1**), therefore it is outside of the 40 foot shoreline setback area and the 55 foot waiver setback line; the Project is therefore in compliance with the Determination of the Shoreline Setback Line, Subpart 2 Shoreline Setbacks, Chapter 13, and Shoreline Setback Ordinance, Chapter 23, ROH.



**Figure 6-1 Special Management Area**

### **6.3 TECHNICAL CHARACTERISTICS**

#### **6.3.1 Use Characteristics**

A CSP technology will be used to generate process steam for internal refinery use. Refining of crude oil into products such as gasoline, jet fuel, diesel, and fuel oil is an energy intensive process, requiring large amounts of heat. One of the common forms of heat used in the refinery is steam that is generated by burning crude oil based fuels. This project will provide a source of steam that does not require the use of fossil fuels and will be used to offset combustion based steam sources. The CSP facility is expected to operate during the hours of the year when the sun is bright enough to generate steam, which is approximately 2,500 hours annually.

#### **6.3.2 Physical Characteristics**

The CSP collectors use mirrors and optics to concentrate energy from the sun onto pipes carrying a heat transfer fluid, such as water or mineral oil. The thermal energy heats fluid in a pipe at the focal point of each collector. The pipes will be connected to a steam generator that will be fed into the current refinery steam system. The steam then aids the refinery in converting crude oil into gasoline, jet fuel, etc.

### **6.3.3 Construction Characteristics**

Construction of the solar panels will consist of the following activities:

- Demolishing existing structures within the project area. This will be accomplished using backhoes and excavators for the most part.
- Removing stockpiles and debris from the site. This will be accomplished using backhoes and excavators for the most part.
- Preliminary grading and constructing foundations for the panels. This will be accomplished using backhoes and excavators for the most part.
- Final grading and stormwater control devices. This will be accomplished using backhoes and excavators for the most part.
- Installation of the solar panels, heat exchanger, heat transfer fluid tank, piping and electrical connections. This will be accomplished by using standard building techniques and equipment.

### **6.3.4 Utility Requirements**

The boiler feed water line will be extended to the solar field. The refinery currently gets its water for steam generation from BWS and uses city water as make-up. Currently the existing water system is adequate to service any additional needs that the proposed action may require, see the BWS letter in **Appendix D**. Although there will be no (zero) net increase in water usage with this project other than the initial filling up the additional volume of the system. The refinery is not increasing its steam generation, so additional generation here will be offset by reductions from the new system.

- Water, supplied by the Honolulu BWS.
- Electricity, Supplied by HECO.

### **6.3.5 Liquid Waste Disposal**

There will not be a need for liquid waste disposal, no waste is generated.

### **6.3.6 Solid Waste Disposal**

During the construction phase, the Proposed Action will generate solid waste within the SMA. The Proposed Action will not generate solid waste after construction either.

Prior to construction the contractor will be required to prepare the following plans and implement them during construction to mitigate potential construction impacts related to waste:

- Construction Safety and Security Plan
- Construction Health and Safety Plan
- Construction Contaminant Management Plan
- Construction Contingency Plan

- Solid Waste Management Plan

During operation there will not be a need for solid waste disposal, no waste will be generated.

### **6.3.7 Access to Site**

The Proposed Action is located within the Chevron Refinery. Access is provided on three of the four sides of the site. There are existing asphalt drive aisles along the west, north and south sides, existing pipelines are along the east side.

### **6.3.8 Other Pertinent Information**

The Proposed Action will support the HCEI goal of having 70 percent of the State's energy come from renewable sources by 2030.

## **6.4 ECONOMIC AND SOCIAL CHARACTERISTICS**

The Proposed Action will be serviced by existing workers on the refinery for activities such as cleaning and maintenance. Operation of the Proposed Action will not increase the number of workers at the refinery. Adverse effects to population, employment levels, and the local economy would not occur. The Proposed Action would not result in direct or indirect effects that could adversely affect cultural practices of nearby communities, Oahu, or Hawaii.

The Proposed Action is located within the existing petroleum refinery within a larger industrial area. The Proposed Action would not be located in close proximity to any human populations, and would not create substantial risks to public health or safety. Therefore, no populations would be disproportionately affected by the Proposed Action, including children, minority, and disadvantaged groups. No significant socioeconomic impacts would occur.

## **6.5 ENVIRONMENTAL CHARACTERISTICS**

### **6.5.1 Soils**

The Proposed Action is predominately designated as coral outcrop (CR). Coral outcrop consists of coral or cemented calcareous sand typically covering 80 to 90 percent of the surface. The remainder is covered with stockpile soil that has accumulated in crack, crevices and depressions within the coral outcrop.

### **6.5.2 Topography**

The Proposed Action topography is generally flat. Site grading will be done to level and grade the parcel to drain properly.

### **6.5.3 Surface Runoff, Drainage, and Erosion Hazard**

Currently surface runoff from the site travels to the southwest corner where it ponds until it infiltrates. No runoff will leave the site and will not discharge into the ocean. The flat slope of the area and the soil type contribute to a minimal erosion hazard.

### **6.5.4 Federal FIRM Zone, Land Use Ordinance Flood Hazard District, Other Geological Hazards**

The FIRMs have the project area is located in a “Zone D” area. Zone D is an unstudied area where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities. The project will not cross or be within any flood zones.

Concerning the LUO Flood Hazard District compliance, the Proposed Action will not cross any flood zone, therefore the site is in compliance.

Floods, hurricanes, earthquakes, and tsunamis can all affect Hawaii. The project will be designed to meet the design standards related to natural hazards. The Proposed Action is within a tsunami evacuation area.

### **6.5.5 Other Pertinent Information**

## **6.6 AFFECTED ENVIRONMENT**

This section discussed both the affected environment and the Proposed Action’s impacts to the various resources discussed.

*A. A brief description of subject site in relation to surrounding area and the description of surrounding area. (Include considerations and information on existing lands uses; General Plan land use designations; zoning; and unique features.)*

The Project Action site is located in the makai (seaward) portion of the Chevron Refinery property (Figure 1-0). Structures within or adjacent to the project site include the existing perimeter security fence, settling ponds, and equipment storage areas. The existing surrounding land use is zoned as I-2, Intensive Industrial. The Chevron Refinery property is located within Campbell Industrial Park (Figure 3-8) which includes heavy and medium industrial developments and the State’s only two oil refineries. The Refinery is a relatively small-scale oil refinery consisting of numerous heavy industrial structures and storage tanks. South of the refinery property is the Brewer Environmental Industries chemical production facility. Immediately north of the refinery is a wide drainage ditch parallel to the north side. Further north of the refinery property is the developing Kenai Industrial Park. The Barber’s Point Deep Draft Harbor is located approximately 0.8 km (0.5 mi) north of the project area.

***B. Project site in relation to publicly owned or used beaches, parks and recreation areas; rare, threatened, or endangered species and their habitats; wildlife and wildlife preserves; wetlands, lagoons, tidal lands and submerged lands; fisheries and fishing ground; other coastal/natural resources.***

**1. Publicly Owned Beaches, Parks, and Recreation Areas**

The following recreational facilities are adjacent to and/or near the Proposed Action and within the SMA: Pacific Ocean coastline and beaches (parallel to the refineries westerly property line), Barber's Point Beach Park (1.0 miles southeast), Ko'Olina Beach Park (1.1 miles to the northwest), and Kalaeloa Regional Park (1.9 miles to the southeast) (Figure 3-2). The Proposed Action will not impact any of these parks, and therefore, no adverse impact is anticipated due to the Proposed Action in SMA.

**2. Rare, Threatened, or Endangered Species and Their Habitats/Wildlife and Wildlife Preserves**

Coordination with governmental agencies, biological study and the literature review indicate that there are no designated critical habitats within the SMA.

*Flora*

No state or federally listed threatened, endangered, or candidate endangered plant species, or rare native Hawaiian plant species are located within the SMA. The majority of the Proposed Action is devoid of vegetation with less than 5% of the site having vegetative cover.

*Fauna*

No state or federally listed threatened, endangered, or candidate bird, mammal, or insect species are located within the SMA. Many of the native birds of Oahu have been killed off or are extinct, particularly at lower elevations.

**3. Fisheries and Fishing Grounds**

The Proposed Action in the SMA will not impact the use or availability of coastal or stream-based fishing grounds used because the site is located within the Chevron Refinery and is completely fenced off from public. The Proposed Action will not limit any access that currently has access to fishing locations.

**4. Other Coastal/Natural Resources**

The Proposed Action will not adversely affect the opportunities for public enjoyment and use of any recreational, coastal or natural resources within the SMA.

***C. Relation to historic, cultural, and archaeological resources.***

## 1. Historical

The Historic OR & L Railway/Bikeway Corridor which runs east-west is approximately 2 miles to the northeast of the project site. The Proposed Action will not impact this, and therefore, no adverse impact is anticipated due to the Proposed Action in SMA.

## 2. Cultural

Archival and ethnographic research shows that most of the traditional cultural resources within the SMA have been previously destroyed by previous development. The Proposed Action will not impact any cultural resources.

## 3. Archaeological

An archaeological study of the project site was completed and found that no cultural materials were observed within the project site and none are believed to be present. There is a historic archaeological district (Barber's Point Archaeological District) to the north of the project site which includes a dispersed archaeological site. Therefore, there will be no adverse impacts to these resources.

***D. Coastal views from surrounding public viewpoints and from the nearest coastal highway across the site to the ocean or to coastal landform.***

The Proposed Action will install CSP collectors which use mirrors and optics to concentrate energy from the sun. These collectors are relatively low, compared to the existing structures in the surrounding vicinity, to the ground approximately 10-12 feet tall. The installation of these parts will not have an adverse impact on the coastal views as there are no surrounding public viewpoints. The nearest coastal highway is State Highway 95 (Kalaeola Boulevard) which runs north-south and is approximately 2,000 feet to the east of the Chevron Refinery property. The views from the highway will not be adversely affected because the project site is located within the Chevron refinery which consists of numerous industrial structures and storage tanks so the Proposed Action will blend in with these structures.

***E. Quality of receiving waters and groundwater (including potable water) resources. Describe effects on the groundwater recharge cycle within the groundwater control area, show existing and proposed well locations with pumping estimates. Describe effects on receiving waters—streams and ocean waters.***

## 1. Streams

The Proposed Action will not cross any stream within the SMA. Therefore, there will be no adverse impacts.

## 2. Marine Waters

The Proposed Action is adjacent to the Pacific Ocean coastline. There is a berm that was constructed between the Proposed Action and the coastline. The berm is approximately 10-12 feet high. Therefore, there will be no adverse impacts.

## 3. Flood Zones

The Proposed Action is in “Other Flood Areas” Zone D, which is designated as “unstudied areas where flood hazards are undetermined, but flooding is possible” (Figure 3-0). Any impacts to the floodplains caused by the Proposed Action will be mitigated through design to comply with current flood zone regulations.

## 4. Groundwater

The Proposed Action is within the Ewa aquifer system of the Pearl Harbor Aquifer sector. There is a deeper confined aquifer in a deep layer of basalt and a shallow unconfined aquifer in the overlying caprock. The groundwater in the confined aquifer is brackish with a chloride content ranging from 250 to 1,000 milligrams per liter. Groundwater depth at the project site is approximately six feet below ground surface and may vary with tidal conditions.

There is an underground injection control line that is to the northeast of the project site and the project will not have an effect on this injection line (Figure 3-4). This project will not have adverse effects on the groundwater recharge cycle.

### ***F. Other Pertinent Information.***

A Final EA, compliant with CCH Chapter 25, has been prepared for the Proposed Action. The information herein is drawn from information used for preparation of that document, including the technical reports that include detailed information concerning the Project-specific field studies performed to support the Final EA.

## **6.7 PROJECT IMPACTS**

This section discusses impacts within the SMA and the CZM objectives.

### ***A. Coastal Zone Management Objectives.***

The text in italics below is copied directly from HRS Section 205A-2, *CZM Program; Objectives and Policies*.

#### ***1. Recreational Resources***

*Provide coastal recreational opportunities accessible to the public.*

The Proposed Action will not create any new coastal recreational opportunities for the public, it will not adversely affect the existing coastal recreational resources or their uses by the public.

2. *Historical Resources*

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

Section 4.11 of the Final EA discusses the Proposed Action's effect on archaeological, cultural, and historic resources.

Most of the area had already been disturbed with previous activity for storage and stockpile purposes. The combination of the installation of an oil pipeline related to the refinery and decades of previous cultivation has likely significantly impacted or destroyed any surface or subsurface materials that may have existed within the project site.

3. *Scenic and Open Space Resources*

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

Section 4.7 of the Final EA identifies the Proposed Actions impacts and mitigation measures related to protected views. Scenic impacts associated with the Proposed Action in the SMA will not be affected as the CSP units are low to the ground, the refinery stacks and buildings will screen them from the mauka side, and the berm along the shoreline will screen them from the makai side.

4. *Coastal Ecosystems*

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

Section 4.9 of the Final EA identifies the Proposed Actions effect on water quality, which could impact coastal ecosystems. The Proposed Action will not have an adverse impact on coastal ecosystems. There will be no direct drainage into the Pacific Ocean due to the distance between the site and the coast. The Proposed Action will be designed to minimize environmental impacts through the use of construction and permanent BMPs. Stormwater will be allowed to infiltrate into the ground as it does currently.

5. *Economic Uses*

- A. *Provide public and private facilities and improvements to the State's economy in suitable locations.*

Section 4.13 of the Final EA discusses the Proposed Actions effect on economic activity. The Proposed Action would assist the State in reaching the HCEI goal of having 70 percent of the State's energy come from renewable resources by 2030. The reduced dependence on fossil fuels for energy generation would be a benefit to Hawaii's environment.

6. *Coastal Hazards*

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

The Proposed Action is located within the tsunami evacuation zone, thus representing an associated risk. The Proposed Action will be designed to applicable standards and specifications regarding storm weather and associated risks. Erosion is not an issue in this area due to the flat slope, as well as the soil type. Foundations for the CSP units will be installed to a depth sufficient to prevent subsidence. The Proposed Action will not increase pollution.

7. *Managing Development*

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

The Proposed Action will require State and City permits and approvals as described in Section 1.4.13 that include provisions for public participation and ensure protection of coastal resources. The Proposed Action is consistent with land use and Campbell Industrial Park plans.

8. *Public Participation*

- A. *Stimulate public awareness, education, and participation in coastal management.*

The Proposed Action has been engaged throughout the planning process, as required by Federal and State laws.

9. *Beach Participation*

- A. *Protect beaches for public use and recreation.*

The Proposed Action is within the refinery's property and will not have a direct impact on these resources. The Proposed Action will not affect coastal erosion in this area.

10. *Marine Resources*

- A. *Promote the protection, use, and development of marine and coastal resources to assure their sustainability.*

The Proposed Action is adjacent to the coastline but will be approximately 200 feet from the shoreline. There is a berm between the shoreline and the Proposed Action. The Proposed Action will not affect marine resources.

***B. SMA Guidelines.***

The text in italics below is copied directly from ROH Chapter 25-3.2, *Review Guidelines*.

a) *All development in the special management area shall be subject to reasonable terms and conditions set by the council to ensure that:*

1. *Adequate public access, by dedication or other means, to and along the publicly owned or used beaches, recreation areas and natural reserves is provided to the extent consistent with sound conservation principle;*

The Proposed Action will not adversely affect access to and along publicly owned beaches, recreation areas, and natural reserves. The Proposed action is within Chevron Refinery property and will not encroach or prohibit public access to the beach adjacent to the property.

2. *Adequate and properly located public recreation areas and wildlife preserves are reserved;*

The Proposed Action will not adversely affect or diminish the quality of public recreation areas or wildlife preserves; there are no wildlife preserves in the SMA.

3. *Provisions are made for solid and liquid waste treatment, disposal and management that will minimize adverse effects upon special management area resources; and*

The Proposed Action will ensure that proper containment, treatment, and disposal methods for solid and liquid wastes are followed during construction in accordance with Federal, State, and local regulations. There will be no adverse impacts to SMA resources.

4. *Alterations to existing land forms and vegetation; except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, wind damage, wave damage, storm surge, landslides, erosion, sea level rise, siltation or failure in the event of earthquake.*

The Proposed Action will not have an adverse effect on water resources. During construction temporary BMPs for the management of stormwater will be designed, installed, and maintained to reduce the potential for impacts to water resources from erosion and other construction activities. The Proposed Action will not impact floodways, cause wind damage, wave damage, storm surges, landslides, erosion of coastal resources, sea level rise, or siltation. The Proposed Action is designed to meet seismic standards and other natural hazards as applicable.

b) *No development shall be approved unless the council has first found that:*

1. *The development will not have any significant adverse environmental or ecological effect, except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health and safety, or compelling public interest. Such adverse effect shall include but not be limited to the potential cumulative impact of individual developments, each one of which*

*taken in itself might not have a significant adverse effect and the elimination of planning options;*

The Proposed Action will not adversely impact any environmental or ecological resource. There will be no significant cumulative impact from the Proposed Action within the SMA.

2. *The development is consistent with the objectives and policies set forth in Section 25-3.1 and area guidelines contained in HRS Section 205A-26;*

The Proposed Action is consistent with the objections and policies set forth for SMAs.

3. *The development is consistent with the county general plan, development plans, and zoning. Such a finding of consistency does not preclude concurrent processing where a development plan amendment or zone change may also be required;*

The Proposed Action is consistent with all plans and zoning.

4. *That the development has been adequately planned to minimize the risk from coastal hazards such as tsunamis, hurricanes, wind, storm waves, flooding, erosion, and sea level rise and;*

The Proposed Action has been adequately planned and designed to the extent practical to minimize the risk from coastal hazards. The Proposed Project design meets applicable standards and specifications regarding storm weather and construction in floodplains. Temporary and permanent BMPs will minimize the risk to coastal areas from erosion.

5. *That the development does not impede public access to the shoreline or beach area.*

The Proposed Action will not impede public access to the shoreline or beach area.

*c) The council shall seek to minimize, where reasonable:*

1. *Dredging, filling, or otherwise altering any bay, estuary, salt marsh, river mouth, slough, or lagoon;*

The Proposed Action will not require any of the above activities within the SMA.

2. *Any development that would reduce the size of any beach or other area usable for public recreation;*

The Proposed Action will not reduce or impact any beaches or areas usable for public recreation because it will be constructed within Chevron Refinery's property.

3. *Any development that would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management area, and the mean high tide line where there is no beach;*

The Proposed Action will not result in any reductions or restrictions on public access to tidal and submerged lands, beaches, portions of rivers and streams within the SMA, and the mean high tide line where there is no beach.

4. *Any development that would substantially interfere with or detract from the line of sight toward the sea from the State highway nearest the coast; and*

The Proposed Action will not have an adverse impact on the coastal views as there are no surrounding public viewpoints. The nearest coastal highway is State Highway 95 (Kalaeola Boulevard) which runs north-south and is approximately 2,000 feet to the east of the Refinery property. The views from the highway will not be adversely affected because the project site is located within the refinery which consists of numerous industrial structures and storage tanks so the Proposed Action will blend in or be hidden by these structures.

5. *Any development that would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agriculture uses of land.*

The Proposed Action will not have an adverse impact on the water quality in this area, nor existing and potential fishing grounds. The Proposed Action will not have an adverse effect on any wildlife habitats or potential or existing agricultural uses of land, as it will be constructed within the Refinery.

## **6.8 MITIGATION MEASURES**

Please see SMA submittal for the BMPs.

# **SECTION SEVEN List Of Agencies, Organizations And Individuals Consulted**

## **SECTION 7 LIST OF AGENCIES, ORGANIZATIONS AND INDIVIDUALS CONSULTED**

### **7.1 CHAPTER 25, ROH FINAL EA DISTRIBUTION**

The agencies and organizations listed in Table 7-1 will receive electronic copies of the Final EA as part of the Chapter 25 review process.

**Table 7-1 List of Agencies and Organizations Receiving the Final Environmental Assessment**

<b>FEDERAL AGENCIES</b>	<b>COMMENTS RECEIVED</b>
United States Army Corps of Engineers Pacific Ocean Division, Building 230 Fort Shafter, HI 96858-5440	
United States Department of the Interior Fish and Wildlife Service Pacific Islands Fish and Wildlife Office 300 Ala Moana Blvd., Room 3-122, Box 50088 Honolulu, HI 96813	
Federal Aviation Administration Western-Pacific Region Airports Division Office 300 Ala Moana Blvd. Room 7-128 Honolulu, HI 96850-0001	Letter Dated July 25, 2012
Federal Aviation Administration Southwest Regional Office Obstruction Evaluation Group 2601 Meacham Boulevard Fort Worth, TX 76137	"Determination of No Hazard to Air Navigation" Letter Dated October 18, 2012

<b>STATE AGENCIES</b>	<b>COMMENTS RECEIVED</b>
State of Hawaii Department of Business, Economic Development and Tourism Office of Planning P.O. Box 2359 Honolulu, HI 96804	Letter Dated August 2, 2012
Hawaii State Energy Office Department of Business, Economic Development and Tourism 235 S. Beretania, 5th Floor Honolulu, HI 96813	Letter Dated August 15, 2012
State of Hawaii Department of Health Clean Air Branch P.O. Box 3378 Honolulu, HI 96801-3378	Letter Dated August 14, 2012

## **SECTION SEVEN List Of Agencies, Organizations And Individuals Consulted**

<b>STATE AGENCIES</b>	<b>COMMENTS RECEIVED</b>
State of Hawaii Department of Health Clean Water Branch P.O. Box 3378 Honolulu, HI 968011-3378	
State of Hawaii Department of Land and Natural Resources Historic Preservation Division Kakuhihewa Building 601 Kamokila Blvd., Room 555 Kapolei, HI 96707	
State of Hawaii Department of Land and Natural Resources Aquatic Resources Division 1151 Punchbowl St, Room 330 Honolulu, HI 96813	
State of Hawaii Department of Land and Natural Resources Division of Forestry and Wildlife 1151 Punchbowl St, Room 325 Honolulu, HI 96813	
State of Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands 1151 Punchbowl St, Room 131 Honolulu, HI 96813	
Office of Hawaiian Affairs 711 Kapiolani Blvd., Ste. 500 Honolulu, HI 96813	
University of Hawaii Environmental Center Krauss Annex 19 2500 Dole Street Honolulu, HI 96822	

<b>COUNTY AGENCIES</b>	<b>COMMENTS RECEIVED</b>
Board of Water Supply 630 S. Beretania Street Honolulu, HI 96843	Letter Dated August 31, 2012
Honolulu Fire Department 636 South Street Honolulu, HI 96813-5007	Letter Dated August 10, 2012
Department of Planning and Permitting 650 S. King Street, 7th Floor Honolulu, HI 96813	Letter Dated August 21, 2012
Department of Parks and Recreation 1000 Uluohia Street, Suite 309 Kapolei, HI 96707	Letter Dated August 6, 2012
Department of Transportation Services 650 S. King Street, 3rd Floor Honolulu, HI 96813	Letter Dated August 21, 2012
Neighborhood Board # 34 Neighborhood Commission Office 530 South King Street, Room 406 Honolulu, HI 96813	

## **SECTION SEVEN List Of Agencies, Organizations And Individuals Consulted**

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COUNTY AGENCIES	COMMENTS RECEIVED
Satellite City Hall #7 1000 Uluohia Street Kapolei, HI 96707	

ADJACENT AND NEARBY PROPERTIES	COMMENTS RECEIVED
Kapolei Public Library 1020 Manawai Street Kapolei, HI 96707	

### **7.2 NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 CONSULTATION**

The SHPD was consulted in compliance with Section 106 of the NHPA. Their concurrence letter is located in **Appendix C**.

**SECTION 8 REFERENCES**

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**SECTION 9 LIST OF PREPARERS**

This report was prepared for Chevron by URS. Members of the URS professional staff are listed below.

