

BENJAMIN M. MATSUBARA
MERVYN M. KOTAKE
CURTIS T. TABATA

MATSUBARA, KOTAKE & TABATA

Attorneys At Law
A Law Corporation
CHARLES R. KENDALL BUILDING
888 MILILANI STREET, SUITE 308
HONOLULU, HAWAII 96813
E-MAIL: ctabata@m-klawyers.com

TELEPHONE
(808) 526-9566

FACSIMILE
(808) 538-3840

December 14, 2020

VIA E-MAIL AND HAND-DELIVERY

Planning Commission
c/o Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, HI 96813

Attention: Ms. Takahara

Re: Applicant: AES West O`ahu Solar, LLC; FILE NO. 2020/SUP-6

Dear Ms. Takahara:

Please find enclosed twelve (12) sets of exhibits for the upcoming January 6, 2021 hearing for the above stated matter. The exhibits are of the following:

- | <u>Exhibit No.</u> | <u>Description</u> |
|--------------------|--|
| 1. | Letter dated December 11, 2020 from Nick Molinari, AES West Oahu Solar, LLC to Arthur D. Challacombe, Chair, City and County of Honolulu Planning Commission re: Special Use Permit (SUP) Application File No. 2020/SUP-6. |
| 2. | West O`ahu Solar + Storage Project, Planning Commission Hearing, State Special Use Permit, Wednesday, January 6, 2021 – Presentation. |
| 3. | An Archeological Inventory Survey of the University of Hawai`i, West O`ahu Campus, District of `Ewa, Island of O`ahu, Hawai`i by Scientific Consultant Services, Inc., Revised June 1998; |
| 4. | Letter dated June 15, 1998 from the Department of Land and Natural Resources, State of Hawai`i to Mr. Michael Dega, MA of Scientific Consultant Services, Inc re: Chapter 6E-8 Historic Preservation Review of a Draft Report on an Archeological Inventory Survey of the Proposed University of Hawai`i, West O`ahu Campus, Honouliuli, Ewa, O`ahu |
| 5. | Letter dated February 3, 1999 from the Department of Land and Natural Resources, State of Hawai`i to Mr. Michael Dega, MA of Scientific Consultant Services, Inc. re: Historic Preservation Review of An Archeological Inventory Survey of the University of Hawai`i, West O`ahu Campus, District of `Ewa, Island of O`ahu, Hawai`i (1998 Dega et al.) Honouliuli, `Ewa, O`ahu |

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

20 DEC 14 P1:59

RECEIVED


Planning Commission
c/o Department of Planning and Permitting
Attention: Ms. Takahara
December 14, 2020
Page Two (2)

6. West O'ahu Solar Plus Storage Project, Panoramic Photo Simulation, Representative Viewpoint 01 Farrington Highway, photograph dated November 15, 2019.
7. Resume of Tiffany Agostini, Senior Biologist of Tetra Tech
8. Resume of Joshua Burdett, Chemist / Glare Specialist of Tetra Tech
9. Resume of Jennifer Chester, Visual Lead / Senior Project Manager of Tetra Tech
10. Resume of Matt Dadswell, Social Scientist/Economist of Tetra Tech
11. Resume Scott Enright of Scott E. Enright Company, LLC
12. Resume of Cameron Haughey, EPC Project Manager of AES Distributed Energy
13. Resume of Eric K. Imada, Project Manager of Austin Tsutsumi
14. Resume Lisa S. Kettley, Senior Planner of Tetra Tech
15. Resume of Kirstin M. Punu, Community Engagement Manager of AES Distributed Energy
16. Resume of Vivian L. Arita, LEED AP, Owner/Landscape Architect of Mailelani Design LLC
17. Resume of Nicholas J Molinari, Project Development Manager of AES Distributed Energy
18. Resume of Aaron Murphy, PE, Senior Project Manager of 3J Consulting
19. Resume of David Shideler, M.A., Principal Investigator of Cultural Surveys Hawai'i
20. Resume of Sam Ley, PE, Director Of Engineering of AES Distributed Energy
21. Resume of Michael Tynan, Visualization Specialist of Tetra Tech

Thank you for your attention to this matter.

Very Truly Yours,

MATSUBARA, KOTAKE & TABATA



Curtis T. Tabata

Enclosures

cc: AES West O'ahu Solar, LLC



December 11, 2020

Arthur D. Challacombe, Chair
City and County of Honolulu Planning Commission

Kathy K. Sokugawa, Acting Director
City and County of Honolulu Department of Planning and Permitting

SENT VIA EMAIL

RECEIVED
20 DEC 14 P1:59
DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

Request for Modifications to Recommendations and Findings of Fact

Regarding: Special Use Permit (SUP) Application File No. 2020/SUP-6
AES West Oahu Solar, LLC for a 12.5-Megawatt Solar Photovoltaic and 50-
Megawatt-Hour Battery Storage Facility Honouliuli, Ewa District, Oahu
Tax Map Key 9-2-002:007 (Por)

Dear Chair Challacombe and Acting Director Sokugawa,

On behalf of the applicant, AES West Oahu Solar, LLC, I am writing to request certain modifications to Recommendations and Findings of Fact included in the recently filed Director’s Report dated December 2, 2020 for the West Oahu Solar and Storage Project - Special Use Permit (SUP) Application File No. 2020/SUP-6 as follow:

- 1) Requested Modification to Recommendation No. 3 – Extending SUP duration from 25 to 29 years
- 2) Requested Modification to Findings of Fact – Recognizing State Historic Preservation Division’s Verbal Commitment to Issue an Effect Determination and Status of AIS Review
- 3) Requested NEW Recommendation – Condition of Approval for 6E and AIS

Below is an explanation and justification for the requested modifications.