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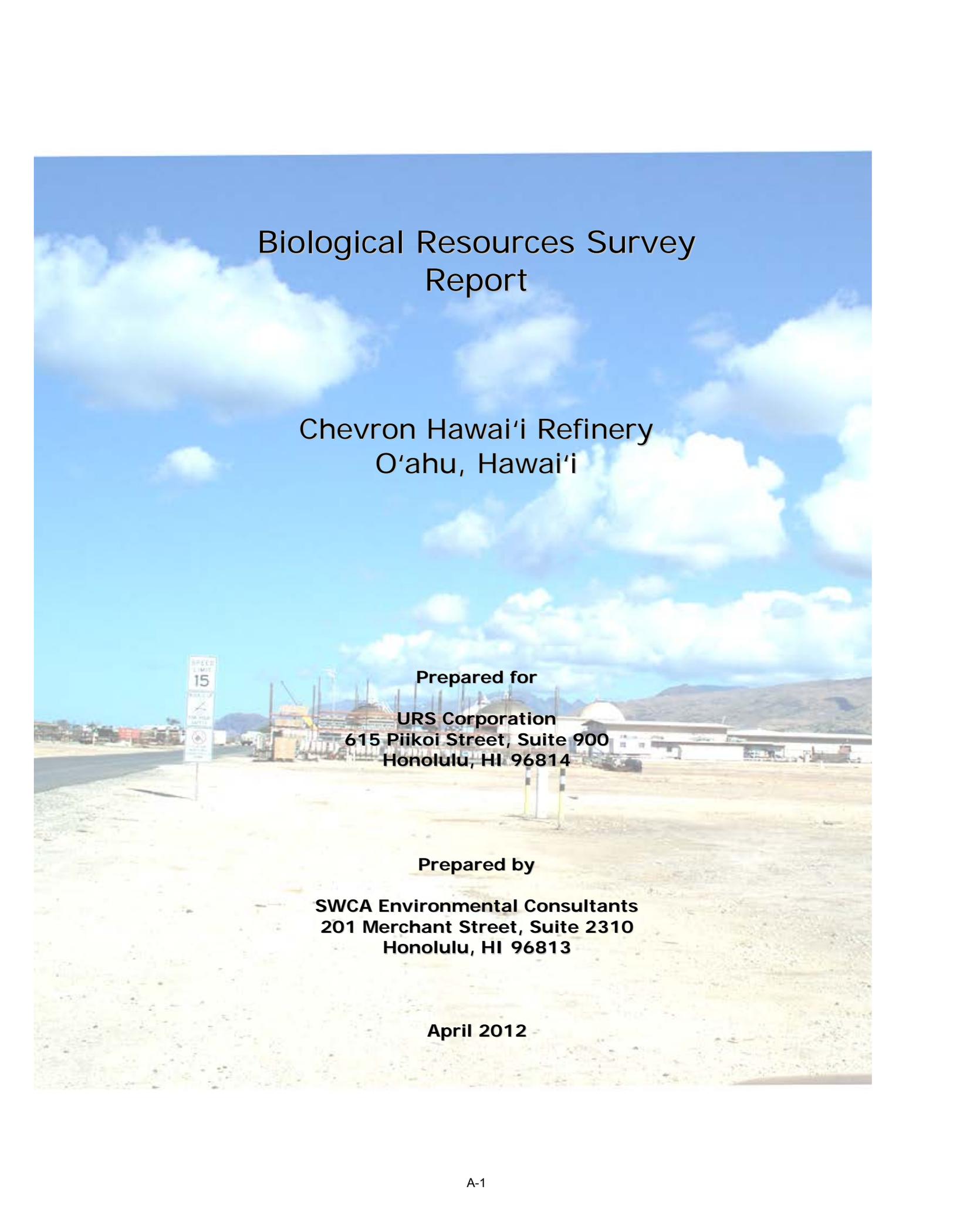
*Graphic Design*

- Lawrence Seeney

# **APPENDIX A**

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## **APPENDIX A BIOLOGICAL RESOURCES SURVEY REPORT**



# Biological Resources Survey Report

Chevron Hawai'i Refinery  
O'ahu, Hawai'i

Prepared for

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615 Piikoi Street, Suite 900  
Honolulu, HI 96814

Prepared by

SWCA Environmental Consultants  
201 Merchant Street, Suite 2310  
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April 2012

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## 1.0 INTRODUCTION

SWCA Environmental Consultants (SWCA) was tasked by URS Corporation to conduct a flora and fauna survey and prepare a biological resources report for a ~15.5 acre (6.3 hectare) parcel (TMK 191014010) within the Chevron Hawai'i Refinery located at the Campbell Industrial Park at Barber's Point, O'ahu (henceforth referred to as the "project site"). URS Corporation proposes to construct a solar energy facility at the site for a project known as *Chevron Solar Thermal Process Project* (URS Project # 2657561.00200). This report provides an assessment of the biological resources within the project area to support an environmental assessment for the proposed solar energy facility.

This report summarizes the findings of the flora and fauna survey conducted by SWCA biologists Jaap Eijzenga and Tiffany Thair on March 26, 2012. The objectives of the flora and fauna survey were:

1. Identify and document the presence and distribution of plant species and vegetation communities within the project boundaries;
2. Identify and document the presence and relative abundance of bird, mammal, amphibian, reptile, and invertebrate macrofauna which occur within the project boundaries;
3. Identify any state or federally listed candidate, threatened, or endangered species, species of concern and/ or rare (either locally or state-wide) species found or known to occur at the project boundaries; and
4. Describe any known resource issues and conflicts unique to the project area.

## 2.0 DESCRIPTION OF THE PROJECT SITE

The ~15.5 acre (6.3 hectare) project site is located within the Chevron Hawai'i Refinery along the western portion of Campbell Industrial Park on the western portion of the 'Ewa Plain, Island of O'ahu (Figure 3). Campbell Industrial Park is the largest heavy industrial area in the State (DPP 2000). The Chevron Hawai'i Refinery encompasses 248 acres (100.4 hectares) within the park (Hawai'i DOFAW 2005). The refinery is bordered on the north by Malakole Street, on the west by the Pacific Ocean, and on the east and south by additional industrial facilities. It is situated less than half a mile south of Kalaeloa Barbers Point Harbor. The refinery is completely surrounded by a security fence and access to the site requires authorization and passage through a guarded gate.

## 3.0 METHODS

SWCA biologists conducted a literature review of available scientific and technical literature regarding natural resources within the vicinity of the project site. On March 26, 2012, one SWCA botanist and wildlife biologist, accompanied by a representative of URS Corporation, surveyed the project site. A hand-held GPS unit was employed together with an aerial site map to determine the survey area.

On June 1<sup>st</sup> one SWCA botanist and wildlife biologist, accompanied by John Timmer of the Chevron Hawaii refinery, performed a brief reconnaissance survey of an alternative site (Figure 3), located within the Chevron Hawaii Refinery boundaries. The biologists went around the perimeter of the approximately 15 acre (6.5 hectares) alternative site for a visual assessment of potential impacts to endangered species from activities in this area. A complete survey was not conducted in this area, and methods and results in this report are given for the survey of the 15.5 acre (6.3 hectare) project site, unless otherwise indicated.

### 3.1 Flora

A pedestrian survey of the area was conducted on March 26, 2012. The biologists walked concurrently along adjacent routes to cover the entire project site. Areas more likely to support native plants (i.e., rocky outcrops, shady areas) were more intensively examined. All plant species observed within the survey area were documented and notes were made on relative abundances (e.g., abundant, common, uncommon, rare), communities, and disturbances.

Plants recorded during the survey are indicative of the season ("rainy" vs. "dry") and the environmental conditions at the time of the survey. It is likely that additional surveys conducted at a

different time of the year would result in minor variations in the species and abundances of plants observed.

### 3.2 Fauna

#### 3.2.1 Avifauna

Point count surveys were conducted on March 26, 2012. Eight minute, 60m (200 ft) radius standard point counts were conducted from four points within the project boundary (figure 3) Field observations of birds were conducted using 10 x 50 binoculars with a 6.5 degree field of vision. The observer also listened for vocalizations and all birds, either heard or seen, were recorded as part of the point counts.

Generally, it is advised to estimate relative species densities using 8-minute point counts conducted during peak bird activity periods (0800–1100 and 1600–1800 hours). However, due to logistical and time constraints, the site was surveyed mid-day. Observations were of eight-minute duration to maximize the likelihood of detecting new species during the survey (Lynch 1995). Rare or previously unrecorded bird species seen between count stations were also noted.

#### 3.2.2 Other Fauna

Mammals, reptiles, amphibians, and invertebrates seen or heard during the point count surveys or between count stations were also documented.

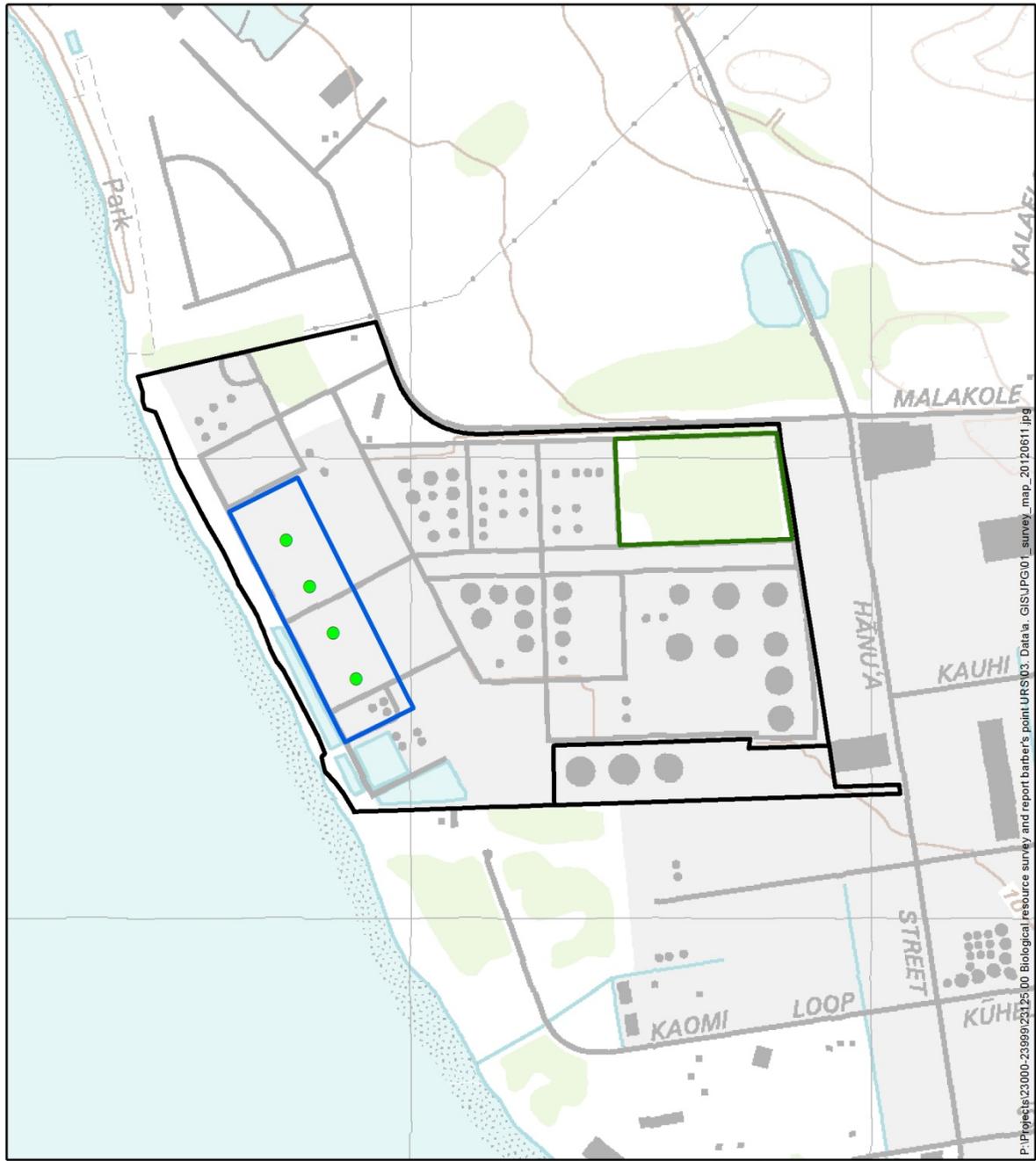
**Figure 1. Project area looking north.**  
Photo courtesy of Darla Guerrero, URS Corp



**Figure 2. Project area looking south.**  
Photo courtesy of Darla Guerrero, URS Corp

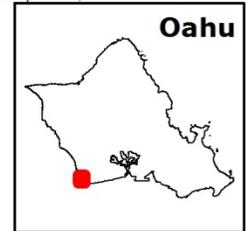
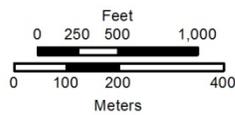


Figure 3. Location of survey area within the Chevron refinery.



**Legend**

- Point Count Station
- ▭ Survey Area
- ▭ Chevron Hawaii Refinery
- ▭ Alternate Location



## 4.0 RESULTS

The project site is heavily disturbed due to various industrial activities. The substrate primarily consists of coral, with a thin layer of sand or soil material (Figures 1 and 2). Some areas of the site have gravel or concrete. The soil surface is cracked in some areas indicating recent ponding and subsequent drying; however, no permanent water features occur within the project site. Old equipment, debris, buildings, and crates are scattered throughout the site.

Sunny weather conditions prevailed throughout the survey. The species recorded are indicative of the season ("rainy" vs. "dry") and the environmental conditions at the time of the survey. It is likely that additional surveys conducted at a different time of the year would likely result in variations in the number and species of plants and animals observed.

### 4.1 Flora

No state or federally listed threatened, endangered, or candidate endangered plant species, or rare native Hawaiian plant species were observed at the project site. The project site does not contain critical habitat for threatened or endangered plants as designated by the U.S. Fish and Wildlife Service.

Twenty-six (26) plant species were recorded at the site during the survey. Of these, only one is native to the Hawaiian Islands - *Heliotropium curassavicum* (kīpūkai). This indigenous species occurs in wet or dry coastal areas throughout the Hawaiian Islands (Wagner et al. 1999). A list of all plant species observed by SWCA biologists within the project site is included in Appendix A of this report.

The majority of the project site is devoid of vegetation with less than 5% of the site having vegetative cover. The minimal vegetation within the project site is comprised of non-native grasses and herbaceous plants that are common in disturbed coastal areas throughout the Hawaiian Islands. *Sporobolus indicus* (West Indian dropseed), *Echinochloa colona* (jungle-rice), *Cenchrus ciliaris* (buffelgrass), and *Chloris barbata* (swollen fingergrass) are among the grasses scattered throughout the area. Non-native herbaceous species found scattered sparsely throughout the site or in isolated patches include *Flaveria trinervia*, *Sesuvium verrucosum* (sea purslane), *Verbesina encelioides* (golden crown-beard), *Portulaca oleracea* (pigweed), and *Portulaca pilosa* (ākulikuli). No trees or large shrubs were observed within the project site. The largest concentration of vegetation occurs in the northeastern portion of the project site within two depressed basins or wash-out areas. These areas support a variety of grasses and weedy herbaceous species. Vegetation is also more common in shadier areas, such as under buildings and pipelines, within the project site.

### 4.2 Fauna

No native state or federally listed threatened, endangered, or candidate bird, mammal, or insect species were observed during our survey. Many of the native birds of Oahu have been extirpated or are extinct, particularly at lower elevations. Extant populations continue to decline, and their range has been highly reduced. Leading causes for population declines and extinctions across the Hawaiian Islands include habitat destruction, introduced predators, and avian disease (Ralph and Van Riper 1985).

#### 4.2.1 Avifauna

Only three (3) bird species were recorded during the survey (Appendix B). House sparrows (*Passer domesticus*) and zebra doves (*Geopelia striata*) were observed occasionally throughout the survey. These two species are introduced to the Hawaiian Islands and are common throughout the Hawaiian Islands, particularly in areas of human habitation (HAS 2005).

Only one native bird recorded at the site, the migratory Pacific golden-plover (*Pluvialis fulva*), was transiting the project area. This species does not nest in Hawaii and is not likely to be affected by any proposed activities at the project site.

The State Department of Land and Natural Resources (DLNR) and the U.S. Fish and Wildlife Service entered a Safe harbor Agreement (SHA) with Chevron Hawaii Refinery in 2005 (Hawaii DOFAW 2005). The purpose of this SHA is to provide habitat for and protect the endangered Hawaiian stilt (*Himantopus mexicanus knudseni*) and Hawaiian coot (*Fulica alai*). Both species are found within the refinery, but are mostly confined to Rowland's Pond and the Impounding Basin and Oxidation Ponds. Although this survey took place within the regular breeding season of both species, neither was observed at, or in the vicinity of the project area. The project area does not contain much vegetation cover, nor does it appear to contain any food resources or any other habitat features that may attract these waterbird species.

#### 4.2.2 Mammals

The Hawaiian hoary bat (*Lasiurus cinereus semotus*) is the only native mammal species which is still extant within the Hawaiian Islands (UFWS 1998). The Hawaiian hoary bat has been recorded on Oahu as well as on Molokai, Maui, Kauai, and Hawaii, but no historical or current population estimates or information exist for this endemic subspecies. Population estimates for all islands in the state in the recent past have ranged from hundreds to a few thousand bats (Menard 2001). The Hawaiian hoary bat is believed to occur primarily below an elevation of 4,000 feet (1,220 m). Since no trees are present within the project area, impacts to this species are not anticipated; therefore, nocturnal acoustic surveys were not performed. No records of threatened or endangered species were found for the survey areas. The survey area does not contain critical habitat and is not near critical habitat for any listed vertebrate or invertebrate species.

No mammals were directly observed during the one-day field survey. Bait stations targeting rats (*Rattus* spp.) were observed around buildings in the vicinity of the project area, indicating presence of rats in the area.

#### 4.2.3 Reptiles and Amphibians

There are no native reptiles or amphibians in Hawaii (McKeown 1996). No reptiles or amphibians were observed during the survey.

#### 4.2.4 Insects and Other Invertebrates

Very few common, non-native invertebrates were encountered during the survey. The most common invertebrate within the project area was the crazy ant (*Paratrechina longicornis*), and some houseflies (*Musca domestica*) were observed as well. The project area does not contain critical habitat for threatened or endangered invertebrates as designated by the U.S. Fish and Wildlife Service.

## 5.0 CONCLUSION AND RECOMMENDATIONS

The proposed project is not expected to have a significant adverse impact on any state or federally listed candidate, threatened, or endangered species, species of concern, and/ or rare plants or animals. The entire site has been intensively disturbed and highly altered by human activity. The flora and fauna within the project site are predominantly non-native (96% and 66 %, respectively). In addition, recent surveys and assessments in the Campbell Industrial Park also did not reveal the presence of listed threatened, endangered, or candidate endangered plant species, or rare native Hawaiian plant species (Lively Architects 1990, Kober/Hanssen/Mitchell Architects. 1991, SSFM International 2010).

The only native plant found at the project site (*Heliotropium curassavicum*) commonly occurs throughout coastal areas on O'ahu and the main Hawaiian Islands. No native animals were found using the project site, with the exception of a transiting Pacific golden- plover.

This one-time survey provides valuable insight into the natural resources on the project area. A more definitive assessment of flora and fauna would entail monitoring the property seasonally. It is not likely that any listed endangered or threatened species would occur within the project area; however, should any such species subsequently be observed there, assistance should be requested from the U.S. Fish and Wildlife Service office in Honolulu prior to any disturbance of the site.

SWCA recommends that native Hawaiian plants be employed for landscaping to the maximum extent practicable. Potential coastal native plants that may be appropriate for landscaping include: *Scaevola taccada* (naupaka), *Sida fallax* ('ilima), *Sesuvium portulacastrum* ('ākulikuli), *Wikstroemia uva-ursi* ('ākia), and *Vitex rotundifolia* (pōhinahina). If native plants do not meet landscaping objectives, plants with a low risk of becoming invasive may be substituted. Additional information on selecting appropriate plants for landscaping can be obtained from the following sites:

- [http://www.botany.hawaii.edu/faculty/daehler/wra/full\\_table.asp](http://www.botany.hawaii.edu/faculty/daehler/wra/full_table.asp)
- [http://www.hear.org/alternativestoinvasives/pdfs/mcaac\\_hpwra\\_a2i\\_list.pdf](http://www.hear.org/alternativestoinvasives/pdfs/mcaac_hpwra_a2i_list.pdf)
- <http://nativeplants.hawaii.edu/>

One of the main impacts on flora and fauna of solar power plants is due to the large footprint needed for commercial-scale energy production. However, there is limited amount of data on birds strikes associated with solar panels. Over a period of 40 weeks, researchers at Solar One, located in the Mojave Desert, California, documented 70 bird fatalities, involving 26 species. Collisions with structures accounted for 81% of the avian mortalities, almost all from collisions with the mirrored heliostats. The overall impact on the local bird population was considered low (0.6-0.7% per week). Solar One is located within close proximity of open water, and 19 of the 57 collision fatalities were waterbird species, including 2 American coots (*Fulica americana*) and 2 black-necked stilts (*Himantopus mexicanus*), close relatives of the endangered Hawaiian coot and Hawaiian stilt (McCrary et al. 1986). Although heliostats are structurally similar to photo voltaic panels, and birds can strike any fixed object, photovoltaic panels are dark blue/black rather than reflective, and there is no scientific evidence of fatality risks to birds associated with photovoltaic arrays.

The alternative site appears to contain a dense stand of kiawe (*Prosopis pallida*) with an understory of mostly non-native weedy species. A small section of this site had already been cleared to facilitate placement of refuse containers. It is highly unlikely that threatened and endangered species that have been documented at the refinery, including the endangered Hawaiian stilt and Hawaiian coot, utilize this area. However, the endangered Hawaiian hoary bat is known to roost in kiawe trees (USFWS 1998), therefore it is recommended that cutting or trimming of trees 15 feet (4.5 m) or taller is restricted to the period outside the bat breeding season, which is between June 1 and September 15, to avoid potential impacts to non-volant juvenile bats.

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**APPENDIX A  
CHECKLIST OF PLANTS OBSERVED AT CHEVRON HAWAI'I REFINERY ON MARCH 26, 2012.**

The following checklist is an inventory of all the plant species observed by SWCA biologists on March 26, 2012 during the survey of the project area as designated by URS Corporation, within the Chevron Hawai'i Refinery on the Island of O'ahu, Hawai'i. The plant names are arranged alphabetically by family and then by species into two groups: Monocots and Dicots. The taxonomy and nomenclature of the flowering plants are in accordance with Wagner et al. (1999), Wagner and Herbst (2003), and Staples and Herbst (2005). Recent name changes are those recorded in Wagner et al. (2012).

**Status:**

- E = endemic = native only to the Hawaiian Islands.
- I = indigenous = native to the Hawaiian Islands and elsewhere.
- P = Polynesian = introduced by Polynesians.
- X = introduced/ alien = all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact (Cook's arrival in the islands in 1778).

**Relative Site Abundance:**

- A = Abundant = forming a major part of the vegetation within the survey area.
- C = Common = widely scattered throughout the area or locally abundant within a portion of it.
- U = Uncommon = scattered sparsely throughout the area or occurring in a few small patches.
- R = Rare = only a few isolated individuals within the survey area.

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
<b>MONOCOT</b>			
<b>Aloaceae</b>			
Aloe vera (L.) Burm.f.	aloe	X	R
<b>Poaceae</b>			
Cenchrus ciliaris L.	buffelgrass	X	U
Chloris barbata Sw.	swollen fingergrass	X	U

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
<i>Digitaria</i> sp.		X	R
<i>Echinochloa colona</i> (L.) Link	jungle-rice	X	U
<i>Eragrostis amabilis</i> (L.) Wight & Arn.		X	R
<i>Sporobolus indicus</i> (L.) R.Br.	West Indian dropseed, smutgrass	X	U
<b>DICOT</b>			
<b>Aizoaceae</b>			
<i>Sesuvium verrucosum</i> Raf.	verrucose seapurslane, western sea purslane	X	U
<b>Amaranthaceae</b>			
<i>Alternanthera tenella</i> Colla	Joyweed	X	R
<i>Amaranthus spinosus</i> L.	spiny amaranth	X	R
<b>Asteraceae</b>			
<i>Crassocephalum crepidioides</i> (Benth.) S. Moore		X	R
<i>Flaveria trinervia</i> (Spreng.) C. Mohr		X	U
<i>Lactuca sativa</i> L.	prickly lettuce	X	R
<i>Sonchus oleraceus</i> L.	sow thistle, pualele	X	R
<i>Tridax procumbens</i> L.	coat buttons	X	R
<i>Verbesina encelloides</i> (Cav.) Benth. & Hook.	golden crown-beard	X	U
<b>Boraginaceae</b>			
<i>Heliotropium curassavicum</i> L.	kīpūkai, nena, seaside heliotrope	I	R

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
<b>Chenopodiaceae</b>			
<i>Atriplex suberecta</i> Verdc.		X	R
<i>Chenopodium murale</i> L.	goosefoot, 'āheahea	X	R
<b>Convolvulaceae</b>			
<i>Ipomoea obscura</i> (L.) Ker Gawl.	morning glory	X	R
<b>Euphorbiaceae</b>			
<i>Euphorbia hirta</i> L.	hairy or garden spurge	X	R
<b>Fabaceae</b>			
<i>Desmanthus pernambucanus</i> (L.) Thell.	slender or virgate mimosa	X	R
<b>Malvaceae</b>			
<i>Malva parviflora</i> L.	cheese weed	X	R
<b>Portulacaceae</b>			
<i>Portulaca oleracea</i> L.	pigweed, 'ākulikuli kula	X	U
<i>Portulaca pilosa</i> L.	'ākulikuli	X	U
<b>Zygophyllaceae</b>			
<i>Tribulus terrestris</i> L.	puncture vine	X	R

**APPENDIX B  
RELATIVE ABUNDANCE OF BIRDS OBSERVED DURING POINT COUNT SURVEYS**

The following checklist is an inventory of all the bird species observed by SWCA biologists on March 26, 2012 during surveys of the survey area designated by URS as part of the Chevron Solar Thermal Process Project, on the Island of O’ahu, Hawai’i. The taxonomy and nomenclature of the avian species are in accordance with the American Ornithological Union (AOU, 2005).

**Status:**

E = endemic = native only to the Hawaiian Islands.

I = indigenous= native to the Hawaiian Islands and elsewhere.

Nat =naturalized alien = all those birds brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact (Cook’s arrival in the islands in 1778).

Table 1: Bird species and relative abundance at the project site.

Common Name	Scientific name	Number of detections	Number of stations occupied	Relative abundance	rank	Status
House sparrow	<i>Passer domesticus</i>	6	2	1.5	1	Nat
Pacific golden plover	<i>Pluvialis fulva</i>	1	1	0.25	3	I
Zebra dove	<i>Geopelia striata</i>	3	2	0.75	2	Nat

Table 2: Bird species and relative abundance at each of point count stations<sup>1</sup>.

Site	Common Name	Scientific name	n	Rank	Status
A	House sparrow	<i>Passer domesticus</i>	3	1	Nat
	Pacific golden plover	<i>Pluvialis fulva</i>	1	2	I
B	Zebra dove	<i>Geopelia striata</i>	1	1	Nat
D	House sparrow	<i>Passer domesticus</i>	3	1	Nat
	Zebra dove	<i>Geopelia striata</i>	2	2	Nat

<sup>1</sup> No birds were observed during the point count at station C.

**APPENDIX B**  
**ARCHAEOLOGICAL ASSESSMENT**

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**FINAL Archaeological Assessment  
for a Proposed Solar Site Project  
Within the Chevron Refinery, Kalaeloa,  
Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island  
TMK: [1] 9-1-014:010 por.**

**Prepared for  
URS Corporation**

**Prepared by  
Hallett H. Hammatt, Ph.D.  
and  
David W. Shideler, M.A.**

**Cultural Surveys Hawai‘i, Inc.  
Kailua, Hawai‘i  
(CSH Job Code: HONOULIULI 64)**

**Revised November 2012**

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## Management Summary

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<b>Reference</b>	Archaeological Assessment For a Proposed Solar Site Project Within the Chevron Refinery, Kalaeloa, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island (TMK: [1] 9-1-014:010 por.) (Hammatt et al. 2007)
<b>Date</b>	Revised December 2012
<b>Project Number</b>	Cultural Surveys Hawai'i Inc. (CSH) Job Code: HONOULIULI 64
<b>Investigation Permit Number</b>	The fieldwork component of this archaeological assessment study was carried out under archaeological permit number 12-14, issued by the Hawai'i State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR), per Hawai'i Administrative Rules (HAR) Chapter 13-282.
<b>Project Location</b>	The Chevron Refinery property is located in coastal Kalaeloa, within the James Campbell Industrial Park. The project area for the current study consists of an approximately 500 m (1,640 ft.) long by 150 m (492 ft.) wide rectangle along the west, <i>makai</i> (seaward) portion of the Chevron Refinery property. This area is depicted on the 1998 USGS 7.5-Minute Series Topographic Map, 'Ewa Quadrangle.
<b>Land Jurisdiction</b>	Private; Chevron USA, Inc.
<b>Agencies</b>	SHPD/DLNR
<b>Project Description and Related Ground Disturbance</b>	The proposed action involves the construction of a Solar Site Project. Minimally, project-related ground disturbance would include modest foundation installation for solar panel units and energy transmission lines.
<b>Project Acreage</b>	The total area of the proposed solar site project Within the Chevron Refinery studied is approximately 18.5 acres (ac) (7.5 hectares [ha])
<b>Area of Potential Effect (APE) and Survey Area Acreage</b>	For the purposes of this archaeological assessment study, the area of potential effect is considered to be the entire approximately 18.5-acre project area. The survey area for the current study included the entire approximately 18.5-ac APE (7.5 ha).

<b>Document Purpose</b>	The proposed project constitutes a project requiring compliance with and review under state of Hawai'i historic preservation legislation [Hawai'i Revised Statutes (HRS) Chapter 6E-42 and Hawai'i Administrative Rules (HAR) Chapter 13-13-284]. At the request of URS Corporation, CSH completed what began as an archaeological inventory survey investigation of the survey area, per the requirements of HAR Chapter 13-13-276. Because no archaeological historic properties were located, this investigation became an archaeological assessment, per the language of HAR Chapter 13-13-284-5. This document is intended to support the proposed Project's historic preservation review under HRS Chapter 6E-42 and HAR Chapter 13-13-284, as well as the Project's environmental review under HRS Chapter 343. It is also intended to support any project-related historic preservation consultation with stake-holding state, and county agencies and interested Native Hawaiian and community groups.
<b>Fieldwork Effort</b>	The fieldwork component of the archaeological assessment study was conducted on March 12, 2012 by two CSH archaeologists, David W. Shideler, M.A., and Todd Tulchin, B.S., under the general supervision of Hallett H. Hammatt, Ph.D. The fieldwork required 1 person-day to complete.
<b>Summary of Findings</b>	The project area was observed to have been almost entirely, if not entirely, previously graded raised reef limestone hard pan. No surface historic properties were observed within or in the immediate vicinity of the project area. Despite the prior heavy land disturbance, the potential for sinkholes and intact sand dune deposits, which could possibly contain human remains or other cultural deposits, was evaluated.  No intact sinkholes, larger than 60 centimeters (cm) in diameter, sand dune deposits, or cultural material were observed within the project area and none are believed to be present.
<b>Recommendations</b>	No further archaeological work is recommended for the proposed Chevron Refinery Proposed Solar Site Project. If in the unlikely event that intact cultural resources, including but not limited to limestone sinkholes containing human remains or other significant cultural deposits, are encountered during the course of development activities, all work in the immediate area should stop and the State Historic Preservation Division should be promptly notified.

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## Section 1 Introduction

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### 1.1 Project Background

At the request of URS Corporation, Cultural Surveys Hawai'i, Inc. (CSH) completed this archaeological assessment study for the proposed Chevron Refinery proposed Solar Site Project, Kalaeloa, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island (TMK: [1] 9-1-014:010 por.). The Chevron Refinery property is located in coastal Kalaeloa, within the James Campbell Industrial Park (Figures 1-3). This area is depicted on the 1998 U.S. Geological Survey 7.5-Minute Series Topographic Map, 'Ewa Quadrangle (Figure 1). The project area for the current study consists of an approximately 500 meters (m)- (1,640 feet [ft])-long by 150 m (492 ft)-wide rectangle along the west, *makai* (seaward) portion of the Chevron Refinery property.

The lands within the project area are privately owned by Chevron USA, Inc. The proposed project involves the construction of a Solar Site Project. Minimally, project-related ground disturbance would include modest foundation installation for solar panel units and energy transmission lines. For the purposes of this archaeological assessment study, the area of potential effect is considered to be the entire approximately 18.5-acre (ac) (7.5 hectare [ha]) project area. The survey area for the current study included the entire approximately 18.5-ac APE.

The proposed project constitutes a project requiring compliance with and review under state of Hawai'i historic preservation legislation [Hawai'i Revised Statutes (HRS) Chapter 6E-42 and Hawai'i Administrative Rules (HAR) Chapter 13-13-284]. At the request of URS Corporation, CSH completed what began as an archaeological inventory survey (AIS) investigation of the survey area, per the requirements of HAR Chapter 13-13-276. Because no archaeological historic properties were located, this investigation became an archaeological assessment, per the language of HAR Chapter 13-13-284-5. This document is intended to support the proposed Project's historic preservation review under HRS Chapter 6E-42 and HAR Chapter 13-13-284, as well as the Project's environmental review under HRS Chapter 343. It is also intended to support any project-related historic preservation consultation with stake-holding state, and county agencies and interested Native Hawaiian and community groups.

### 1.2 Scope of Work

The agreed upon scope of work for this archaeological assessment study was as follows:

1. Historical research including study of archival sources, historic maps, Land Commission Awards (LCA) and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near the project area.
2. Field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. This assessment identifies any sensitive areas that may require further investigation or mitigation before the project proceeds.

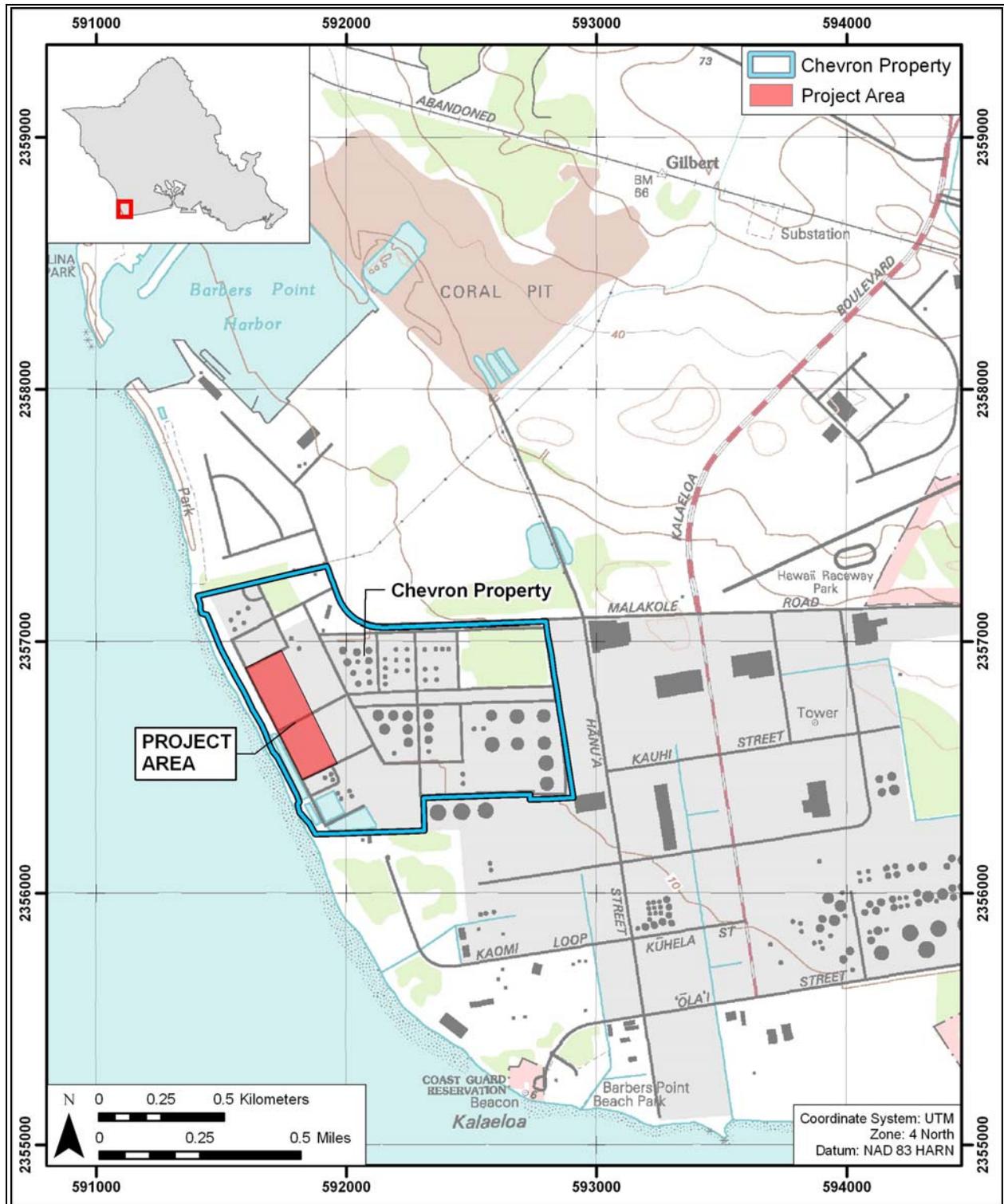


Figure 1. Portion of U.S. Geological Survey 7.5-Minute Series Topographic Map, 'Ewa Quadrangle (1998), showing the location of the project area

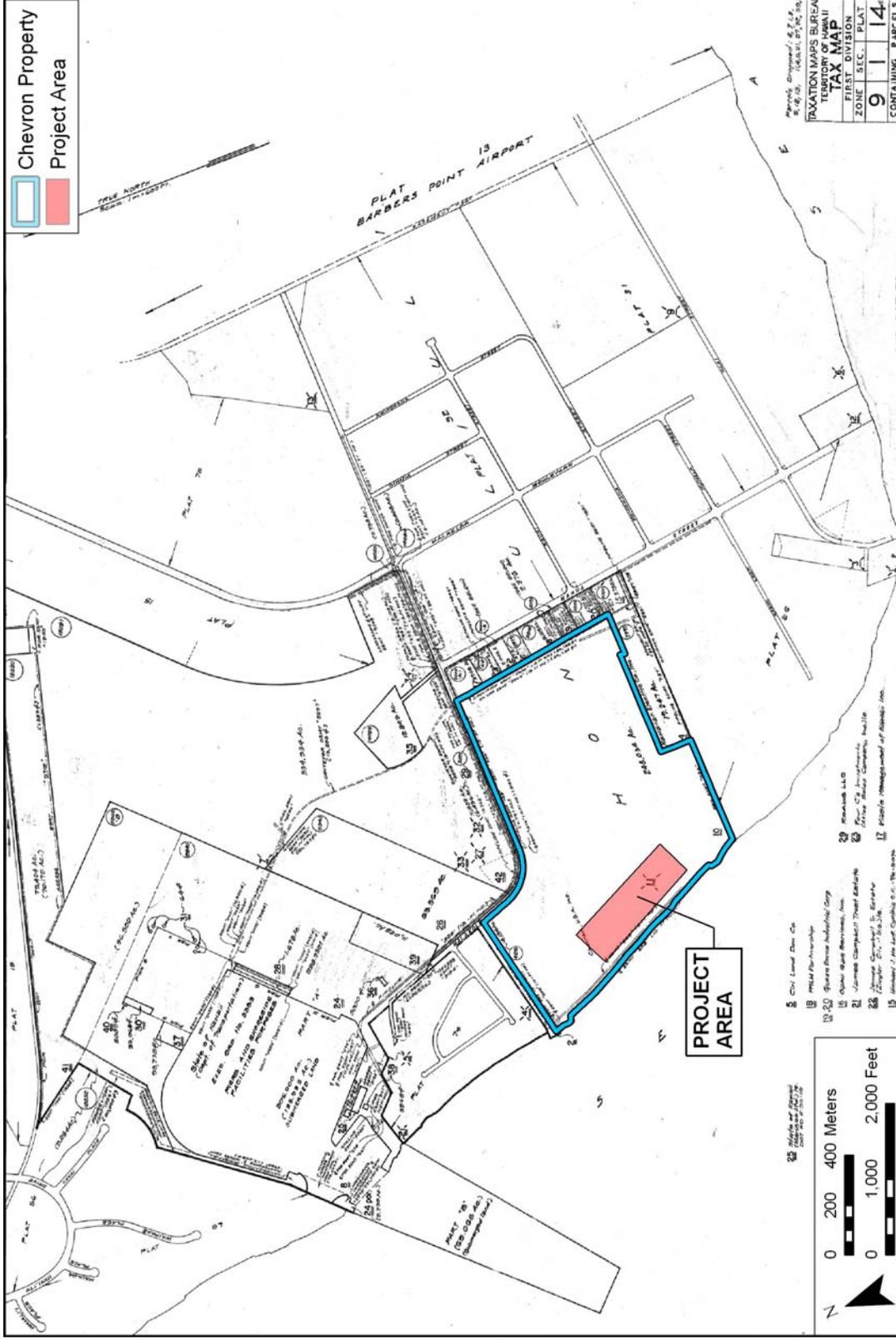


Figure 2. Portion of Tax Map Key 9-1-14, showing the location of the project area

Archaeological Assessment for a Proposed Solar Site Project within the Chevron Refinery, Kalaeloa, O'ahu

TMK: [1] 9-1-014:010 por.



Figure 3. Aerial photograph, showing the location of the project area (source: U.S. Geologic Survey Orthoimagery 2005)

3. Preparation of this report, including the results of the historical research and the field inspection, with an assessment of archaeological potential based on that research and recommendations for further archaeological work, if appropriate.

## 1.3 Environmental Setting

### 1.3.1 Natural Environment

Observations of less disturbed lands adjacent to the project area indicated the *makai* portion of the project area likely consisted of exposed limestone outcrop partially overlain with beach sand deposits. However, the beach sand and the surface of the coral shelf appear to have been graded and pushed *makai*, creating an approximately 2 m-high berm along the *makai* property line (west or outside of the project area) consisting primarily of boulders and construction rubble.

The surface of the project area and vicinity is Coral Outcrop (Figure 4). The surface of the Pleistocene limestone outcrop, where not covered by alluvium or stockpiled material, has characteristic dissolution “pit caves” (Mylroie and Carew 1995), which are nearly universally, but erroneously, referred to as “sink holes” (Halliday 2005). These pit caves, or sinkholes, vary widely in areal extent and depth, with some of the more modest features comparable in volume to five-gallon buckets, while some of the larger features, although usually irregularly shaped, are several meters wide and several meters deep (all pit caves observed during this project were of the approximate size of a 5 gallon bucket).

Lying in the lee of the Wai‘anae mountain range, the project area is one of the driest areas of O‘ahu with most of the area averaging about 18 inches (in) (460 millimeters [mm]) of rainfall annually (Juvik and Juvik 1998:56). In pre-Contact Hawai‘i, the vicinity of the project area would have been mostly lowland coastal dry shrub and grassland. However, this area has been extensively disturbed and transformed by human activity, with most of the land dominated by a variety of exotic grasses, weeds, and shrubs or graded and grubbed bare. These grasses and shrubs, along with pockets of *kiawe* (*Prosopis pallida*), castor bean (*Ricinus communis*), *klu* (*Acacia farnesiana*), *koa haole* (*Leucaena leucocephala*), and a few scattered ficus (*Ficus spp.*) trees are characteristic of the vegetation of the project vicinity. Native Hawaiian plants observed near the project area included ‘*akulikuli* (*Sesuvium portulacastrum*) and *milo* (*Thespesia populnea*). The project area per se is almost completely barren of vegetation and ground visibility was excellent.

### 1.3.2 Built Environment

The project area consists of the *makai* portion of the Chevron Refinery property. The entire project area has been drastically altered by historic and modern land use including grubbing and grading during initial and ongoing construction within the refinery property. A major berm along the *makai* edge of the refinery property is understood to be composed of bulldozer push from the grading and grubbing of the project lands. Structures within or adjacent to the project area include the existing perimeter security fence, settling ponds, and equipment storage areas.

The Chevron Refinery property is located within the James Campbell Industrial Park, which includes heavy and medium industrial developments and the State’s only two oil refineries. The Chevron Refinery is a relatively small-scale oil refinery consisting of numerous heavy industrial



Figure 4. U.S. Geologic Survey topographic map with overlay of USDA Soil Survey of the State of Hawai'i (Foote et al. 1972), indicating sediment types within the project area

structures and storage tanks. South of the refinery property is the Brewer Environmental Industries (BEI) chemical production facility. Immediately north of the refinery is a wide-drainage ditch parallel to the north side. Further north of the refinery property is the developing Kenai Industrial Park. The Barbers Point Deep Draft Harbor is located approximately 0.8 kilometers (km) (0.5 miles [mi]) north of the project area.

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## Section 2 Methods

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### 2.1 Field Methods

The field inspection of the project area was conducted on March 12, 2012 by two CSH archaeologists, David W. Shideler, M.A., and Todd Tulchin, B.S., under the general supervision of Hallett H. Hammatt, Ph.D. The fieldwork required 1 person-day to complete. The pedestrian inspection of the approximately 500 m- (1,640 ft)-long, 150 m- (492 ft)-wide project area (covering approximately 18.5-ac [7.5 ha]) was accomplished through systematic sweeps. The interval between the archaeologists was generally 10 m (33 ft). The graded nature of the project area made for excellent ground visibility. All potential historic properties encountered were examined.

### 2.2 Document Review

Historic and archival research included information obtained from the UH Hamilton Library, the State Historic Preservation Division (SHPD), the Hawai'i State Archives, the State Land Survey Division, and the Archives of the Bernice Pauahi Bishop Museum (BPBM). Previous archaeological reports for the area were reviewed, as were historic maps and primary and secondary historical sources. Information on LCAs was accessed through Waihona Aina Corporation's Mahele Data Base (<[www.waihona.com](http://www.waihona.com)>).

## Section 3 Background Research

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### 3.1 Traditional and Historical Background

#### 3.1.1 Mythological and Traditional Accounts and Early Historic Period

Various legends and early historical accounts indicate that the *ahupua'a* of Honouliuli (Figure 5) was once heavily populated by pre-Contact Hawaiians. This substantial settlement is attributable for the most part to the plentiful marine and estuarine resources available at the coast, as well as lowlands fronting the west loch of Pearl Harbor (Kaihuopala'ai) suitable for wetland taro cultivation. In addition, forest resources along the slopes of the Wai'anae Range, as suggested by E.S. and E.G. Handy, probably acted as a viable subsistence alternative during times of famine and/or low rainfall:

The length or depth of the valleys and the gradual slope of the ridges made the inhabited lowlands much more distant from the wao, or upland jungle, than was the case on the windward coast. Yet the wao here was more extensive, giving greater opportunity to forage for wild foods during famine time [Handy and Handy 1972:469-470].

John Papa 'I'i describes a network of Leeward O'ahu trails that in later historic times encircled and crossed the Wai'anae Range, allowing passage from West Loch to the Honouliuli lowlands, past Pu'u Kapolei and Waimānalo Gulch to the Wai'anae coast and onward, circumscribing the shoreline of O'ahu ('I'i 1959:96-98). Following 'I'i's description, a portion of this trail network would have passed close to the present Farrington Highway alignment.

The Hawaiian *Ali'i* were also attracted to this region. One historical account of particular interest refers to an *Ali'i* residing in Ko'olina, approximately 1.5 km (0.9 mi) north of the current project area:

Ko'olina is in Waimānalo near the boundary of 'Ewa and Wai'anae. This was a vacationing place for chief Kākuhihewa and the priest Napuaikamao was the caretaker of the place. Remember reader, this Ko'olina is not situated in the Waimānalo on the Ko'olau side of the island but the Waimānalo in 'Ewa. It is a lovely and delightful place and the chief, Kākuhihewa loved this home of his [*Ke Au Hou* July 13, 1910 in Sterling and Summers 1978:41].

Other early historical accounts of the general region typically refer to the more populated eastern portion of the 'Ewa district, where missions and schools were established and subsistence resources were perceived to be greater. However, the presence of archaeological sites along the barren coral plains and coast of southwest Honouliuli Ahupua'a indicate that pre-Contact and early post-Contact populations also adapted to less inviting areas, despite the environmental hardships.

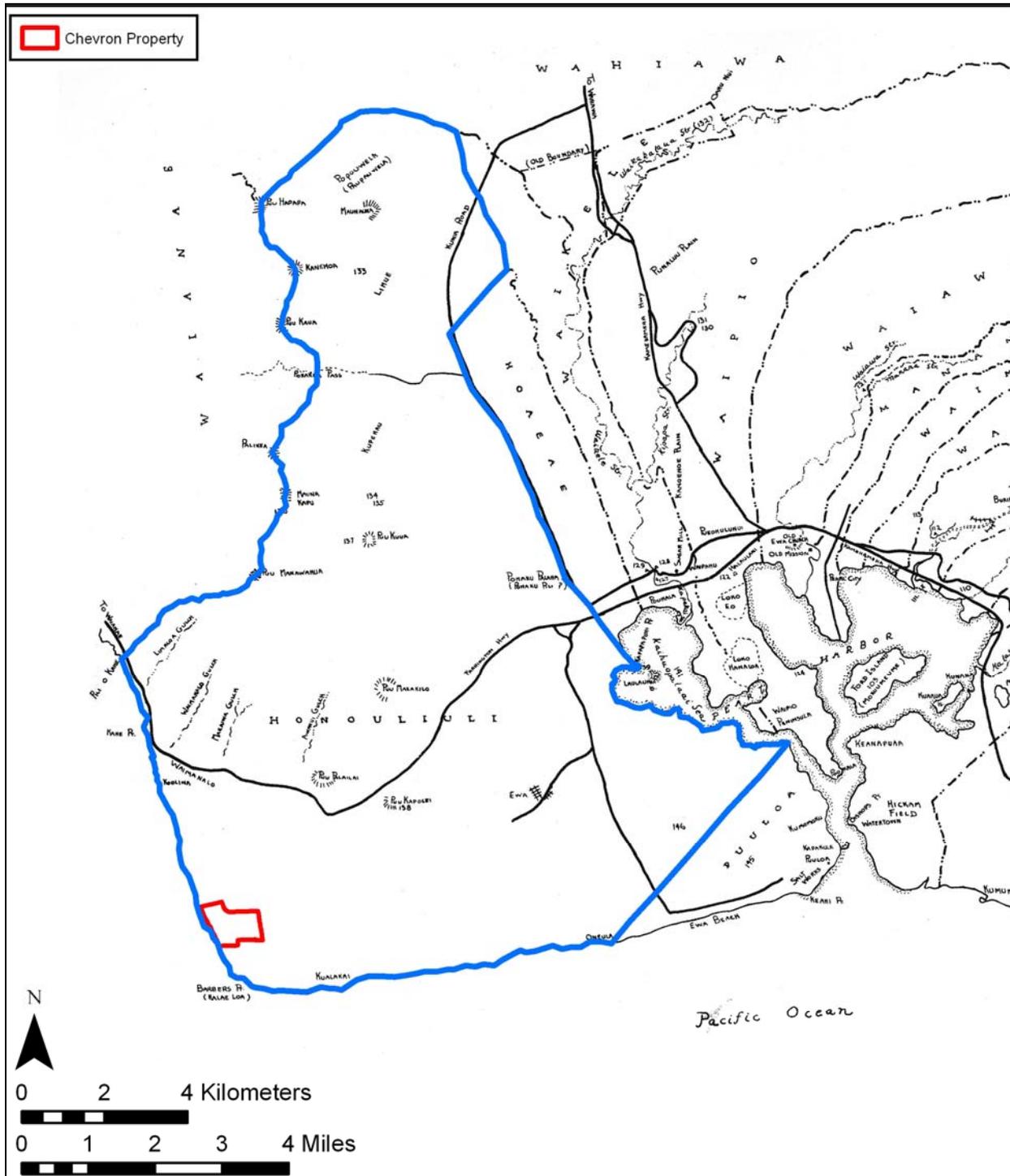


Figure 5. Map showing location of Honouliuli Ahupua‘a in southwest O‘ahu (adapted from Sterling and Summers 1978)

Barber's Point is named after Captain Henry Barber, whose ship ran aground on October 31, 1796. Subsequent to western contact in the area, the landscape of the 'Ewa plains and Wai'anae slopes was adversely affected by the over-harvesting of the sandalwood forest, and particularly by the introduction of domesticated animals and exotic plant species. In the early 1790s, Captain George Vancouver brought to the Hawaiian Islands goats, sheep, and cattle which were allowed to graze freely about the land for some time after. L.A. Henke reports the existence of a longhorn cattle ranch in Wai'anae by circa 1840 (in Frierson 1972:10).

During this same time, perhaps as early as 1790, exotic plant species were introduced to and flourished in the area. The following dates of specific vegetation introduced to Hawai'i are given by R. Smith and outlined by Frierson (1972:10-11):

“early”, c. 1790: Prickly pear cactus (*Opuntia tuna*); *Haole koa* (*Leucaena glauca*); Guava (*Psidium guajava*)

1835-1840: Burmuda [sic] grass (*Cynodon dactylon*); Wire grass (*Eleusine indica*)

1858: Lantana (*Lantana camara*)

The *kiawe* tree was also introduced during this period, either in 1828 or 1837 [Frierson 1972:11].

### 3.1.2 Mid- to late-1800s

Following the Māhele of 1848, 99 individual land claims in the *ahupua'a* of Honouliuli were registered and awarded by King Kamehameha III. The present study area appears to have been included in the largest award (Royal Patent 6071, LCA 11216, 'Āpana 8) granted in Honouliuli Ahupua'a to Miriam Ke'ahi-Kuni Kekau'ōnohi on January 1848 (Native Register). Kekau'ōnohi acquired a deed to all unclaimed land within the *ahupua'a*, totaling 43,250 ac (17,503 ha).

Kekau'ōnohi was one of Liholiho's (Kamehameha II's) wives, and after his death, she lived with her half-brother, Luanu'u Kahala'i'a, who was governor of Kaua'i. Subsequently, Kekau'ōnohi ran away with Queen Ka'ahumanu's stepson, Keli'i-ahonui, and then became the wife of Chief Levi Ha'alelea. Upon her death on June 2, 1851, all her property was passed on to her husband and his heirs. When Levi Ha'alelea died, the property went to his surviving wife, who in turn leased it to James Dowsett and John Meek in 1871 for stock running and grazing.

In 1877, James Campbell purchased most of Honouliuli Ahupua'a -including the current project area- for a total of \$95,000. He then drove off 32,347 head of cattle belonging to Dowsett, Meek, and James Robinson and constructed a fence around the outer boundary of his property (Bordner and Silva 1983:C-12). By 1881, the Campbell property of Honouliuli prospered as a cattle ranch with “abundant pasturage of various kinds” (Briggs in Haun and Kelly 1984:45).

In 1889, Campbell leased his property to Benjamin Dillingham, who subsequently formed the Oahu Railway and Land Company (OR&L) as the result of a franchise granted by King Kalākaua in 1886. In 1889, Dillingham opened the first 9 mi of narrow gauge track on the King's birthday. To attract business to his new railroad system, Dillingham subleased all land below 200

ft to William Castle who in turn sublet the area to the Ewa Plantation Company for sugar cane cultivation (Frierson 1972:15).

Ewa Plantation Co. grew quickly and continued in full operation up into modern times. As a means to generate soil deposition on the coral plain and increase arable land in the lowlands, the Ewa Plantation Co. installed ditches running from the lower slopes of the mountain range to the lowlands and then plowed the slopes vertically just before the rainy season to induce erosion (Frierson 1972:17).

### 3.1.3 History of Shipwrecks and the Barbers Point Light House

The first western ship recorded as wrecking in the Hawaiian Islands was the brig *Arthur* under the command of Captain Henry Barber that ran aground at Kalaeloa Point on the southwest corner of O'ahu at 8:00 PM on October 31, 1796. Captain Barber was en route from Honolulu to Canton with a cargo of sea otter hides. Breakers broke up the ship on the rocks and six of the twenty-two-man crew drowned. The point became known as Barber's Point and in 1968 the apostrophe was officially deleted from the name by the U.S. Board of Geographic Names (Dean 1991:17). One of the most interesting shipwrecks at the point occurred in 1804 when a demasted Japanese vessel drifted ashore at Waialua while being towed to Honolulu. In 1855, the French whaler *Marquis de Turenne* ran aground reportedly about a mile off the point and was a total loss.

In 1880 the surveyor general of the Hawaiian Kingdom, William Dewitt Alexander, selected a location at Barbers Point for an aid to navigation in what was then a very undeveloped area (Figure 6) and money was appropriated that same year. There were delays in obtaining the Fresnel lens, lamps and lantern from New York and by the time they arrived funds had been expended. In 1888, a lighthouse was constructed of stone and cement mortar "42 ft above mean tide" seemingly on a 6-foot high coral shelf along with a small frame house and a water cistern (Dean 1991:19). It appears that the light station site was originally 2 ac but was expanded to 5 ac with lands acquired by condemnation in 1910 (Dean 1991:207). Improvements were made to the residence, a storehouse, and a separate oil house in 1905 and 1915 and 3 ½-mi of water pipe was laid to the facility c. 1915. A U.S. army transport ship, the *Sheridan*, arriving from Manila ran aground in 1906, but was successfully recovered. A 60-ft Japanese sampan smashed apart at Kalaeloa in 1919. In 1920, the *West Eldura* also en route from Manila ran aground but was also hauled off the reef.

To address continuing navigation concerns a new 72-ft-high tower (still extant) was built in 1933 adjacent to the old 40-ft tower and the old tower was toppled. The tower was automated in 1964 ending 76 years of lighthouse keeping. The Barbers Point lighthouse is located approximately 1.3 km (0.8 mi.) southeast of the current project area.

### 3.1.4 1900s

Twentieth century land use in the vicinity of the project area included transportation along the former OR&L alignment that ran roughly parallel to the coast 500 m inland. Passenger totals on the OR&L line increased throughout the first half of the twentieth century. In 1908, a total of 446,318 people rode on the line. This total rose to approximately 1,200,000 by 1922 and 1943

saw an all time high of 2,642,516 passengers. Throughout WWII, the railway served a critical function in moving both personnel and equipment.

The development of a better road system and more cars on the island began to cut into passenger totals on the OR&L. According to the National Register of Historic Places Inventory forms on file at SHPD/DLNR, on December 12, 1947, all operations outside of Honolulu ceased. In 1950, the U.S. Navy purchased the track and right-of-way from Pearl Harbor to the Naval Ammunition Depot (NAD) access road in Nānākuli for \$1.00 in the name of “National Defense”. The NAD maintained this 25.5-mi stretch of track until the early 1950s when a 6.5-mi stretch from Pearl Harbor to Waipahu was ceded to the state of Hawai'i. A further 6 mi was reverted to the state in 1954 after a heavy flood. The final 13-mi stretch was in use until 1968 and was ceded to the state in 1980.

The 1919 Fire Control Map (Figure 7) shows a road and architectural features in the area of the Gilbert Station 3 km northeast of the present project area, understood as the site of a very small Gilbert Camp associated with the railway and 'Ewa Plantation. An unimproved loop access road extends from Gilbert Station down to Barbers Point passing through the present project area and looping back to the OR&L alignment. These features also appear in the 1928 U.S. Geological Survey map (Figure 8) which also shows the relatively new tank and pipeline that provided water to the lighthouse compound. A 1943 War Department map (Figure 9) shows the same features as well as a number of new unimproved roads in the vicinity, one of which passes through the central portion of the present project area. A road corresponding to the modern Malakole Road is also shown along the northern boundary of the Chevron Refinery property. The 1943 War Department map does not show the new Barbers Point Military Reservation infrastructure but it is perhaps not surprising that during the time of war, new military bases would not be shown on maps for widespread distribution.

### 3.1.5 Coastal Defenses at Battery Barbers Point (1937 to 1942)

It appears that the Barbers Point Military Reservation was established in 1921. Between 1937 and 1942 there were two sets of two “Panama Mount” 155 mm guns. Batteries of up to four guns on Panama mounts (as at Barbers Point Military Reservation) often served as temporary defenses while nearby permanent batteries awaited construction (<http://ca/ckwinfo.net/info/guns/index.html>). The two sets of 155 mm guns at the Barbers Point Military Reservation were separated by the Barbers Point lighthouse. “This site was an early training firing point for 155 mm guns.” ([www.geocities.com/naforts/hi.html](http://www.geocities.com/naforts/hi.html)).

The 1953 Army Map Service map (Figure 10) shows very little post-war development in the vicinity other than the re-location of a U.S. Coast and Geodetic Survey Observatory 500 m to the east on the north side of what is now Ōla'i Street. The 1962 U.S. Geological Survey map (Figure 11) however, reflects the boom that accompanied statehood with the establishment of the Chevron oil refinery installation, a major cement plant south of the project area, and additional industrial development in the vicinity. The Camp Malakole Military Reservation and the Barbers Point Barge Harbor are also indicated north of the project area. The 1977-78 U.S. Geological Survey Orthophoto (Figure 12) shows the increased industrial development within the James Campbell Industrial Park, in the vicinity of the current project area.

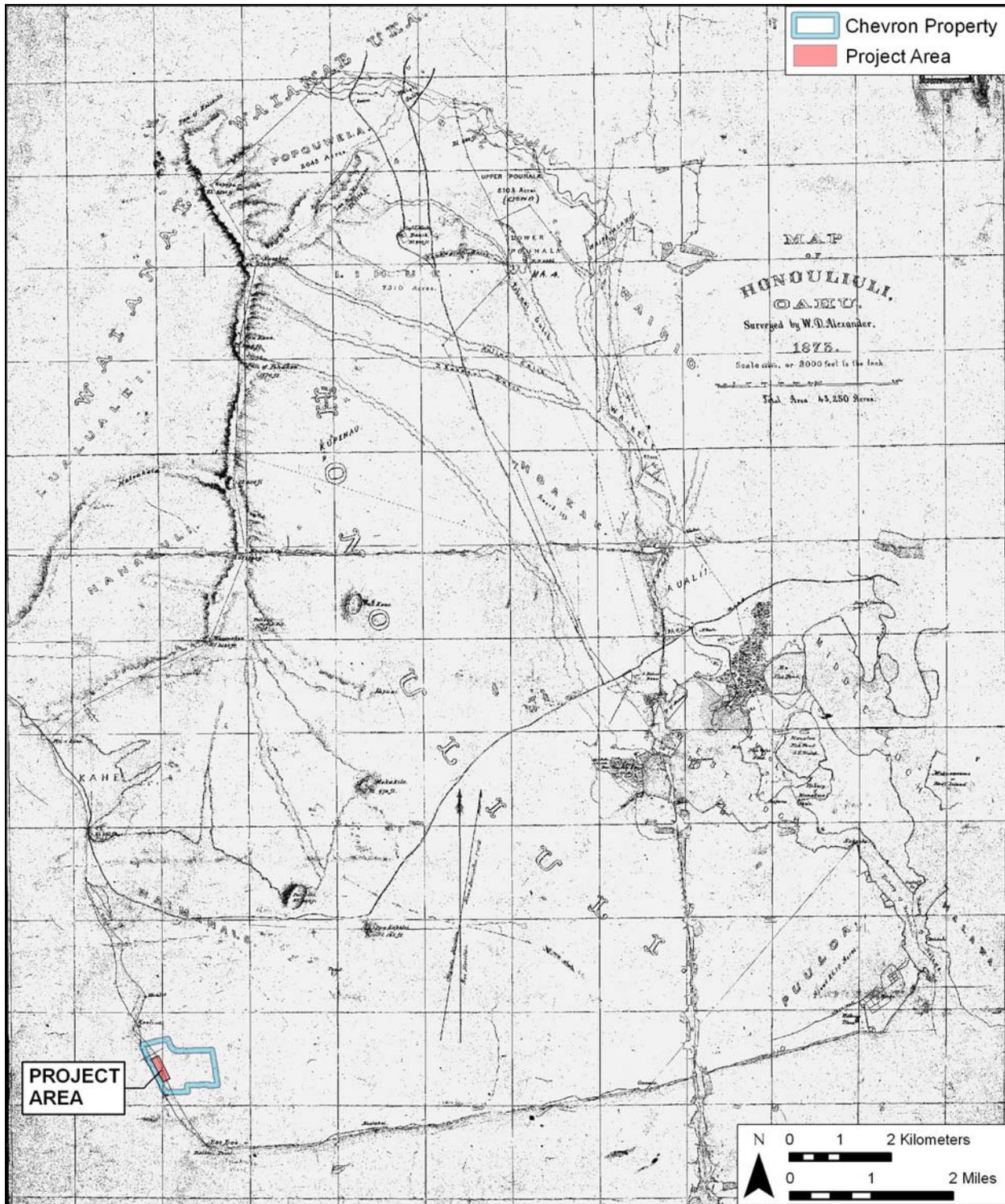


Figure 6. 1873 Alexander map of Honouliuli (Source: 1878 Government Survey Map – W.D. Alexnader)

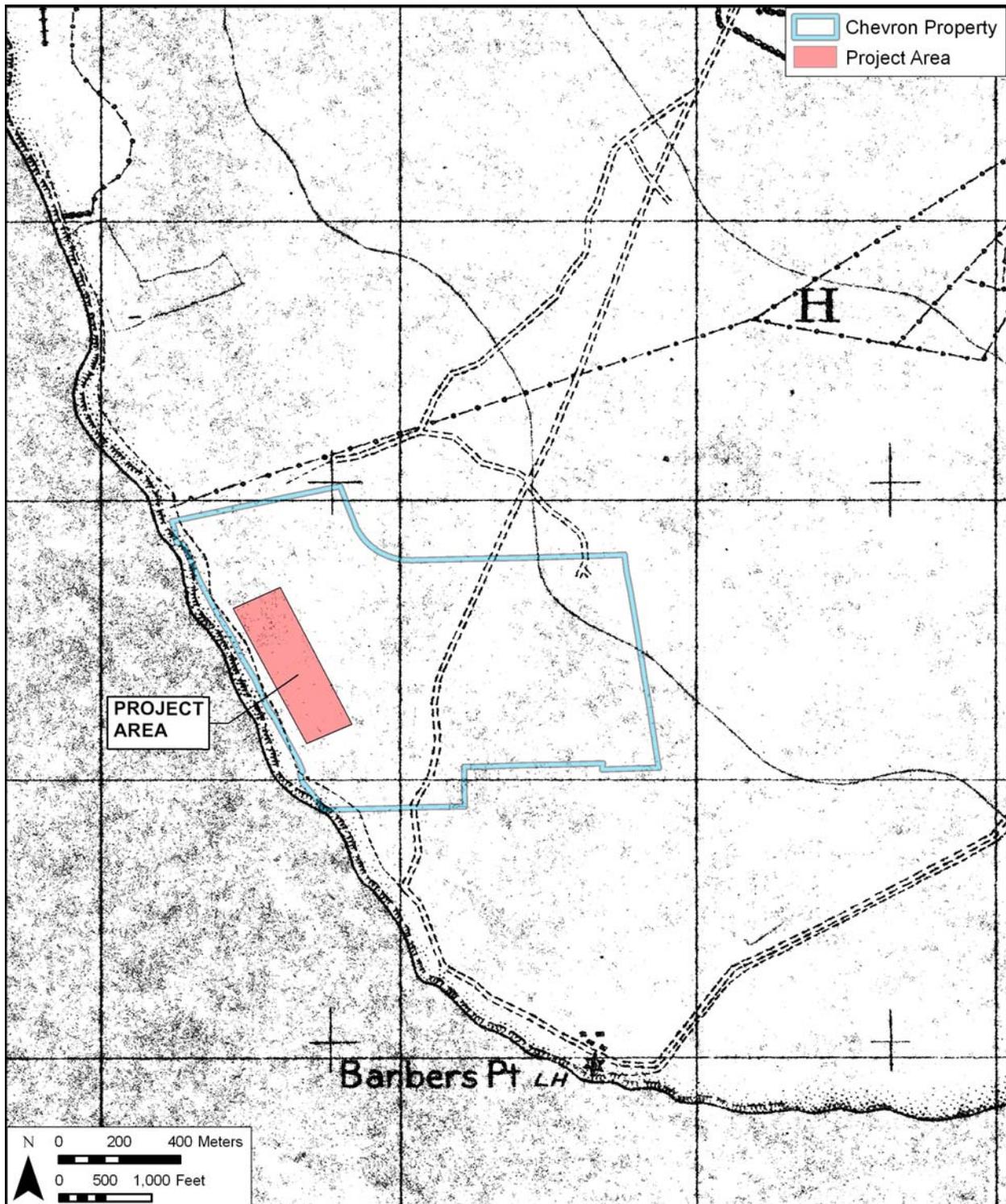


Figure 7. 1919 U.S. War Department Fire Control Map, 1:20,000 Scale, Barbers Point Quadrangle, showing the location of the project area

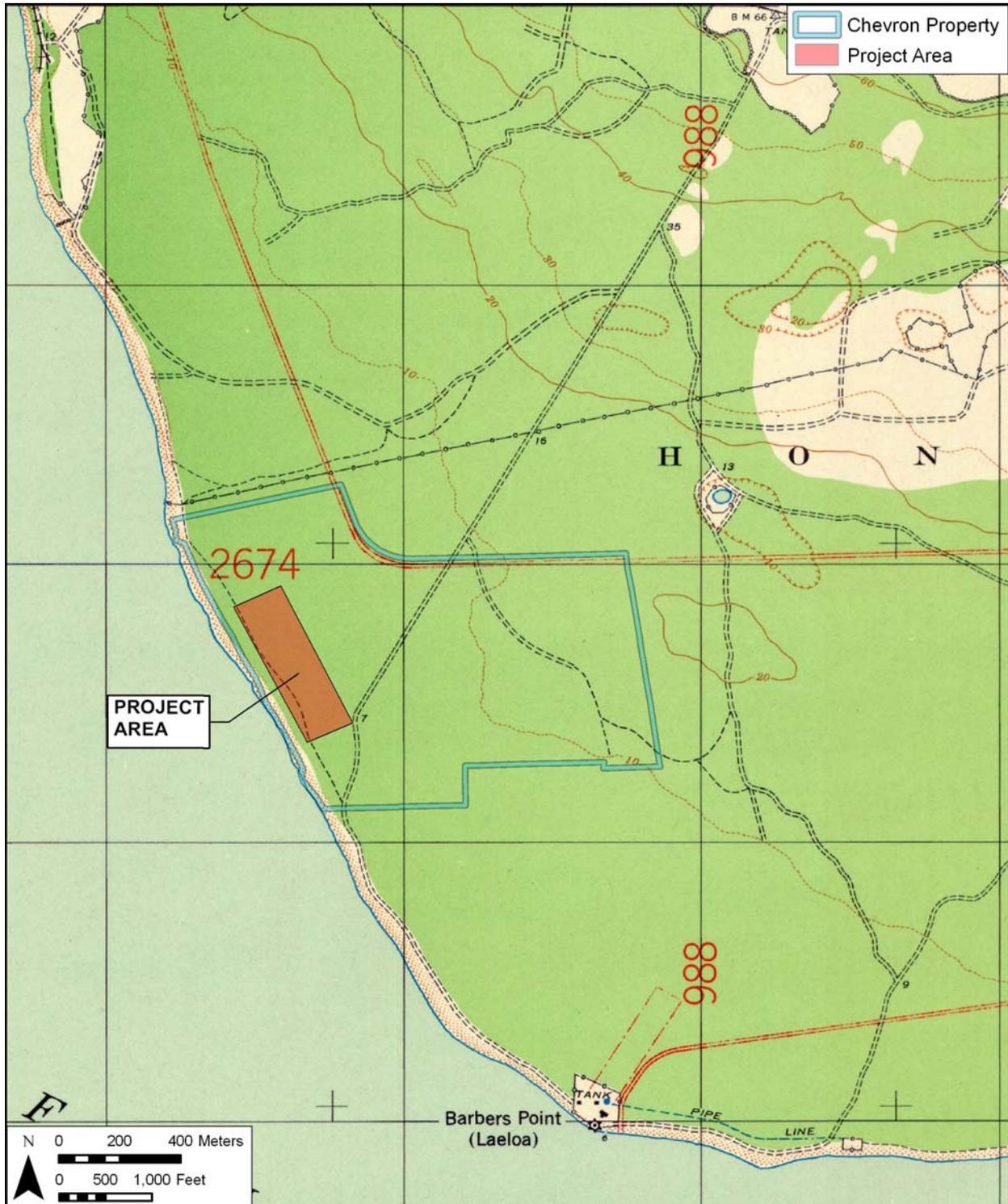


Figure 8. 1936 U.S. War Department Topographic Map, 1:20,000 Scale, Barbers Point Quadrangle, showing the location of the project area.

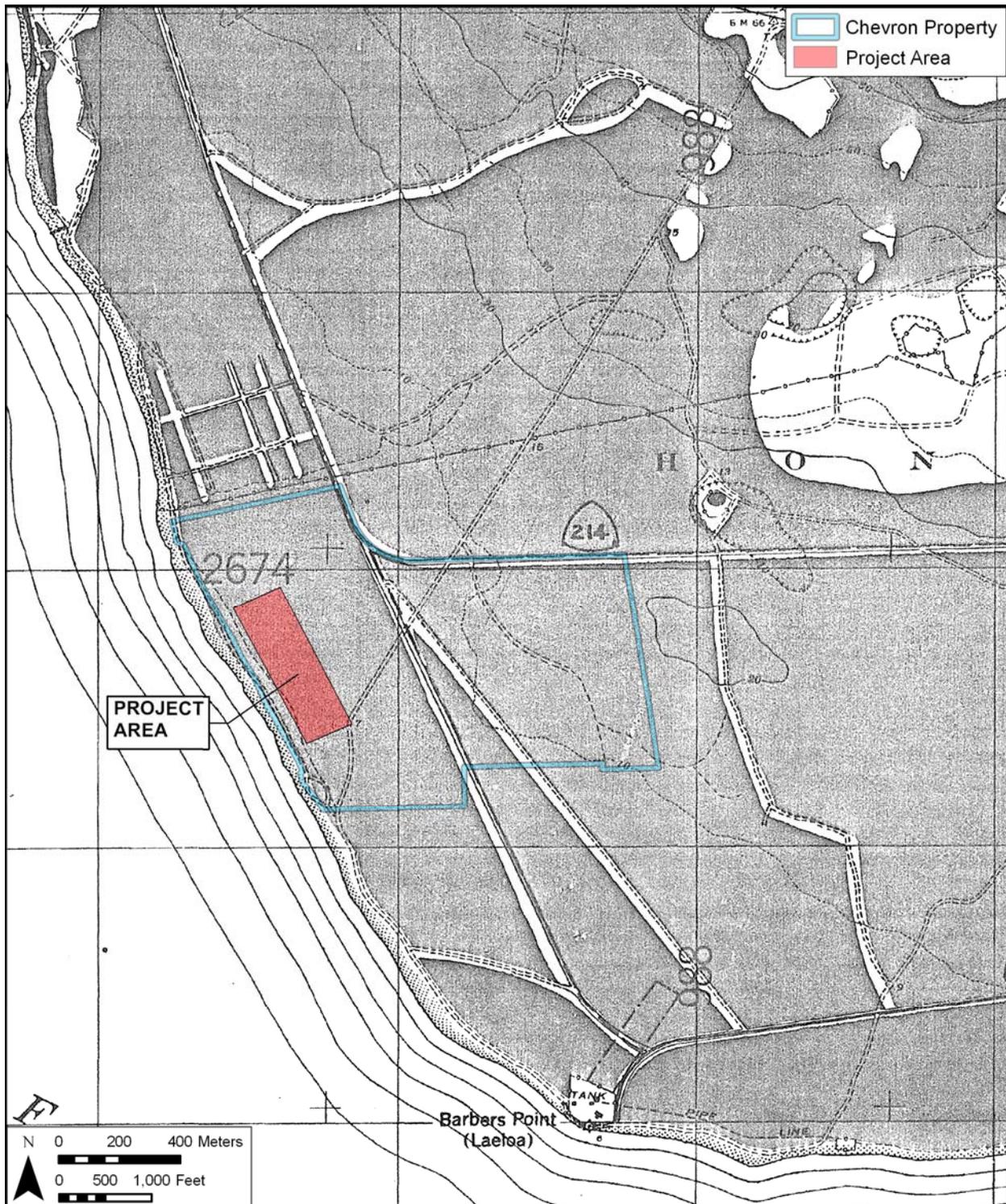


Figure 9. 1943 U.S. War Department Terrain Map, 1:20,000 Scale, Barbers Point Quadrangle, showing the location of the project area

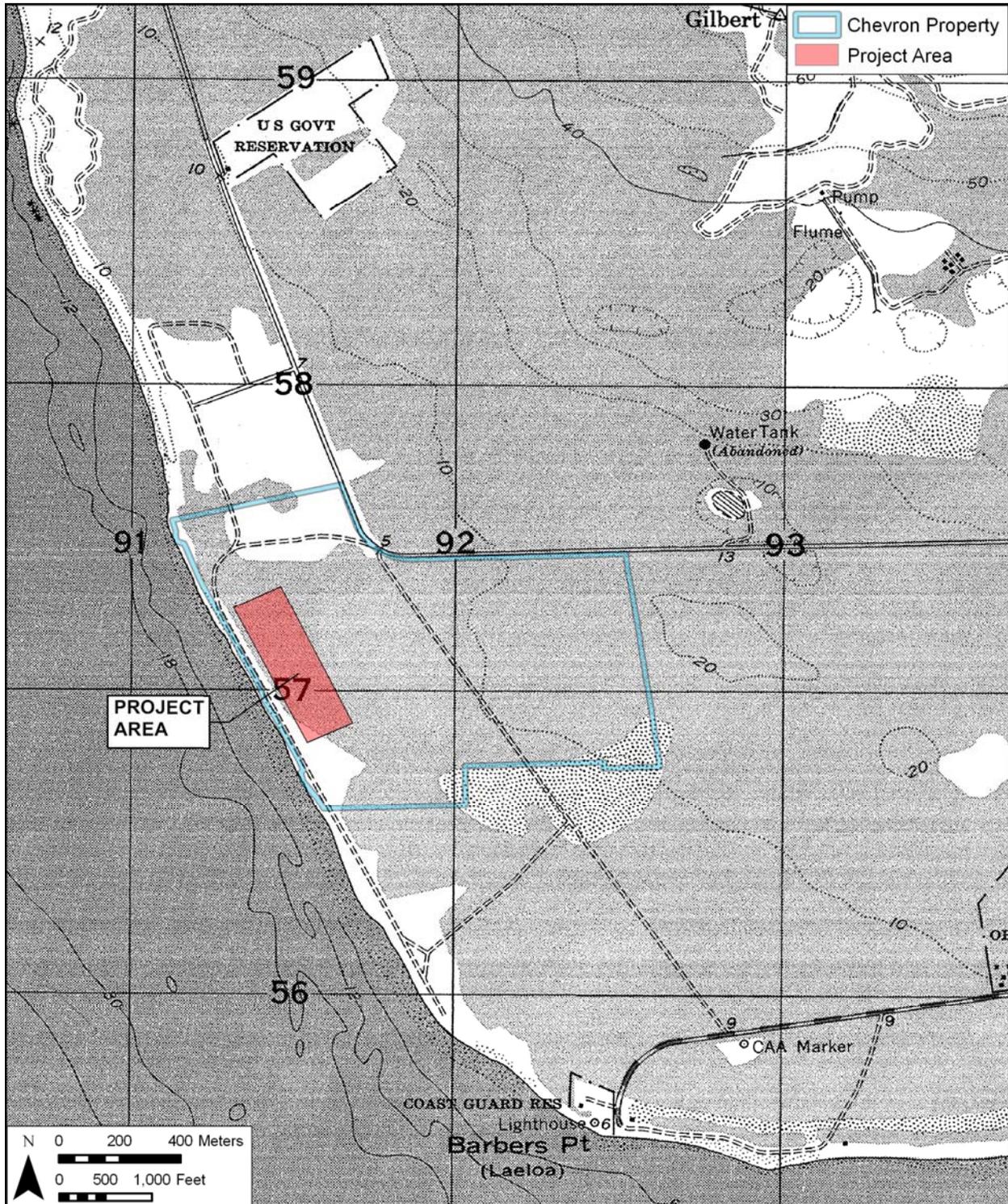


Figure 10. 1953 U.S. Army Map Service Topographic Map, 1:25,000 Scale, 'Ewa Quadrangle, showing the location of the project area

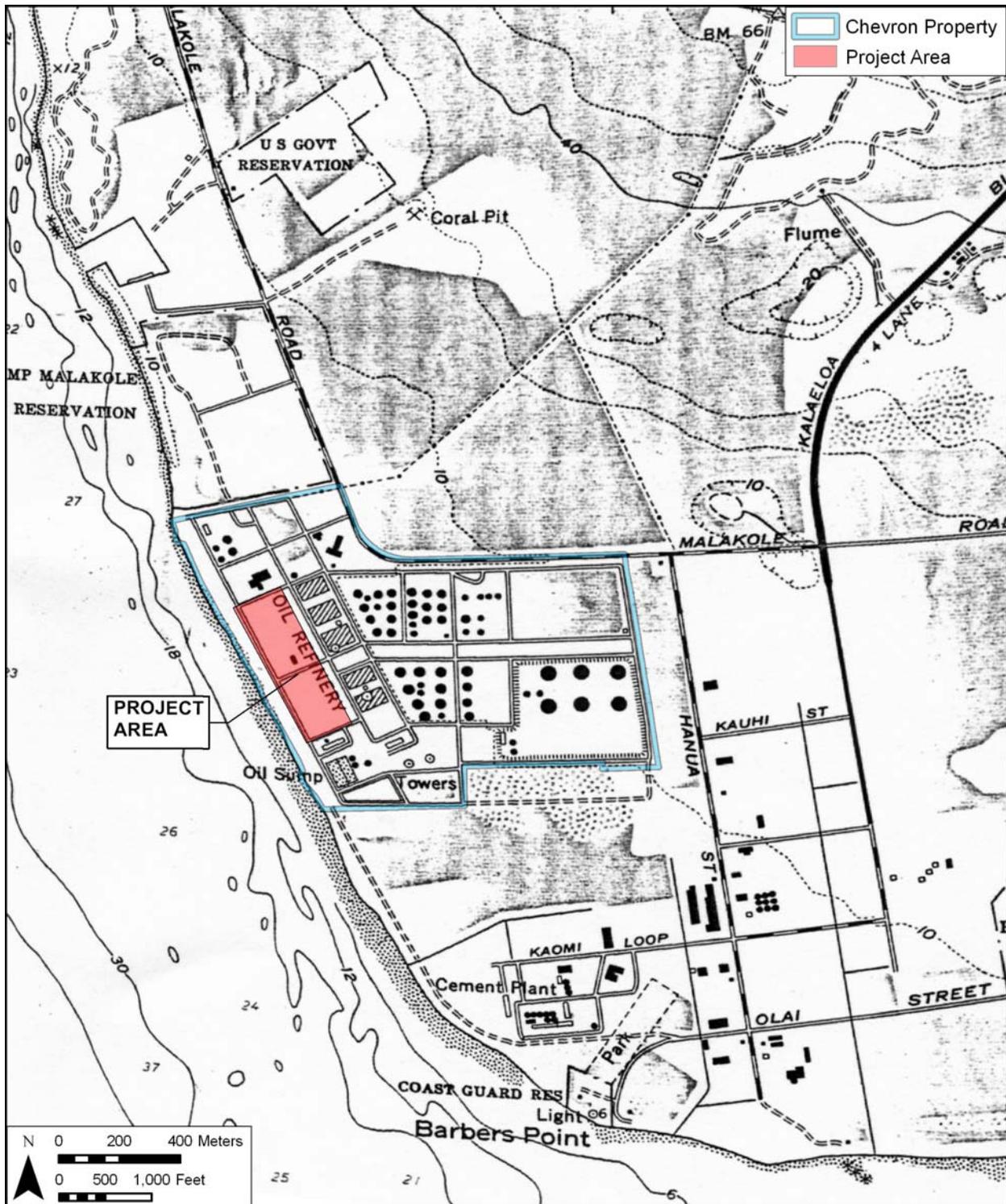


Figure 11. 1962 U.S. Geological Survey Topographic Map, 1:24,000 Scale, 'Ewa Quadrangle, showing the location of the project area



Figure 12. 1977-78 U.S. Geological Survey Orthophoto, 1:24,000 Scale, 'Ewa Quadrangle, showing the location of the project area

## 3.2 Review of Past Archaeological / Paleontological Studies

### 3.2.1 Overview of Archaeological Studies in Western Honouliuli

An overview of archaeological studies in the west half of Honouliuli Ahupua'a is presented in Table 1. Relevant studies in the vicinity of the project area are shown in Figure 13 and findings germane to the project area are discussed below.

Table 1. Archaeological and Related Studies in Western Honouliuli Ahupua'a

Reference	Nature of Study	General Location of Study
Thrum 1906	<i>Heiau</i> study	Hawaiian Islands
McAllister 1933	All island survey	O'ahu Island
Kikuchi 1959	Site letter report	Barbers Point
Lewis 1970	Reconnaissance Survey	Barbers Point (harbor area)
Frierson 1972	Study of land use & vegetation change	Honouliuli
Barrera 1975	Reconnaissance Survey	Barbers Point (harbor area)
Clark and Connolly 1975	Reconnaissance Survey	Barbers Point (harbor area)
Oshima 1975	Reconnaissance Survey	Barbers Point
Sinoto 1976	Cultural resources Survey	Barbers Point (harbor area)
Bordner 1977	Reconnaissance Survey	Kalo'i Gulch
Davis 1978	Scholarly paper	Barbers Point (harbor area)
Davis and Griffin 1978	Archaeological Survey	Barbers Point (harbor area)
Hawaii Marine Research Inc. 1978	Geoarchaeological reconnaissance	Barbers Point (harbor area)
Kirch 1978	Land snail study	Barbers Point (harbor area)
Sinoto 1978	Archaeological & Paleontological salvage	Barbers Point (harbor area)
Barrera 1979	Archaeological Survey	West Beach
Clark 1979	Reconnaissance Survey	Barbers Point (harbor area)
Cleghorn 1979	Reconnaissance Survey	Barbers Point
Davis 1979a	Emergency excavations	Barbers Point (harbor area)
Davis 1979b	Emergency excavations	Barbers Point (harbor area)
Davis 1979c	Emergency excavations	Barbers Point (harbor area)
Komori and Dye 1979	Archaeological testing	West Beach
Sinoto 1979	Cultural resources Survey	Barbers Point (harbor area)
Davis 1980	Research design	Barbers Point

<b>Reference</b>	<b>Nature of Study</b>	<b>General Location of Study</b>
Kirch and Christensen 1980	Land snail study	Barbers Point (harbor area)
Christensen and Kirch 1981	Land snail study	Barbers Point (harbor area)
Hammatt and Folk 1981	Archaeological and Paleontological Investigation	Barbers Point (harbor area)
Davis 1982	Academic paper	Barbers Point
McCoy et al. 1982	Proposal for investigations	Barbers Point (harbor area)
Neller 1982	Scholarly study	Barbers Point
Olson and James 1982	Fossil avifauna study	Barbers Point
Ahlo and Hommon 1983	Reconnaissance Survey	Barbers Point
Bordner and Silva 1983	Reconnaissance Survey	Waimānalo Gulch
Barrera 1984	Archaeological Status Report	West Beach
Hammatt 1984	Reconnaissance Survey	Kahe Point
Haun and Kelly 1984	Research resign for Archaeological Survey	Naval Air Station
Hommon and Ahlo 1984	Test excavations	Barbers Point
Tuggle 1984	Survey report	Naval Air Station
Neller 1985	Review and evaluation	West Beach
Barrera 1986	Archaeological Investigations	West Beach
Davis and Haun 1986	Intensive Survey and test excavations	West Beach
Davis et al. 1986a and 1986b	Research design	West Beach
Haun 1986a	Reconnaissance Survey	Kapolei Town
Haun 1986b	Reconnaissance Survey	Kapolei Town
Davis and Haun 1987a and 1987b	Intensive Survey & test excavations	West Beach
Rosendahl 1987a	Reconnaissance Survey	Kapolei Town
Rosendahl 1987b	Survey report	Kapolei Town
Welch 1987	Reconnaissance Survey	Naval Air Station
Davis 1988	Reconnaissance Survey	HECO Station Barbers Point
Shapiro and Rosendahl 1988	Test excavations	Camp Malakole
Bath 1989a	Petroglyph study	Waimānalo Gulch
Bath 1989b	Burial documentation	Kahe
Burgett and Rosendahl 1989	Subsurface archaeological testing	North of OR&L
Davis 1989	Archaeological investigations	HECO Station Barbers Point

<b>Reference</b>	<b>Nature of Study</b>	<b>General Location of Study</b>
Hammatt and Shideler 1989a	Archaeological assessment	Barbers Point (harbor area)
Hammatt and Shideler 1989b	Reconnaissance Survey	Kahe
Sinoto 1989	Letter report	Barbers Point
Carlson and Rosendahl 1990	Inventory Survey	Kaomi Loop Subdivision
Cleghorn and Davis 1990	Archaeological and paleontological investigation	Barbers Point (harbor area)
Davis 1990a	Archaeological and paleontological study (Ph.D. dissertation)	Barbers Point (harbor area)
Davis 1990b	Archaeological and paleontological investigation	Barbers Point (HECO area)
Kawachi 1990	SHPD Burial Recordation	Canal at east end of Ōla'i Street
Rosendahl 1990	Letter report	Kapolei Town
Folk 1991	Reconnaissance Survey	Drainage channel
Hammatt et al. 1991	Inventory Survey	Makaīwa Hills
Hammatt and Shideler 1991	Archaeological assessment	Barbers Point (harbor area)
Haun et al. 1991	Survey report	Naval Air Station
Kennedy 1991	Subsurface testing	Pu'u o Kapolei
Burgett and Rosendahl 1992	Inventory Survey	Barbers Point (harbor area)
Erkelens 1992	Archaeological Survey	Naval Air Station
Hammatt and Folk 1992	Subsurface testing	Barbers Point (drainage beach berm)
Davis 1993	Archaeological and paleontological investigation	Barbers Point (harbor area)
Glidden et al. 1993	Data recovery excavations	Paradise Cove
Jones 1993	Fossil coral reefs study (Ph.D. dissertation)	Hawaiian Islands
Landrum 1993	Reconnaissance and subsurface testing	Naval Air Station
Miller 1993	Data recovery	Barbers Point (harbor area)
Hammatt and Shideler 1994	Archaeological assessment	Barbers Point (harbor area)
Hammatt et al. 1994	Inventory Survey	Barbers Point (harbor area)
Hammatt and Shideler 1995	Data recovery plan	Barbers Point (harbor area)
Jourdane 1995	Burial documentation	Paradise Cove
O'Hare et al. 1996	Intensive Survey and testing	Naval Air Station

Reference	Nature of Study	General Location of Study
Athens et al. 1997	Cultural resource inventory, paleoenvironmental investigation	‘Ewa Plain: Naval Air Station
Tuggle 1997a	Cultural resource inventory	Naval Air Station
Tuggle 1997b	Synthesis	‘Ewa Plain
Tuggle and Tomonari-Tuggle 1997	Cultural resource inventory Survey	Naval Air Station
Wickler and Tuggle 1997	Cultural resource inventory, Inventory Survey	Naval Air Station
Wulzen and Rosendahl 1997	Subsurface testing & data recovery	Naval Air Station
McIntosh and Cleghorn 1999	Archaeological Archival Research	12 mile Water Reclamation Transmission Line
McDermott et al. 2000	Data recovery	Barbers Point (harbor area)
Hammatt and Shideler 2001	Archaeological Inventory Survey	Proposed 360 Fiber Optic Cable TMK:9-1-14&15
Sinoto and Titchenal 2002	Archaeological Inventory Survey	Desalination facility S of E end of Ōla‘i Street
Cordy and Hammatt 2003	Archaeological Assessment	Barbers Point, North of OR&L
Hoffman and Hammatt	Field Inspection	Approximately 124 Acres at Kapolei (TMK 9-1-14:33 and 9-1-15:20)
O’Hare et al. 2004	Documentation of Plantation Infrastructure	North of OR&L
Terry et al. 2004	Archaeological Inventory Survey of Two Sinkholes	North of OR&L
Hoffman et al. 2005	Archaeological Inventory Survey	South of OR&L
McDermott et al. 2006	Archaeological Inventory Survey	Proposed 345-Acre Kapolei Harborside Center
Hammatt and Shideler 2007a	Archaeological Inventory Survey (draft)	Proposed Kapolei Corporation Yard, Kalaeloa
Rasmussen and Tomonari-Tuggle 2006	Archaeological Monitoring	Waiau Fuel Pipeline
Hammatt and Shideler 2007b	Archaeological Literature Review and Field Inspection	For an Approximately 21.2-Acre Project Area at Ko‘olina, TMK: [1] 9-1-057:002 & 004
Hammatt et al.2007	Archaeological Literature Review and Field Inspection	For a proposed Chevron Refinery fencing project, Kalaeloa, (TMK: [1] 9-1-014:010 por.)

<b>Reference</b>	<b>Nature of Study</b>	<b>General Location of Study</b>
Tulchin, T., et al. 2007	Archaeological Assessment	For the 65.8-acre former Hawai'i Raceway Park Property, (TMK: (1) 9-1-075: 044 and 050),
Groza et al. 2008	Archaeological Assessment	For an Approximately 123-Acre Project area Lots 16915 and 16916, Kalaeloa (TMK: [1] 9-1-015:20 por.)
Hunkin and Hammatt 2009	Archaeological Inventory Survey	62-acre Makakilo Drive Extension Project, (TMK: [1] 9-2-002:006, 9-2-003:079)
Thurman et al. 2009	Archaeological Literature Review and Field Inspection Report	I C Sunshine Solar Energy Project, TMK: [1] 9-1-032:001
Tulchin, J. and Hammatt 2009	Archaeological Assessment	The Villas at Malu'ohai, a 2-acre Parcel in Kapolei, TMK: [1] 9-1-016:064 por.
Altizer and Hammatt 2010 (Draft)	(DRAFT) Archaeological Literature Review and Field Inspection	IC Sunshine Solar Energy Project (TMK:[1] 9-1-032:001)
Groza and Hammatt 2010	Archaeological Monitoring Report	For wastewater improvements at Kalaeloa City and County Beach Park (also known as Barbers Point Beach Park), TMK: [1] 9-1-026:027
Runyon et al. 2010a	Archaeological Monitoring Report	For Phase 1B of the North-South Road Project, TMK: [1] 9-1-17: 4, 95, 96, 97, 98
Runyon et al. 2010b	Archaeological Monitoring Report	For Phase 1C of the North-South Road Project, TMK: [1] 9-1-018:001,003,004,005; 9-2-002:001,006
Hammatt and Shideler 2011	Archaeological Assessment	For a Board of Water Supply Fire Dip Tank Project at Pālehua, TMK: [1] 9-2-003: 088 por.

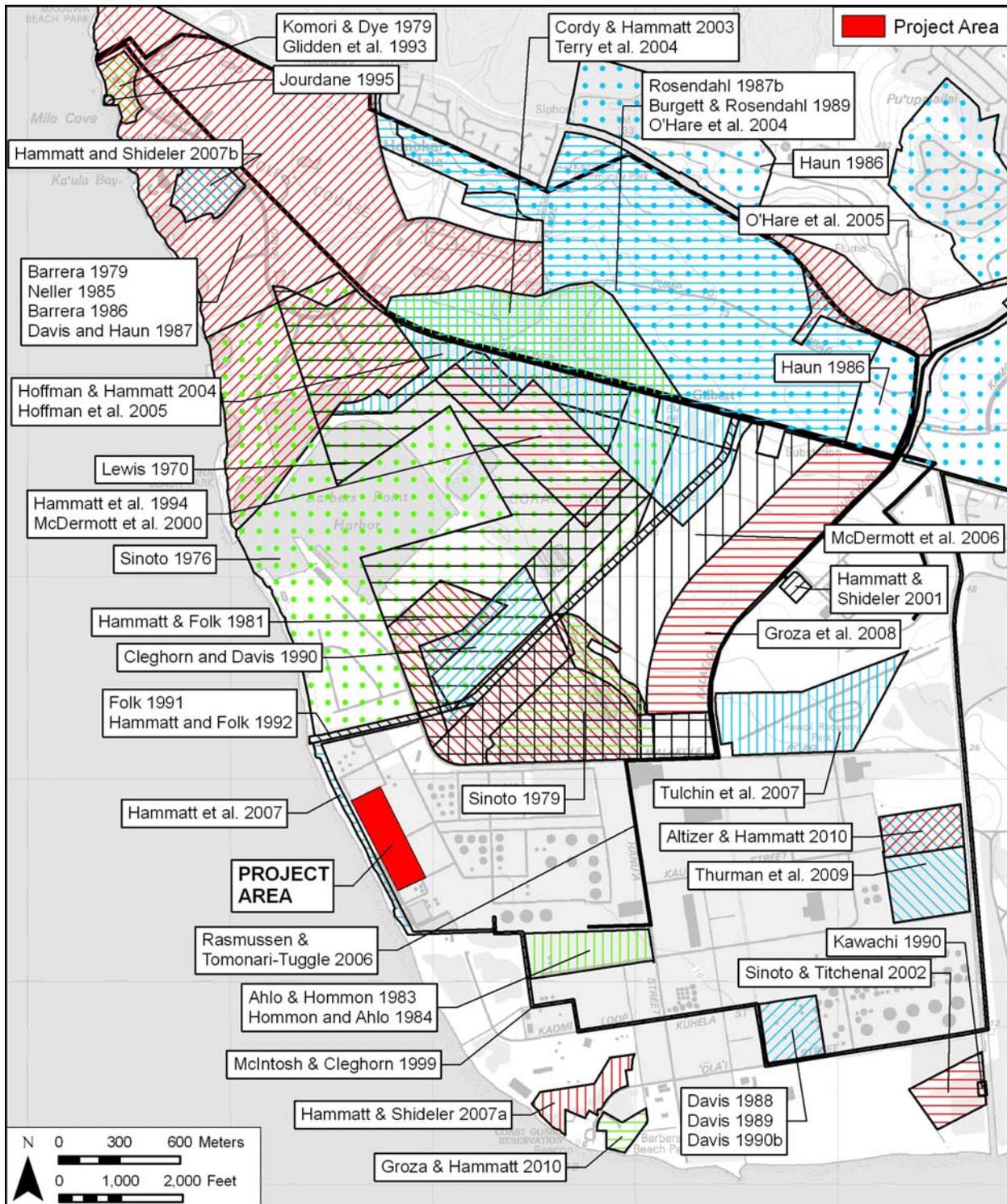


Figure 13. U.S. Geological Survey 7.5-Minute Series Topographic Map, 'Ewa quadrangle (1998), showing areas of archaeological study in the vicinity of the project area

The first effort to record archaeological sites in Honouliuli was by Thrum (1906:46), who references “a *heiau* on Kapolei hill, ‘Ewa - size and class unknown. Its walls thrown down for fencing.” The former *heiau* was on Pu‘u Kapolei, 5 km northeast of the present study area.

In his 1930 surface survey of the island of O‘ahu, archaeologist J. Gilbert McAllister recorded the specific locations of important archaeological and cultural sites, and the general locations of some sites of lesser importance. McAllister (1933:107-108) recorded seven specific sites at Honouliuli (numbered 133-139) and these became the first seven sites in the BPBM Site Numbering System (OA-B6-1 through OA-B6-7). The nearest of these specific sites to the present project area is McAllister Site 138, including the Pu‘u Kapolei *heiau* and an adjacent rock shelter. McAllister (1933:109), however designated McAllister Site 146 to include archaeological features covering a large but poorly defined area along the coast. His impressions of Site 146 are recorded as follows:

‘Ewa coral plains, throughout which are remains of many sites. The great extent of old stone walls, particularly near the Pu‘uloa Salt Works belongs to the ranching period of about 75 years ago [c. 1850s]. It is probable that the Hawaiians formerly used the holes and pits in the coral. Frequently the soil on the floor of larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here

These archaeological sites of the ‘Ewa coral plains would be the subject of some 40 or so archaeological reports in the 1970s and 1980s with approximately a hundred studies to date.

From the period between McAllister’s 1930 study and the flurry of work that began in 1969, there are only a few sporadic pieces of poorly documented research. “In 1933, Dr. Kenneth P. Emory examined a well-preserved house site and a possible *heiau* in the western part of the coral plain; these sites were later destroyed by sugar-cane planting” (Sinoto 1976:1). In 1959, William Kikuchi removed a number of burials from a burial cave site (BPBM Site OA-B6-10) at the Standard Oil Refinery, which was subsequently destroyed (Barrera 1975:1). Kikuchi recovered 12-16 incomplete primary and/or secondary burials cached in a sinkhole or crevice exposed during construction activities near the big bend in Malakole Road just south of the northeast end of the present solar site project study area (Kikuchi 1959; Davis 1990a:146-147). Specific location data is not available but if this find was close to the big bend in Malakole Road then it would appear to have been within 200 m of the northeast end of the present solar site project study area.

In 1960, Yoshi Sinoto and Elspeth Sterling made note of a house site (BPBM Site OA-B6-8). “In 1962, Lloyd Soehren recorded another secondary human burial in a sinkhole at the Barber’s Point Naval Air Station” (Davis 1990a:147). These reports of a number of sites resulted in a number of visits by Dr. Sinoto and student volunteers in late 1969 and early 1970. A University of Hawaii graduate student, Ernest Lewis (1970) conducted a surface survey that located some 22 archaeological sites of the types that are typical for the Kalaeloa region, including various types of enclosures and mounds, as well as walls, made of the locally available stacked limestone cobbles and boulders.

In 1975 Neal Oshima carried out an archaeological reconnaissance survey of the then proposed drainage channel (at the east end of Ōla'i Street) identifying walls, a platform, an enclosure near the east end of Malakole Road.

In 1975, William Barrera of the BPBM, under contract with the U.S. Army Corps of Engineers (USACE), conducted an archaeological reconnaissance survey for the proposed Barber's Point Harbor. The USACE continued the archaeological research in 1976 by requesting another survey (Sinoto 1976) of the cultural remains in the area previously surveyed in 1970 (Lewis) and 1975 (Barrera). Sinoto's work included mapping of 68 new archaeological sites and more complete mapping of 30 previously recorded sites. In the course of this research, two excavations were conducted in the large, presently fenced, sinkhole Site 9545, located north of the barge harbor. This large sinkhole yielded archaeological remains and a radiocarbon date from a hearth feature, as well as bones of extinct bird species.

An important aspect of this first research by Sinoto (1976) was the identification of the presence of numerous avifaunal skeletal remains within limestone sinkholes, which led to the contacting of Storrs Olson, Associate Curator of Birds at the Smithsonian Institution. After a field inspection and a brief review of the recovered material he knew that many extinct endemic species, new species, and even new genera were present. Olson stated that:

The various limestone sinks...contain probably the most extensive fossil avifauna in Hawaii with many new species endemic to the island. Such fossils have not and probably cannot be found anywhere else on the island. Furthermore, the nature of preservation is such as to insure that virtually complete skeletons can probably be assembled for most species. Thus, there is much highly significant and totally new biological and paleontological information that can be obtained at the Barbers Point site.

Destruction of any of the potential fossil sinks would result in the loss of many specimens, some possibly unique, since one sinkhole might contain species absent in another. Also, the fauna of one sinkhole might not be coetaneous with that of another, the age of a deposit being determined by when a sinkhole first formed. Therefore, an investigation of the fauna of different sinks might show changes in species composition and changes in morphology within a species through time. Finally, it would also be desirable to retain some sinks intact as fossil "banks" should some new technique or different information be desired in the future. The fossil deposits at Barbers Point are a unique and irreplaceable resource. (Olson in Sinoto 1976:74)

In 1980, Storrs Olson extended the test pit of Aki Sinoto in the large sinkhole SIHP # 9545 and conducted extensive excavation of this area in 1981 (Olson and James 1982:27).

In 1977, Aki Sinoto (1978) undertook salvage archaeological and paleontological excavations in the proposed barge harbor area. Sinoto's work for the Corps of Engineers (1978) included preliminary sampling and analytical studies of avifaunal remains and terrestrial gastropods (land snails) and a geological study of the emerged coral reef based on the excavation of one sinkhole.

In late 1977 and early 1978, an archaeological survey was conducted by the Archaeological Research Center of Hawaii in the deep draft port facility area (Davis and Griffin 1978).

In 1977, Barber's Point Archaeological District was assigned SIHP # 50-80-12-2888 and listed on the National Register of Historic Places (based on the SHPD's Hawai'i/National Register web site, <http://www.hawaii.gov/dlnr/hpd/hpgreeting.htm>). This district lies virtually adjacent to the north side of the present project area (see Figure 13).

To complete the archaeological survey of the entire area to be affected by the harbor and support facilities, the USACE contracted for survey of the areas designated as Optional Area 1 and Study Area 1a (Davis 1978) and Area 1b (Sinoto 1978). Those surveys by Davis and Sinoto located numerous archaeological sites, as well as sinks of late Pleistocene to early Holocene ages that are of considerable paleontological interest.

Sinoto's (1979) work shows that, although sinks containing remains of extinct species are dispersed throughout his study area, only 3 out of 19 sinks tested (or 16 percent) contained extinct species. However, this amounts to a considerable number of sinks as Sinoto estimated the total number of testable sinks in the 1979 study area as between 1,100 and 2,500 (Sinoto 1979:34). The majority of Sinoto's New Disposal Site Area has been utilized for chemical dumps and coral stockpiling. That portion which remains is the site of the proposed Sinkhole Reserve and Park, comprising approximately 7 acres located 1.2 km east of the current project area.

In 1979, Bertell Davis carried out "emergency excavations" (Davis 1979a-c) within the area he had previously designated as Area II, located east of the easternmost corner (the *mauka*, Diamond Head corner) of the present harbor open water. These excavations were carried out in advance of the quarry expansion operation (which preceded the harbor expansion) and it is believed that all sites in this area were salvaged or lost.

Also in 1979, an archaeological reconnaissance survey was conducted of a proposed waterline route down the east side of Kalaeloa Blvd. and then east along the north side of Malakole Road. "No archaeological sites were found along the proposed waterline route." and it was noted that: "this area is either presently in sugar cane cultivation or has been used for this purpose in the past" (Cleghorn 1979:5).

Hammatt and Folk (1981) undertook archaeological testing and salvage excavations in three adjoining parcels designated Study Areas 1A, 1B and Optional Area. Of 138 archaeological sites, 88 sites were tested and 26 were excavated. Associated paleontological studies show that the limestone solution sinks and surrounding terrain were a major habitat of many fossil birds. Appendix 1 of their report, by Storrs Olson and Helen James, lists over 30 species of extinct fossil birds identified at Barber's Point.

Ahlo and Hommon (1983) and Hommon and Ahlo (1984) carried out studies at a proposed solid waste processing and resource recovery facility project area, examining two sinkholes, three rectangular pits and a possible cultural deposit. Finds were minimal.

The most voluminous study (Cleghorn and Davis 1990) started in 1982 and concentrated in the area just northeast of the main bend of Malakole Road. A "final draft" (Davis 1993) report documents that research as did Bertell Davis' Ph.D. dissertation (Davis 1990a).

Lynn Miller (1993) produced a report on her findings in a 31-acre parcel located just to the southeast of the present Deep Draft Harbor. Her research covers some 20 features at two state sites (SIHP #s -2710 and -2711) that included enclosures, sinkhole caves, and a single burial.

The extensive archaeological and paleontological research conducted prior to development of West Beach (Ko'olina) to the north of the current project area is relevant. It is the second area of the 'Ewa Plain in which major data recovery was accomplished. Barrera (1979, 1984, and 1986) conducted preliminary surveys and Davis and Haun (1986) and Davis et al. (1986a and 1986b) undertook intensive survey and data recovery. Over 600 sinkholes were identified in the area along with around 180 surface sites, many of them similar in function to those at Barber's Point.

Haun and Kelly (1984) reported on a survey of the Naval Air Station at Barber's Point, which lies along the coast to the east of the present project lands.

Hammatt et al. (1991) conducted an archaeological inventory survey on a 1,915-acre Makaīwa Hills project area located 4 km to the north, *mauka* of Farrington Highway, identifying 34 sites.

A preliminary reconnaissance survey conducted by Haun (1986a) covered approximately 200 acres on the *mauka* side of Farrington Highway. Only one site was identified, an irrigation ditch that extended from the northwestern edge of his project area to a quarry at the northeastern edge. The ditch was described as “constructed of concrete and stone. Elevated flumes constructed of timbers and galvanized steel bridge the gulches” (Haun 1986a:3).

An archaeological reconnaissance survey (Haun 1986b) for the 'Ewa Town Center/Secondary Urban Center study covered an area of approximately 1,400 acres 3 km north of the present project area. The study was conducted on both the *mauka* and *makai* side of Farrington Highway, and surrounded the 200-acre parcel surveyed earlier in 1986.

One previously recorded site was known to have once been in the project area, a portion of the Oahu Railroad and Land Company right-of-way (SIHP # 50-80-12-9714). The additional sites Haun (1986b) identified included an irrigation ditch (a portion of the SIHP # -4341 identified during the 200-ac survey), a military structure, and a rock wall that paralleled the irrigation ditch. A study by Burgett and Rosendahl (1989) involved the excavation of seventy-two backhoe test trenches in a 360-ac portion of the Haun study area. There were no significant finds.

Shapiro and Rosendahl (1988) carried out sinkhole excavations at a 60-ac Camp Malakole industrial subdivision site. Some 500 sinkholes were identified and a 5 percent sample (25 sinkholes) was selected for testing but was later reduced to 15 sinkholes. Although some cultural use was indicated by the presence of shell midden, volcanic glass, coral abraders and a bone fishhook fragment the cultural value was suggested to be low. Although a fairly intact *Branta* species goose was recovered the paleontological value was also suggested to be low.

Bertell Davis (1988, 1989, 1990b) carried out three studies at the location of a 20-ac parcel proposed for a HECO generating station on the north side of Ōla'i Street approximately 600 m east of the present study area. Some 15+ sinkholes were identified, 13 were recorded and tested and extensive excavation was undertaken at four of the sinkholes. Extinct bird bones were identified in all four of these sinkholes. A human burial was encountered in sinkhole SIHP # -4099-1 (Davis 1990b:33-37). This burial was of particular interest as it was dated to AD 1422-1664 and appeared to show signs of syphilis, which was understood to be a western introduced disease.

Between 1989 and 1994 Hammatt and Shideler produced a number of archaeological assessments of the Barber's Point area. A detailed discussion of the creation of the preserve area that is centrally located along the north side of Malakole Road is included in the report (Hammatt and Shideler 1989a:33-36).

To the north of the project area, Paradise Cove, Lanikūhonua, and West Beach have been the subject of numerous archaeological studies (Barrera 1979, 1984, and 1986; Komori and Dye 1979; Neller 1985; Davis and Haun 1986, 1987a, and 1987b; Glidden et al. 1993; and Jourdane 1995).

In 1990 Carol Kawachi documented a burial in a sinkhole near the east end of Ōla'i Street approximately 1.5 km east of the present study area on the side of the large canal "in a sinkhole which was probably exposed and cross-sectioned during excavation for the storm drain (Kawachi 1990:2).

Lynn Miller (1993) conducted a study on a 31-ac parcel located just to the southeast of the present Deep Draft Harbor and reported 20 features at two state sites (SIHP #s -2710 and -2711) which included enclosures, sinkhole caves, and a single burial SIHP # 50-80-12-2711, and Feature 28, an unmodified sinkhole.

To the north of the current project area Hammatt et al. (1994) and McDermott et al. (2000) conducted an archaeological inventory survey and a large archaeological data recovery project respectively in lands just south of the OR&L alignment. This work resulted in the creation of two archaeological preserve areas. SIHP # 50-80-12-9633 is a cave that was found to contain human remains and part of a wooden canoe (described in Hammatt et al. 1994:93-94). Because of its function as a burial site, the cave was not excavated and the remains were protected in the state in which they were discovered. Another sinkhole burial SIHP # 50-80-12-4907D was identified during the McDermott et al. 2000 study. Just east of that fenced preserve is another smaller preserve area surrounding the very large sinkhole SIHP # 50-80-12-9545 (McDermott et al. 2000).

McIntosh and Cleghorn (1999) carried out archival research for the Honouliuli wastewater treatment plant including a 12-mi pipeline. They conclude the likelihood of encountering surface archaeological sites is low but that "there is the possibility of encountering subsurface resources in the form of sinkholes containing cultural materials and possibly human burials." (McIntosh and Cleghorn 1999:i)

In 2002, Sinoto and Titchenal carried out an archaeological inventory survey of a 30-acre area south of the east end of Ōla'i Street identifying three sites two cultural and one paleontological. Cultural features included a circular enclosure, a capped sinkhole, a cist-like structure and a lime kiln. A curious bone toggle artifact believed to be "probably human" was the only *iwi* recovered (Sinoto and Titchenal 2002:58). Thirteen species of birds including many extinct species were identified.

Cordy and Hammatt (2003) made a study of a land parcel north of the current project area, across the OR&L. Several sinkholes were noted as of potential archaeological interest. The study also documented the presence of a historic chicken farm as well as other twentieth century architectural remains, including a Quonset hut. Two follow-up studies of plantation

infrastructure (O'Hare et al. 2004) and two of these sinkholes (Terry et al. 2004) further addressed cultural resources north across the OR&L alignment.

More recently, Hoffman et al. (2005) identified several archaeological and historic sites as part of an archaeological inventory survey that covered portions of the northwest corner of the current project area. This investigation noted that this northwest portion of the current project area had been greatly affected by past land use; particularly the limestone quarry operation; however, there were still remnant archaeological features preserved within the less disturbed *kiawe* thickets. The types of features documented included sinkholes and stacked limestone wall segments and enclosures.

An Archaeological Inventory Survey (Hammatt and Shideler 2007a) for the proposed Kapolei Corporation Yard at Kalaeloa Point, identified (SIHP # 50-80-12-6866) remnants of the Barbers Point Military Reservation established in 1921 and dating perhaps particularly during the period between 1937 and 1942. SIHP # -6866 consisted of three designated features: two 155 mm "Panama Mount" artillery bases; and an associated cement slab. In addition, a number of sinkholes were observed with indications that one or more contained extinct bird bones. Testing and/or preservation of sinkholes and a monitoring program were recommended.

### 3.2.2 Archaeological Studies of Particular Interest to the Current Project

Two archaeological studies were conducted for a proposed drainage channel along the northern edge of the current project area, including an archaeological reconnaissance (Folk 1991) and subsequent subsurface testing of a beach berm along the coast (Hammatt and Folk 1992). The archaeological reconnaissance study (Folk 1991) resulted in: the identification of a homestead (*kuleana*) lot with undisturbed sinkhole features at the northern end of the proposed drainage channel (near the OR&L alignment); sinkholes and remnants of the Camp Malakole Military Reservation between the Barbers Point Harbor and the Chevron Refinery; and a beach berm/sand dune along the coast.

Following the reconnaissance study, subsurface testing was conducted within the beach berm at locations 400 m and 660 m north of the current project area (Hammatt and Folk 1992). The authors indicated testing was not conducted further south because of the absence of the beach berm due to prior grading. Subsurface testing indicated the berm had been previously disturbed by the installation of an oil pipeline related to the adjacent Chevron Refinery. However, a remnant cultural layer (SIHP # 50-80-12-4526) with charcoal deposits was identified. Radiocarbon dating yielded an age of A.D. 1230-1405.

Hammatt et al. (2007) undertook an archaeological literature review and field inspection for a proposed Chevron Refinery Fencing Project. The project area was observed to have been almost entirely, if not entirely, previously graded raised reef limestone hard pan. No surface historic properties were observed within or in the immediate vicinity of the project area. No intact sinkholes, sand dune deposits, or cultural material were observed within the project area.

## 3.3 Background Summary and Predictive Model

The one general observation regarding the archaeology of the 'Ewa Plain is that there was more pre-Contact utilization of the area than might be expected given its present day uninventing

ambiance and “marginal ecology” (Sinoto 1976:71). Given that the current project area is not only on the coast but adjacent to a prominent point of land, pre-Contact use was likely significant.

Prior to extensive historic and modern land alteration, this area of Honouliuli would be expected to yield the remnants of traditional Hawaiian temporary habitations used during forays for marine resources and/or evidence of opportunistic seasonal agriculture and possibly burials. Based on ethnographic accounts and past archaeological investigations in the vicinity, limestone sinkholes on the ‘Ewa Plain were used for agriculture and burial interment, with the largest overhangs used for temporary shelter. With the spread of Western land use in the nineteenth century, the project area may have been used for ranching. Following statehood in 1959, construction began on the Chevron oil refinery. Extensive land disturbance related to the refinery construction would have destroyed or buried portions of the project area’s traditional Hawaiian archaeological record, including surface features and sinkholes. Some sinkholes at Barbers Point have been shown to be a storehouse of data on more than a score of previously unknown, extinct, bird species.

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## Section 4 Results of Field Inspection

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The field inspection consisted of a complete pedestrian inspection of the project area. As previously discussed, the project area for the current study consists of an approximately 18.5 ac (7.5 ha) rectangle measuring 500 m by 150 m. in the *makai* (seaward) portion of the Chevron Refinery property (Figure 14).

The project area was observed to have been almost entirely, if not entirely, previously graded raised reef limestone hard pan (Figure 15 to Figure 18). Typically the project area is covered with a thin (< 10 cm thick) layer of coral silt and gravel. Occasional coral outcrops were observed which appeared to have been graded flat (Figure 19 and Figure 20). Occasional very small pit cave features were observed but none of these were as large as 60 cm in diameter (Figure 20 to Figure 22).

No surface historic properties were observed within or in the immediate vicinity of the project area. Despite the prior heavy land disturbance, the potential for sinkholes and intact sand dune deposits, which could possibly contain human remains or other cultural deposits, was evaluated. No intact sinkholes greater than 60 cm in diameter, sand dune deposits, or cultural material were observed in this project area and none are believed to be present.



Figure 14. Aerial photograph (source: USGS Orthoimagery 2005) showing the track log of one (of two) archaeologists conducting fieldwork in relation to the project area



Figure 15. General view of the northwest portion of the project area showing the graded ground surface, view to southwest



Figure 16. General view of the northeast portion of the project area showing the graded ground surface, view to NNW



Figure 17. General view of the central portion of the project area showing the graded ground surface, view to northwest



Figure 18. General view of the south portion of the project area showing the graded ground surface, view to southeast



Figure 19. General view of raised reef limestone the project area



Figure 20. General view of raised reef limestone the project area with small “pit cave” features and a very uncommon waterworn basalt cobble



Figure 21. General view of typical small “pit cave” feature partially filled in with silt



Figure 22. General view of typical small “pit cave” feature

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## Section 5 Summary

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To the best of our knowledge no sites have been formally reported in the immediate vicinity of the proposed solar project area studied. Kikuchi recovered 12-16 incomplete primary and/or secondary burials cached in a sinkhole or crevice exposed during construction activities near the big bend in Malakole Road just south of the northeast end of the present solar project study area (Kikuchi 1959; Davis 1990a:146-147). Specific location data is not available but if this find was close to the big bend in Malakole Road then it would appear to have been within 200 m of the northeast end of the present solar project study area. In 1969, artifacts were recovered by Roger Green from a beach midden site (B6-14), south of the barge harbor but again the specific location is uncertain.

Two archaeological studies were conducted for a proposed drainage channel along the northern edge of the current project area, including an archaeological reconnaissance (Folk 1991) and subsequent subsurface testing of a beach berm along the coast (Hammatt and Folk 1992). The archaeological reconnaissance study resulted in: the identification of a homestead (*kuleana*) lot with undisturbed sinkhole features at the northern end of the proposed drainage channel (near the O.R. & L. alignment); sinkholes and remnants of the Camp Malakole Military Reservation between the Barbers Point Harbor and the Chevron Refinery; and a beach berm/sand dune along the coast.

Following that reconnaissance study, subsurface testing was conducted within the beach berm at locations 400 m and 660 m north of the current project area (Hammatt and Folk 1992). The authors indicated testing was not conducted further south because of the absence of the beach berm due to prior grading. Subsurface testing indicated the berm had been previously disturbed by the installation of an oil pipeline related to the adjacent Chevron Refinery. A remnant cultural layer (SIHP # 50-80-12-4526) with charcoal deposits was identified in the northern portion of their study area. Radiocarbon dating yielded an age of A.D. 1230-1405.

During the present fieldwork particular attention was given to consideration of whether the cultural resources identified north of the northwest corner of the Chevron campus in the Folk (1991) and Hammatt and Folk (1992) studies were likely to extend into the present project area. There appears to be a significant change in landform with the coastal dunes in which cultural resources were documented not extending as far south as the Chevron campus. No soft sediments were observed within the present solar project study area. Based on our observations no sand dune deposits are believed to be present in the present solar project study area.

The project area is almost entirely, if not entirely previously graded raised reef limestone hard pan. The potential for pit caves (popularly called "sink holes"), which could possibly include burials and or other cultural deposits, was evaluated. Because of previous grading no undisturbed pit caves larger than 60 cm in diameter were observed in the project corridor. A few very small pit caves (see Figure 20 to Figure 22) were observed. These pit caves appeared small (less than 60 cm) in diameter and much disturbed and appeared to hold little promise of containing cultural resources. Experience has indicated that such small pit caves have little potential for significant archaeological or paleontological deposits.

## Section 6 Recommendations

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Based on the extensive grading of the project area and the absence of any surface historic properties or evidence of pit caves with entries greater than 60 cm, no further archaeological work is recommended. However, as a general precaution, the project plans should include provisions stating that “In the event that sand deposits and/or historic resources, including structural remains, subsurface cultural deposits, pit caves (sinkholes) with openings greater than 1 m in diameter, or human skeletal remains, are identified during the construction project, cease all work in the immediate vicinity of the find, protect the find, protect the find from additional disturbance, and contact the SHPD at (808) 692-8015.

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- U. S. War Department**
- 1919 U.S. War Department Fire Control Map, Barbers Point Quadrangle. Available at US Geological Survey Information Services, Box 25286, Denver, Colorado.
- 1936 U.S. War Department Topographic Map of Barbers Point Quadrangle. Available at US Geological Survey Information Services, Box 25286, Denver, Colorado.
- 1943 U.S. War Department Terrain Map of Barbers Point Quadrangle. Available at US Geological Survey Information Services, Box 25286, Denver, Colorado.
- Welch, David J.**
- 1987 Archaeological Reconnaissance of Former 'Ewa Marine Corps Air Station, Barbers Point Naval Air Station, O'ahu, Hawai'i, IARII. Honolulu.

**Wickler, Stephen, and H. David Tuggle**

1997 A Cultural Resource Inventory of Naval Air Station Barbers Point, O'ahu, Hawai'i Part II: Phase II Inventory Survey of Selected Sites, IARII, Honolulu.

**Wulzen, Warren, and Paul H. Rosendahl**

1997 Subsurface Testing and Data Recovery Excavations, Site 50-80-12-2220, Nimitz Beach, Naval Air Station Barbers Point, PHRI, Hilo, Hawaii.

# **APPENDIX C**

---

## **APPENDIX C SHPD CONCURRENCE LETTER**

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



**HISTORIC PRESERVATION DIVISION  
DEPARTMENT OF LAND AND NATURAL RESOURCES**

601 Kamokila Boulevard, Suite 555  
Kapolei, HI 96806

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

ESTHER KIA'AINA  
INTERIM 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  
KAIHOOLAWE ISLAND RESERVE COMMISSION  
LAND  
STATE PARKS

December 7, 2012

Mr. David W. Shideler  
Cultural Surveys Hawai'i, Inc.  
P.O. Box 1114  
Kailua, Hawaii 96734  
[dshideler@culturalsurveys.com](mailto:dshideler@culturalsurveys.com)

LOG NO: 2012.3286  
DOC NO: 1212SL07  
Archaeology

Dear Mr. Shideler:

**SUBJECT: Chapter 6E-42 Historic Preservation Review –  
Archaeological Assessment for a Proposed Solar Project within the Chevron Refinery  
Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu  
TMK (1) 9-1-014:010 por.**

Thank you for the opportunity to review this revised report titled *Archaeological Assessment for a Proposed Solar Site Project within the Chevron Refinery, Kalaehoa, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island TMK (1) 9-1-014:010 por.* (Hammatt and Shideler, November 2012). The submittal was received at the Kapolei office of SHPD on November 18, 2012. The archaeological assessment was conducted at the request of URS Corporation in support of a proposed solar site project within the Chevron Refinery property. The project area totals about 18.5 acres within the western (*makai*) portion of the Chevron Refinery property.

The archaeological assessment report provides adequate discussion of the environment, cultural and historical background, and previous archaeological and paleontological studies in the vicinity. The field methods involved a series of pedestrian transects documenting that the entire project area has been extensively graded. The survey identified a few pit caves (sinkholes) with opening diameters less than 60 cm, but no evidence of surface historic properties. Pursuant to HAR §13-284-5, the investigation is an archaeological assessment because no historic properties were identified.

The revisions made to this document adequately address the concerns raised in our prior correspondence (October 12, 2012; Log No. 2012.1564, Doc. No. 1210SL21). We concur with the assessment that no historic properties will be affected by the proposed project, and the recommendation that precautionary archaeological monitoring occur during land alteration because buried pit caves (sinkholes) and/or human remains may exist in this environment.

This revised report meets the requirements of Hawaii Administrative Rule (HAR) §13-276-5. It is accepted by SHPD. Please send one hardcopy of the document, clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office, attention SHPD Library. Please contact Susan A. Lebo at (808) 692-8019 or at [Susan.A.Lebo@hawaii.gov](mailto:Susan.A.Lebo@hawaii.gov) if you have any questions or concerns regarding this letter.

Aloha,

A handwritten signature in black ink, appearing to read "Theresa K. Donham".

Theresa K. Donham  
Archaeology Branch Chief

**APPENDIX D**  
**DRAFT ENVIRONMENTAL ASSESSMENT**  
**COMMENTS AND RESPONSES**

# BOARD OF WATER SUPPLY

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



August 31, 2012

PETER B. CARLISLE, MAYOR

DUANE R. MIYASHIRO, Chairman  
MAHEALANI CYPHER, Vice Chair  
THERESIA C. McMURDO  
ADAM C. WONG

WESTLEY K.C. CHUN, Ex-Officio  
GLENN M. OKIMOTO, Ex-Officio

ERNEST Y. W. LAU, P.E.  
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.  
Deputy Manager and Chief Engineer *mk*

Ms. Darla Guerrero  
URS Corporation  
615 Piikoi Street, Suite 900  
Honolulu, Hawaii 96814

Dear Ms. Guerrero:

Subject: Letter Dated July 20, 2012, from the Department of Planning and Permitting, Requesting Comments on the Draft Environmental Assessment (DEA) for the Solar Thermal Process Heat Project at Chevron Refinery Located at 91-480 Malakole Street – Tax Map Key: 9-1-014: 010

The existing potable water system is adequate to accommodate the proposed Solar Thermal Process Heat Project. The Board of Water Supply (BWS) currently supplies Chevron with RO demineralized recycled water for boiler feed. The DEA should indicate the additional RO water demand to determine availability and system adequacy. 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 the building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

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

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

The proposed project is subject to Board of Water Supply Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit applications.

This parcel is served by a 20-inch ductile iron water main fronting this parcel.

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

Very truly yours,

ERNEST Y. W. LAU, P.E.  
Manager and Chief Engineer

cc: Steve Tagawa, Department of Planning and Permitting

**RECEIVED**

SEP 06 2012

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

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813  
TELEPHONE: (808) 768-8000 • FAX: (808) 768-6041  
DEPT. WEB SITE: www.honoluluapp.org • CITY WEB SITE: www.honolulu.gov



PETER B. CARLISLE  
MAYOR

DAVID K. TANOUE  
DIRECTOR

JIRO A. SUMADA  
DEPUTY DIRECTOR

2012/ED-8(ST)

August 21, 2012

Ms. Darla Guerrero, Project Manager  
URS Corporation  
615 Piikoi Street, 9th Floor  
Honolulu, Hawaii 96814

Dear Ms Guerrero:

Subject: Chapter 25, Revised Ordinances of Honolulu  
Draft Environmental Assessment  
Chevron Refinery Solar Thermal Heat Project  
91-480 Malakole Street - Kapolei (Campbell Industrial Park)  
Tax Map Key 9-1-14: portion of 10

We have reviewed the Draft Environmental Assessment (EA) for the above-referenced project and have the following comments:

**Chapter 25, Revised Ordinances of Honolulu vs. Chapter 343, Hawaii Revised Statutes:**

The early sections of this document (i.e., Executive Summary; Section 1.4.1, Chapter 200, Title 11, Hawaii Administrative Rules; and Section 1.4.2., Chapter 343, Hawaii Revised Statutes), should be revised to clarify that this EA is required pursuant to the Special Management Area (SMA) law, Chapter 25, Revised Ordinances of Honolulu (ROH), and is not a Chapter 343, Hawaii Revised Statutes (HRS) required document.

As a project located on private land, outside the 40-foot shoreline setback, there is actually no "trigger" for the preparation of an EA pursuant to State Environmental Impact Statement (EIS) regulations, Section 343-5, HRS. However, the SMA law, Section 25-3.3, ROH, requires that the procedural steps set forth in Chapter 343, HRS, and Title 11, Chapter 200, Hawaii Administrative Rules must be followed. Typically, not all of the content requirements set forth in the State EIS law, such as the secondary economic impacts of a project (e.g., population or employment changes, and traffic generation), are necessary in an EA required by Chapter 25, ROH.

**Section 1.3 Purpose and Need:** There should be some quantitative (i.e., numerical) information provided on the anticipated energy savings from the proposed project (e.g., the amount of petroleum that would be displaced or "saved," in the production of the equivalent amount of steam that will be generated by the solar collectors)

Ms. Dara Guerro  
August 21, 2012  
Page 2

**Section 1.4.14 Environmental Permit and Required Approvals:** The "local" permits in the table should be revised to indicate that the Lead Agency for the SMA Use Permit is the Honolulu City Council. The table should also indicate that a modification to Chevron's existing Conditional Use Permit, File No. 87/CUP1-14, from the Department of Planning and Permitting also will be required following the disposition of the SMA Use Permit by the City Council.

**Section 2.2.2 Project Location:** We suggest that all visual references cited in the text be uniformly labeled and located within the section discussed (i.e., do not mix Figures and Photos). We note that a Figure referenced in Section 1 is located in Section 6. The Final EA should provide the area/acreage for the portion of the project site that is located within the SMA (i.e., not all of the 15.5-acre project site is subject to Chapter 25, ROH.)

**Section 4.5 Visual Resources:** The Final EA should include some exhibits which simulate the installation of the proposed project as viewed to and along the coast line.

**Section 7 List of Agencies, Organizations and Individual Consulted:** We note that the Department of Planning and Permitting did not distribute the draft EAs to all of the agencies and organizations listed. Please revise this list to accurately reflect the actual distribution of the draft document (see the attached Department of Planning and Permitting distribution list).

If you have any questions, please contact Steve Tagawa of our staff at 768-8024.

Very truly yours,



for David K. Tanoue, Director  
Department of Planning and Permitting

DKT:hd

cc: OEQC

201212109-1612



# DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

NEIL ABERCROMBIE  
GOVERNOR  
RICHARD C. LIM  
DIRECTOR  
MARY ALICE EVANS  
DEPUTY DIRECTOR

No. 1 Capitol District Building, 250 South Hotel Street, 5th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804  
Web site: www.hawaii.gov/dbedt

Telephone: (808) 586-2355  
Fax: (808) 586-2377

August 15, 2012

Mr. David K. Tanoue  
Director, Department of Planning and Permitting  
City and County of Honolulu  
650 South King Street, 7<sup>th</sup> Floor  
Honolulu, Hawaii 96813

DEPT OF PLANNING  
AND PERMITTING  
CITY & COUNTY OF HONOLULU  
12 AUG 20 AM 1:15  
RECEIVED

Subject: Special Management Area Ordinance, Chapter 25, Revised Ordinances of Honolulu  
Draft Environmental Assessment  
Chevron Refinery Concentrated Solar Thermal Process Project

Dear Director Tanoue:

On behalf of the Hawaii State Energy Office, I am pleased to provide these comments on the Draft Environmental Assessment (DEA) for the proposed Chevron Refinery Concentrated Solar Thermal Process Project (Project) in Campbell Industrial Park near Kapolei, Oahu. Applicant Chevron proposes to construct and operate a demonstration concentrating solar power thermal system to generate process steam for the Refinery's internal use.

We commend Chevron for its plan to utilize the sun to offset the burning of fossil fuels needed to refine crude oil into other usable petroleum products. Operation of the Project will reduce the Refinery's crude oil consumption and require very little electricity to operate, thus moving Hawaii closer to meeting our aggressive goal of 70% clean energy by 2030. To help quantify our clean energy progress, we would like the Final Environmental Assessment to state Chevron's projected overall energy savings resulting from the Project.

We encourage Chevron to continue working with the permitting agencies identified in the DEA to obtain the required permits and approvals, and note no zoning permit from the Department of Planning and Permitting is identified in Table 1-1 (*Potential Permits, Approvals, and Consultations Associated with the Proposed Action*).

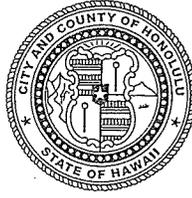
Thank you for the opportunity to comment on the proposed Project. If you have any questions please call Cameron Black at 587-9009 or email [cameron.b.black@dbedt.hawaii.gov](mailto:cameron.b.black@dbedt.hawaii.gov).

Sincerely,

Mark B. Gliel  
Energy Program Administrator

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

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813  
TELEPHONE: (808) 768-8000 • FAX: (808) 768-6041  
DEPT. WEB SITE: www.honolulu.dpp.org • CITY WEB SITE: www.honolulu.gov



PETER B. CARLISLE  
MAYOR

DAVID K. TANOUE  
DIRECTOR

JIRO A. SUMADA  
DEPUTY DIRECTOR

2012/ED-8(ST)

September 20, 2012

Ms. Darla Guerrero, Project Manager  
URS Corporation  
615 Piikoi Street, 9th Floor  
Honolulu, Hawaii 96814

Dear Ms Guerrero:

Subject: Chapter 25, Revised Ordinances of Honolulu  
Draft Environmental Assessment  
Chevron Refinery Solar Thermal Heat Project  
91-480 Malakole Street - Kapolei (Campbell Industrial Park)  
Tax Map Key 9-1-14: portion of 10

We are forwarding copies of the comment letters received for the proposed project. In accordance with the procedural provisions of the EIS Rules, Title 11, Chapter 200, Hawaii Administrative Rules, all comment letters received during the 30-day comment period, which began with the initial publication of a notice of the availability of the Draft EA in The Environmental Notice on July 23, 2012, require a response addressed directly to the commenter. The Final EA must include all comment letters and responses to the letters, as well as appropriately revised text.

If you have any questions, please contact Steve Tagawa of our staff at 768-8024.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Elizabeth Cl.", is written in black ink.

for David K. Tanoue, Director  
Department of Planning and Permitting

DKT:hd

Enclosures:

**RECEIVED**

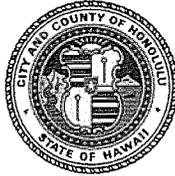
SEP 21 2012

**URS CORPORATION**  
Honolulu Office

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

EMMIT A. KANE  
DEPUTY FIRE CHIEF

August 10, 2012

DEPT. OF PLANNING  
AND PERMITTING  
CITY & COUNTY OF HONOLULU  
12 AUG 16 P 1:02  
PETER CARLISLE

TO: DAVID TANOUE, DIRECTOR  
DEPARTMENT OF PLANNING AND PERMITTING

FROM: KENNETH G. SILVA, FIRE CHIEF

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT  
CHEVRON REFINERY CONCENTRATED SOLAR THERMAL PROCESS  
PROJECT  
91-480 MALAKOLE STREET - KALAELOA  
TAX MAP KEY: 9-1-014: PORTION OF 010

In response to your memorandum of July 20, 2012, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) reviewed the material provided and requires that the following be complied with:

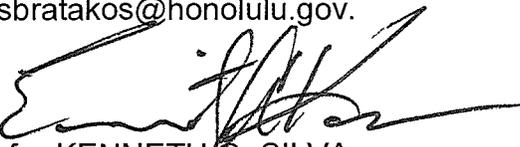
1. Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1; Uniform Fire Code [UFC]<sup>TM</sup>, 2006 Edition, Section 18.2.3.2.2.)  
**Access road will be provided around and in-between panel clusters.**  
A fire department access road shall extend to within 50 ft (15 m) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building. (NFPA1; UFC<sup>TM</sup>, 2006 Edition, Section 18.2.3.2.1.) **No buildings will be constructed, solar panels only.**
2. A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. 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

David Tanoue, Director  
Page 2  
August 10, 2012

approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction].  
(NFPA 1; UFC™, 2006 Edition, Section 18.3.1, as amended.)

- No portion of the facility will be farther than 150' from an on-site hydrant or access road.**
3. Submit civil drawings to the HFD for review and approval. **Will submit at time of Building Permit Application.**

Should you have questions, please contact Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 723-71521 or [sbratakos@honolulu.gov](mailto:sbratakos@honolulu.gov).



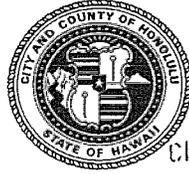
for KENNETH G. SILVA  
Fire Chief

KGS/SY:bh

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



'12 AUG 22 P12:57

WAYNE Y. YOSHIOKA  
DIRECTOR

KAI NANI KRAUT, P.E.  
DEPUTY DIRECTOR

DEPT OF PLANNING  
AND PERMITTING  
CITY & COUNTY OF HONOLULU

TP7/12-476524R

August 21, 2012

MEMORANDUM

TO: DAVID K. TANOUE, DIRECTOR  
DEPARTMENT OF PLANNING AND PERMITTING

FROM: WAYNE Y. YOSHIOKA, DIRECTOR  
DEPARTMENT OF TRANSPORTATION SERVICES

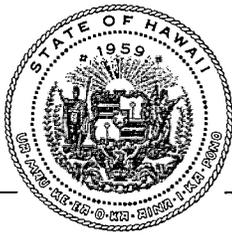
SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA) CHEVRON REFINERY  
CONCENTRATED SOLAR THERMAL PROCESS PROJECT

This responds to your memo of July 20, 2012, requesting our comments concerning this proposed project.

The Traffic Engineering Division (TED) has the following comment. The area Neighborhood Board, as well as the area residents, businesses, etc. should be kept apprised of the details for the proposed project and the impacts the project may have on the adjoining local street network area. **The surrounding community will be kept up to date with the project and its impacts.**

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at Local 88359.

  
WAYNE Y. YOSHIOKA  
Director



# DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

2012/2109-1213

NEIL ABERCROMBIE  
GOVERNOR  
RICHARD C. LIM  
DIRECTOR  
MARY ALICE EVANS  
DEPUTY DIRECTOR  
JESSE K. SOUKI  
DIRECTOR  
OFFICE OF PLANNING

## OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846  
Fax: (808) 587-2824

Ref. No. P-13682

August 2, 2012

Mr. David K. Tanoue, Director  
Department of Planning and Permitting  
City and County of Honolulu  
650 S. King Street, 7<sup>th</sup> Floor  
Honolulu, Hawaii 96813

12 AUG -6 AM 1:29  
OFFICE OF PLANNING  
CITY AND COUNTY OF HONOLULU

Dear Mr. Tanoue:

Subject: Special Management Area Ordinance, Chapter 25, Revised Ordinances of Honolulu Draft Environmental Assessment – Chevron Refinery Concentrated Solar Thermal Process Project

Thank you for the opportunity to provide comments on the Draft Environmental Assessment (Draft EA) for the Chevron Refinery Concentrated Solar Thermal Process Project.

The Office of Planning has reviewed the subject Draft EA, and has the following comments to offer:

1. The recorded owner of the parcel with Tax Key Map (TMK) 9-1-014: 010 should be provided at the beginning of the Final EA. **The recorded owner has been added to the beginning of the Final EA.**
2. It is our understanding that this Draft EA is required under Section 25-3.3(c), Revised Ordinances of Honolulu (ROH), and that this assessment is being conducted prior to the processing of the application for a Special Management Area Use Permit. One of triggers for Hawaii Revised Statutes (HRS) Chapter 343, is use within the shoreline area as defined in HRS Section 205A-41. According to Section 6.2 - Shoreline Setback, page 6-1, the project is not within the shoreline area. On page 1-3 of the Draft EA, Section 1.4.2 - HRS Chapter 343, it is not accurate to state that "The Proposed Action triggers the requirements of Chapter 343, HRS, by being within the Special Management Area." **Text has been updated to reflect the EA being required because a SMA permit is required.**
3. On page 1-4 of the Draft EA, Section 1.4.6 - Hawaii Coastal Zone Management Program, while it is described that shoreline setbacks extend not less than 20 feet and not more than 40 feet inland from the shoreline, the Final EA should also cite HRS Section 205A-45(a), where the counties through rules adopted pursuant to Chapter 91

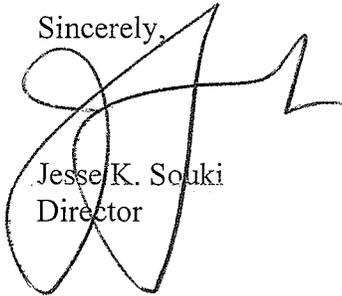
Mr. David K. Tanoue  
Page 2  
August 2, 2012

or ordinance may require that shoreline setback lines be established at distances greater than that established in Part III of HRS Chapter 205A. **Text has been updated to reflect this comment.**

4. The proposed project will utilize concentrating solar thermal (CSP) technologies to generate process steam for internal refinery use. CSP technologies utilize mirrors to focus sunlight onto a piping system. The Kalaeloa Airport is approximately 2 miles (page 3-4), and the Honolulu International Airport is approximately 20 miles (page 3-15) to the east of the project site. Due to the use of reflective mirrors in CSP, we suggest that the applicant contact the State Department of Transportation, Airports Division, regarding any potential impacts of this proposed project on established flight paths or aircraft utilizing Kalaeloa and Honolulu International Airports. **DOT-Airports has commented and is requesting a Form 7460-1 be submitted, this form has been submitted.**
5. On page 3-15 of the Draft EA, the sentence that reads, "The Proposed Action is located within a SMA or SSA under the Hawaii CZM Program," should be corrected to make it clear that the proposed project is not located in the shoreline setback area (SSA). If located in the SSA, the project may require a shoreline setback variance, pursuant to Part III of HRS Chapter 205A and ROH Chapter 23. **Text has been updated to reflect that the Proposed Action is located within the SMA not the SSA.**
6. We note that the Draft EA did not include Appendix A, B, C, and D. The Final EA should include these Appendices. **The Appendices have been included with the Final EA.**

If you have any questions regarding this comment letter, please contact Leo Asuncion, Coastal Zone Management Program Manager, at 587-2875.

Sincerely,



Jesse K. Souki  
Director

**BOARD OF WATER SUPPLY**

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



August 31 2012 5 P 2 :02

DEPT OF PLANNING  
AND PERMITTING  
CITY & COUNTY OF HONOLULU

PETER B. CARLISLE, MAYOR

DUANE R. MIYASHIRO, Chairman  
MAHEALANI CYPHER, Vice Chair  
THERESIA C. McMURDO  
ADAM C. WONG

WESTLEY K.C. CHUN, Ex-Officio  
GLENN M. OKIMOTO, Ex-Officio

ERNEST Y. W. LAU, P.E.  
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.  
Deputy Manager and Chief Engineer

Ms. Darla Guerrero  
URS Corporation  
615 Piikoi Street, Suite 900  
Honolulu, Hawaii 96814

Dear Ms. Guerrero:

Subject: Letter Dated July 20, 2012, from the Department of Planning and Permitting, Requesting Comments on the Draft Environmental Assessment (DEA) for the Solar Thermal Process Heat Project at Chevron Refinery Located at 91-480 Malakole Street – Tax Map Key: 9-1-014: 010

The existing potable water system is adequate to accommodate the proposed Solar Thermal Process Heat Project. The Board of Water Supply (BWS) currently supplies Chevron with RO demineralized recycled water for boiler feed. The DEA should indicate the additional RO water demand to determine availability and system adequacy. 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 the building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

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

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

The proposed project is subject to Board of Water Supply Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit applications.

This parcel is served by a 20-inch ductile iron water main fronting this parcel.

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

Very truly yours,

ERNEST Y. W. LAU, P.E.  
Manager and Chief Engineer

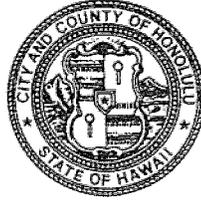
cc: ✓ Steve Tagawa, Department of Planning and Permitting

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

RECEIVED  
\*12 AUG -7 P2:10

PETER B. CARLISLE  
MAYOR



DEPT. OF PLANNING  
AND PERMITTING  
CITY & COUNTY OF HONOLULU

GARY B. CABATO  
DIRECTOR

ALBERT TUFONO  
DEPUTY DIRECTOR

August 6, 2012

TO: DAVID K. TANOUE, DIRECTOR  
DEPARTMENT OF PLANNING AND PERMITTING

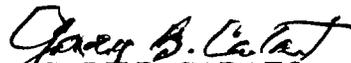
FROM: GARY B. CABATO, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT  
CHEVRON PRODUCTS COMPANY CONCENTRATED SOLAR  
THERMAL PROCESS PROJECT TMK: 9-1-14: PORTION OF 10

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for Chevron Products Company's concentrated solar thermal process project.

The Department of Parks and Recreation has no comment, as the proposed project will have no impact to 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.

  
GARY B. CABATO  
Director

GBC:jr  
(476629)

201212109-1612



# DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

NEIL ABERCROMBIE  
GOVERNOR  
RICHARD C. LIM  
DIRECTOR  
MARY ALICE EVANS  
DEPUTY DIRECTOR

No. 1 Capitol District Building, 250 South Hotel Street, 5th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804  
Web site: www.hawaii.gov/dbedt

Telephone: (808) 586-2355  
Fax: (808) 586-2377

August 15, 2012

Mr. David K. Tanoue  
Director, Department of Planning and Permitting  
City and County of Honolulu  
650 South King Street, 7<sup>th</sup> Floor  
Honolulu, Hawaii 96813

DEPT OF PLANNING  
AND PERMITTING  
CITY & COUNTY OF HONOLULU  
12 AUG 20 AM 1:15  
RECEIVED

Subject: Special Management Area Ordinance, Chapter 25, Revised Ordinances of Honolulu  
Draft Environmental Assessment  
Chevron Refinery Concentrated Solar Thermal Process Project

Dear Director Tanoue:

On behalf of the Hawaii State Energy Office, I am pleased to provide these comments on the Draft Environmental Assessment (DEA) for the proposed Chevron Refinery Concentrated Solar Thermal Process Project (Project) in Campbell Industrial Park near Kapolei, Oahu. Applicant Chevron proposes to construct and operate a demonstration concentrating solar power thermal system to generate process steam for the Refinery's internal use.

We commend Chevron for its plan to utilize the sun to offset the burning of fossil fuels needed to refine crude oil into other usable petroleum products. Operation of the Project will reduce the Refinery's crude oil consumption and require very little electricity to operate, thus moving Hawaii closer to meeting our aggressive goal of 70% clean energy by 2030. To help quantify our clean energy progress, we would like the Final Environmental Assessment to state Chevron's projected overall energy savings resulting from the Project.

We encourage Chevron to continue working with the permitting agencies identified in the DEA to obtain the required permits and approvals, and note no zoning permit from the Department of Planning and Permitting is identified in Table 1-1 (*Potential Permits, Approvals, and Consultations Associated with the Proposed Action*). **Added Zoning Permit to the Table, also reviewed potential required permits and updated the Table.**

Thank you for the opportunity to comment on the proposed Project. If you have any questions please call Cameron Black at 587-9009 or email [cameron.b.black@dbedt.hawaii.gov](mailto:cameron.b.black@dbedt.hawaii.gov).

Sincerely,

Mark B. Gliel  
Energy Program Administrator



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

Western-Pacific Region  
Airports District Office

300 Ala Moana Blvd., Rm. 7-128  
Honolulu, HI 96813  
MAIL: Box 50244  
Honolulu, HI 96850-0001  
Telephone: (808) 541-1232  
FAX: (808) 541-3566

July 25, 2012

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

Dear Mr. Tanoue:

**Draft Environmental Assessment  
Chevron Refinery Concentrated Solar Thermal Process Project  
Kalaeloa, Hawaii**

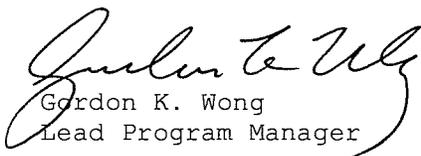
We have reviewed the Draft Environmental Assessment for the proposed construction of concentrated solar thermal process system on 15.5 acres approximately 2 miles from Kalaeloa Airport.

Per Federal Aviation Regulation (FAR) Part 77, Notice of Proposed Construction or Alteration, we request an airspace review be conducted by the proponent through submittal of FAA Form 7460-1, Notice of Proposed Construction or Alteration. **Completed Form 7460-1 and submitted to the website on 09-24-2012. Form is included in this EA.**

An airspace analysis will be conducted upon submittal of the information. The information (i.e., FAA Form 7460-1) should be submitted on the following website: <https://oeaaa.faa.gov/oeaaa>

Please call if you have any questions.

Sincerely,

  
Gordon K. Wong  
Lead Program Manager

Ronnie V. Simpson  
Manager, Airports District Office

cc: State of Hawaii, Department of Transportation, Airports Division

DEPT. OF TRANSPORTATION  
 AIRPORTS DISTRICT OFFICE  
 CITY & COUNTY OF HONOLULU  
 12 JUL 27 AM 10  
 808-541-1232



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

In reply, please refer to:  
File:

12-667A CAB

August 14, 2012

Mr. David K. Tanoue  
Director  
Department of Planning and Permitting  
City and County of Honolulu  
650 South King Street, 7<sup>th</sup> Floor  
Honolulu, Hawaii 96813

Dear Mr. Tanoue:

SUBJECT: Chevron Refinery Concentrated Solar Thermal Process Project  
Special Management Area Use Permit Application (2012/ED-8(ST))  
Draft Environmental Assessment

DEPT. OF PLANNING  
AND PERMITTING  
CITY & COUNTY OF HONOLULU  
12 AUG 21 PM 2:50  
PERMITTING

A significant potential for fugitive dust emissions exists during construction. The activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust.

A Dust Control Plan has been added to the text in Section 4.1.1

We encourage the contractor to implement a dust control plan, which does not require approval by the Department of Health, to comply with the fugitive dust regulations. Additional dust control measures that may complement those that are being proposed include, but are not limited to, the following: This text has been added to Section 4.1.1

- a) Planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
- b) Providing an adequate water source at the site prior to start-up of construction activities;
- c) Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
- d) Minimizing dust from shoulders and access roads;
- e) Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
- f) Controlling dust from debris being hauled away from the project site. Also, controlling dust from daily operations of material being processed, stockpiled, and hauled to and from the facility.

If you have any questions, please contact Mr. Barry Ching of the Clean Air Branch at 586-4200.

Sincerely,

  
STUART YAMADA, P.E., CHIEF  
Environmental Management Division

BC:rg



September 27, 2012

Ernest Y. W. Lau, P.E.  
Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, HI 96843

**Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI), Solar Thermal Process Heat Project at the Chevron Refinery, Located at 91-480 Malakole Street – Tax Map Key: 9-1-014:010 Response to Comment**

Dear Ernest Lau:

Thank you for your August 31, 2012 comment letter regarding the Solar Thermal Process Heat Project Draft Environmental Assessment (EA).

We note that the existing 20-inch ductile iron water main fronting the parcel is adequate to accommodate the proposed project. The potable water will be used to maintain the solar panels by cleaning them approximately twice a year. The RO demineralized recycled water that is currently being supplied to the boiler feed will not have a net (zero) increase, with the exception of the initial filling of the Solar Thermal Heat Process System. The estimate for the amount required to fill the system, which is dependent of the supplier used, will be less than 30,000 gallons. The system will not be generating additional steam to the refinery; it will be replacing the amount currently being generated by burning fossil fuels. This is stated in Sections 3.3.2 and 4.3.1 of the Final EA.

We note the following:

- A final decision will be confirmed when the building permit is submitted for approval.
- When the water is made available there may be a Water System Facilities charge for resource development, transmission and daily storage.

URS Corporation  
615 Piikoi Street, Suite 900  
Honolulu, Hawaii 96814  
Tel: 808.593.1116  
Fax: 808.593.1198  
[www.urscorp.com](http://www.urscorp.com)



Solar Thermal Heat Process Project at the Chevron Refinery  
September 27, 2012  
Page 2

- The on-site fire protection requirements will be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.
- The proposed project is subject to BWS Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the building permit applications.

If you have any questions or concerns, please call me at 808-629-7904 or email me at [Darla.Guerrero@URS.com](mailto:Darla.Guerrero@URS.com)

Sincerely,

**URS Corporation**

A handwritten signature in black ink that reads "Darla Guerrero".

Darla Guerrero, P.E.  
Senior Project Manager

DJG, djg

Attachments:

cc: Chevron Technology Ventures c/o Mr. Don Nelson  
Board of Water Supply c/o Robert Chun



September 27, 2012

Mark B. Glick  
Energy Program Manager  
Department of Business, Economic Development and Tourism  
P.O. Box 2359  
Honolulu, HI 96804

**Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI), Solar Thermal Process Heat Project at the Chevron Refinery, Located at 91-480 Malakole Street – Tax Map Key: 9-1-014:010 Response to Comment**

Dear Mark Glick:

Thank you for your August 15, 2012 comment letter regarding the Chevron Refinery Concentrated Solar Thermal Process Project Draft Environmental Assessment (EA).

We note that the Refinery will be offsetting the burning of fossil fuels by utilizing the sun for this project. The system will not be generating additional steam to the refinery; it will be replacing the amount currently being generated by burning fossil fuels. Based on the expected size of the project, the reduction in carbon dioxide equivalent (CO<sub>2</sub>e) emissions is approximately 5,000 tons per year. The reduction in fossil fuel combustion will be an annual maximum of 10,000 barrels of oil equivalent. This is stated in Sections 3.1.2 and 4.1.1 of the Final EA.

We note the following:

- We will continue to work with the permitting agencies to obtain the required permits and approvals for the Project.
- A Zoning Permit will be required and has been added to Table 1-1 in the Final EA.

URS Corporation  
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Solar Thermal Heat Process Project at the Chevron Refinery  
September 27, 2012  
Page 2

If you have any questions or concerns, please call me at 808-629-7904 or email me at Darla.Guerrero@URS.com

Sincerely,

**URS Corporation**

A handwritten signature in black ink that reads 'Darla Guerrero'.

Darla Guerrero, P.E.  
Senior Project Manager

DJG, djg

Attachments:

cc: Chevron Technology Ventures c/o Mr. Don Nelson  
Department of Business, Economic Development & Tourism c/o Cameron B. Black



September 27, 2012

Jesse K. Souki  
Director  
Department of Planning  
Department of Business, Economic Development and Tourism  
P.O. Box 2359  
Honolulu, HI 96804

**Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI), Solar Thermal Process Heat Project at the Chevron Refinery, Located at 91-480 Malakole Street – Tax Map Key: 9-1-014:010 Response to Comment**

Dear Jesse Souki:

Thank you for your August 2, 2012 comment letter regarding the Chevron Refinery Concentrated Solar Thermal Process Project Draft Environmental Assessment (EA) Reference No. P-13682.

We note the following:

- The recorded owner of the parcel has been provided in the Proposed Action at the beginning of the Final EA.
- The statement “The Proposed Action triggers the requirements of Chapter 343, HRS, by being within the Special Management Area” has been deleted from the Final EA. See Section 1.4.3.
- HRS Section 205A-45(a) states where counties through rules adopted pursuant to Chapter 91 or ordinance may require that the shoreline setback lines be established at distances greater than that established in Part III of HRS Chapter 205A has been cited in Section 1.4.7 of the Final EA.
- The State Department of Transportation, Airports has responded to the Draft EA and has requested that a FAA Form 7460-1 be submitted and an airspace review has been initiated. This will be included in the Final EA.

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Solar Thermal Heat Process Project at the Chevron Refinery  
September 27, 2012  
Page 2

- The Proposed Action is not located within the shoreline setback area (SSA) and reference to this has been removed from the Final EA. See Section 3.12.2.
- The Final EA will include Appendices A, B, C, and D.

If you have any questions or concerns, please call me at 808-629-7904 or email me at Darla.Guerrero@URS.com

Sincerely,

**URS Corporation**

A handwritten signature in black ink that reads "Darla Guerrero".

Darla Guerrero, P.E.  
Senior Project Manager

DJG, djg

Attachments:

cc: Chevron Technology Ventures c/o Mr. Don Nelson  
DBEBT CZM Management Program c/o Leo Asuncion



September 27, 2012

Gary Cabato  
Director  
Department of Parks and Recreation  
City and County of Honolulu  
1000 Uluohia Street, Suite 309  
Kapolei, HI 96707

**Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI), Solar Thermal Process Heat Project at the Chevron Refinery, Located at 91-480 Malakole Street – Tax Map Key: 9-1-014:010 Response to Comment**

Dear Gary Cabato:

Thank you for your August 6, 2012 comment letter regarding the Solar Thermal Process Heat Project Draft Environmental Assessment (EA).

If you have any questions or concerns, please call me at 808-629-7904 or email me at Darla.Guerrero@URS.com

Sincerely,

**URS Corporation**

Darla Guerrero, P.E.  
Senior Project Manager

DJG, djg

Attachments:

cc: Chevron Technology Ventures c/o Mr. Don Nelson  
CCH Department of Parks and Recreation c/o Mr. John Reid, Planner

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Honolulu, Hawaii 96814  
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Fax: 808.593.1198  
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September 27, 2012

Stuart Yamada, P.E., CHIEF  
Environmental Management Division  
State of Hawaii  
Department of Health  
P.O. Box 3378  
Honolulu, HI 96801-3378

**Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI), Solar Thermal Process Heat Project at the Chevron Refinery, Located at 91-480 Malakole Street – Tax Map Key: 9-1-014:010 Response to Comment**

Dear Stuart Yamada:

Thank you for your August 14, 2012 comment letter regarding the Solar Thermal Process Heat Project Draft Environmental Assessment (EA).

We note that the Proposed Action will comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust.

We note that the contractor shall implement a dust control plan prior to initiating construction. Additional dust control measures include, but not limited to the following:

- Planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
- Providing adequate water source at the site prior to start-up of construction activities;
- Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
- Minimizing dust from shoulders and access roads;
- Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and

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Solar Thermal Heat Process Project at the Chevron Refinery  
September 27, 2012  
Page 2

- Controlling dust from debris being hauled away from the project site. Also, controlling dust from daily operations of material being processed, stockpiled, and hauled to and from the facility.

See Sections 3.1.12 and 4.1.1 of the Final EA.

If you have any questions or concerns, please call me at 808-629-7904 or email me at Darla.Guerrero@URS.com

Sincerely,

**URS Corporation**

A handwritten signature in black ink that reads "Darla Guerrero".

Darla Guerrero, P.E.  
Senior Project Manager

DJG, djg

Attachments:

cc: Chevron Technology Ventures c/o Mr. Don Nelson  
State of Hawaii DOH Clean Air Branch c/o Mr. Barry Ching



September 27, 2012

Wayne Y. Yoshioka  
Director  
Department of Transportation Services  
City and County of Honolulu  
650 South King Street, 3<sup>rd</sup> Floor  
Honolulu, HI 96813

**Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI), Solar Thermal Process Heat Project at the Chevron Refinery, Located at 91-480 Malakole Street – Tax Map Key: 9-1-014:010 Response to Comment**

Dear Wayne Yoshioka:

Thank you for your August 21, 2012 comment letter regarding the Solar Thermal Process Heat Project Draft Environmental Assessment (EA).

We note the following:

- The area Neighborhood Board, residents, businesses, etc. shall be kept apprised of the Proposed Action and the impacts that the project may have on the adjoining local street network area.

If you have any questions or concerns, please call me at 808-629-7904 or email me at [Darla.Guerrero@URS.com](mailto:Darla.Guerrero@URS.com)

Sincerely,

**URS Corporation**

Darla Guerrero, P.E.  
Senior Project Manager

Attachments:

cc: Chevron Technology Ventures c/o Mr. Don Nelson  
CCH Department of Transportation Services Local 88359 c/o Michael Murphy

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Honolulu, Hawaii 96814  
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Solar Thermal Heat Process Project at the Chevron Refinery  
September 27, 2012  
Page 2



September 27, 2012

David Tanoue  
Director  
Department of Planning and Permitting  
City and County of Honolulu  
650 South King Street, 7<sup>th</sup> Floor  
Honolulu, HI 96813

**Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI), Solar Thermal Process Heat Project at the Chevron Refinery, Located at 91-480 Malakole Street – Tax Map Key: 9-1-014:010 Response to Comment**

Dear David Tanoue:

Thank you for your August 21, 2012 comment letter regarding the Solar Thermal Process Heat Project Draft Environmental Assessment (EA).

We note the following:

- The EA is required pursuant to the Special Management Area (SMA) law, Chapter 25, Revised Ordinances of Honolulu (ROH), and is not a Chapter 343, Hawaii Revised Statutes (HRS) required document. See the Final EA Executive Summary, Sections 1.4.1 and 1.4.3.
- The anticipated energy savings from the proposed project will be approximately 10,000 barrels of oils equivalent, see the Final EA Section 1.3.
- Table 1.1 has been updated to reflect the lead agency for the SMA Permit is Honolulu City Council and the a modification to Chevron's existing Conditional Use Permit, File No. 87/CUP1-14 from the Department of Planning and Permitting will also be required, see the Final EA Section 1.4.15.
- The area of the Proposed Action within the SMA has been updated, see Final EA Section 2.2.2.
- The visual references cited in the text have been uniformly labeled and located within the section they are discussed.
- The Final EA has included some exhibits which simulate the installation of the proposed project as viewed to and along the coast line, see Section 4.5.

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Solar Thermal Heat Process Project at the Chevron Refinery  
September 27, 2012  
Page 2

- Section 7.1, the List of Agencies and Organizations Receiving the Draft EA has been updated to reflect the actual distribution in the Final EA.

If you have any questions or concerns, please call me at 808-629-7904 or email me at Darla.Guerrero@URS.com

Sincerely,

**URS Corporation**

A handwritten signature in black ink that reads "Darla Guerrero". The signature is written in a cursive, flowing style.

Darla Guerrero, P.E.  
Senior Project Manager

Attachments:

cc:

Chevron Technology Ventures c/o Mr. Don Nelson  
City and County of Honolulu DPP c/o Mr. Steve Tagawa



September 27, 2012

Gordon K. Wong  
Lead Program Manager  
Western-Pacific Region Airports District Office  
Federal Aviation Administration  
P.O. Box 50244  
Honolulu, HI 96850-0001

**Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI), Solar Thermal Process Heat Project at the Chevron Refinery, Located at 91-480 Malakole Street – Tax Map Key: 9-1-014:010 Response to Comment**

Dear Gordon Wong:

Thank you for your July 25, 2012 comment letter regarding the Solar Thermal Process Heat Project Draft Environmental Assessment (EA).

We note that a Notice of Proposed Construction or Alteration, request for an airspace review be conducted by FAA through the submittal of FAA Form 7460-1. This is stated in Section 4.5.1 of the Final EA.

The request was submitted to FAA on September 24, 2012 and was assigned Aeronautical Study Number (ASN): 2012-AWP-7180-OE on September 27, 2012.

If you have any questions or concerns, please call me at 808-629-7904 or email me at [Darla.Guerrero@URS.com](mailto:Darla.Guerrero@URS.com)

URS Corporation  
615 Piikoi Street, Suite 900  
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Solar Thermal Heat Process Project at the Chevron Refinery  
September 27, 2012  
Page 2

Sincerely,

**URS Corporation**

A handwritten signature in black ink, appearing to read "Darla Guerrero".

Darla Guerrero, P.E.  
Senior Project Manager

DJG, djg

Attachments:

cc: Chevron Technology Ventures c/o Mr. Don Nelson  
FAA Western-Pacific Region Airports District Office c/o Ronnie V. Simpson



September 27, 2012

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

**Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI), Solar Thermal Process Heat Project at the Chevron Refinery, Located at 91-480 Malakole Street – Tax Map Key: 9-1-014:010 Response to Comment**

Dear Kenneth Silva:

Thank you for your August 10, 2012 comment letter regarding the Solar Thermal Process Heat Project Draft Environmental Assessment (EA).

We note the following:

- The Project will provide the Fire Department access roads that will be located not more than 150 feet from the farthest point of the facility.
- The access roads will comply with the National Fire Protection Association (NFPA) 1; Uniform Fire Code (UFC) <sup>TM</sup>, 2006 Edition, Section 18.2.3.2.2.
- A water supply approved by the county will be capable of supplying the required fire flow for fire protection, and shall be provided where the facility is in excess of 150 feet from a water supply. This will be measured by an approved route around the exterior of the facility.
- On-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the Authority Having Jurisdiction (AHJ).
- Civil drawings will be submitted to HFD at the time of the building permit submittal for their review and approval.

This is stated in Sections 3.3.2 and 4.3.1 of the Final EA.

URS Corporation  
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Solar Thermal Heat Process Project at the Chevron Refinery  
September 27, 2012  
Page 2

If you have any questions or concerns, please call me at 808-629-7904 or email me at Darla.Guerrero@URS.com

Sincerely,

**URS Corporation**

A handwritten signature in black ink that reads 'Darla Guerrero'.

Darla Guerrero, P.E.  
Senior Project Manager

DJG, djg

Attachments:

cc: Chevron Technology Ventures c/o Mr. Don Nelson  
CCH Fire Prevention Bureau c/o Battalion Chief Socrates Bratakos