1) Requested Modification to Recommendation No. 3 – Extending SUP duration from 25 to 29 years

Recommendation No. 3 states:

EXHIBIT "1"



The SUP shall be valid for a period of 25 years from the date of the State Land Use (SLU) Commission's Decision and Order approving the SUP, subject to further extensions upon a timely request for extension filed with the PC at least 120 days prior to the SUP's expiration.

AES West Oahu Solar, LLC, respectfully requests modification to Recommendation No. 3 to include the period for the Project's predevelopment, permitting and approvals, construction, operations, and decommissioning. It is critical that the duration of the SUP permit adequately cover the time necessary for predevelopment, operation, and decommissioning in order for the applicant to secure the financing necessary for the Project. This is particularly important given financing must be secured prior to construction to enable the Project to proceed.

Should the Planning Commission and subsequently the State Land Use Commission approve the Special Use Permit application, the Project will still need to seek a Conditional Use Permit (Minor), grading permit, and building permit from the City and County of Honolulu. In addition, easement(s) applications will need to be submitted to the City and recorded in Land Court. Construction will only commence after all governmental approvals are secured. The estimated duration for permitting, approvals and construction is approximately two (2) - three (3) years from the State Land Use Commission Decision & Order.

Once the Project is built and commissioned, the term of the Power Purchase Agreement (PPA) with Hawaiian Electric is twenty-five (25) years. The Project may then either be repowered (subject to an extension of the term), or decommissioned. The decommissioning process to return the land to pre-existing conditions is expected to take approximately one (1) year after the end of the operational term.

As a result of these factors, the Applicant, AES West Oahu Solar, LLC respectfully requests an extension to the duration of the SUP and a modification of Recommendation No. 3 to read:

The SUP shall be valid for a period of ~~25~~ [29] years from the date of the State Land Use (SLU) Commission's Decision and Order approving the SUP, subject to further extensions upon a timely request for extension filed with the PC at least 120 days prior to the SUP's expiration.



2) Requested Modification to Findings of Fact – Recognizing State Historic Preservation Division’s (SHPD) Commitment to Issue an Effect Determination and Status of AIS Review

To date, the DPP, Applicant and landowner have not received SHPD’s comments on the draft Archaeological Inventory Survey (AIS) Report filed on February 5, 2020 (SHPD LOG No. 2020.00290).

On December 10, 2020, representatives of the Applicant, landowner and archaeologist met with SHPD via Zoom. At the meeting, SHPD indicated a willingness to agree in writing with the determination of “Effect with Agreed Upon Mitigation Commitments” following a follow-up meeting to determine the appropriate mitigation and affected feature(s). The archaeologist provided a written summary of the meeting and next steps via email, a copy of which is included here (attached). The Applicant and the Office of Planning (OP) recognize the delay in receiving reviews and approvals from SHPD due to SHPD’s workload. In its letter dated November 5, 2020, the OP acknowledged the effort the Applicant has made to satisfy this requirement.

The verbal agreement and email correspondence regarding an effect determination and mitigation are vital to demonstrating the Applicant and SHPD’s efforts to satisfy and complete a review and acceptance of the AIS.

The Applicant respectfully requests that the Findings of Fact in the final adopted Planning Commission Decision and Order for the Project SUP include the finding that:

Applicant and SHPD have agreed with the determination of Effect with Agreed Upon Mitigation Commitments, subject to determination of appropriate mitigation and affected feature(s).

3) Requested NEW Recommendation – Condition of Approval for 6E and AIS

Should the SHPD not provide approval of the AIS or concurrence with the effect or appropriate mitigation prior to the Planning Commission hearing, the Applicant respectfully requests a new recommendation for condition of approval to state:

SHPD approval of the AIS, effect and/or recommended mitigation measures shall be obtained prior to the issuance of a grading or building permit by the DPP.



Thank you for your consideration.

Regards,

A handwritten signature in black ink, appearing to read "NM", followed by a horizontal line.

Nick Molinari

Project Development Manager / Authorized Representative

AES West Oahu Solar, LLC

Tel: 1 303 524 4368

nick.molinari@aes.com

Cc: Gloria Takara, Planning Commission
Planning Commissioners – City & County of Honolulu
Dina Wong, Department of Planning and Permitting
Raymond Young, Department of Planning and Permitting

From: [David Shideler](#)
To: [Nick Molinari](#); [Jan Gouveia](#); [Kettley, Lisa](#)
Subject: FW: Request to set up a meeting to discuss mitigation for the AES West O'ahu Solar Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu, TMK: [1] 9-2-002:007 (por.)
Date: Wednesday, December 9, 2020 3:46:18 PM

USE CAUTION: External Sender

Aloha AES Solar Team:

Just FYI on my outreach to SHPD.

Aloha.

David Shideler
Cultural Surveys Hawai'i
PO Box 1114
Kailua, HI 96734
PH: (808) 262-9972
Cell: (808) 753-0785
Fax: (808) 262-4950
dshideler@culturalsurveys.com

From: David Shideler
Sent: Wednesday, December 9, 2020 1:45 PM
To: Hemenway, Samantha <samantha.hemenway@hawaii.gov>; Gumapac-McGuire, Tanya H <Tanya.Gumapac-McGuire@hawaii.gov>; 'Susan.A.Lebo@hawaii.gov' <Susan.A.Lebo@hawaii.gov>
Cc: Lauren Murai <lmurai@hawaii.edu>; alan.s.downer@hawaii.gov
Subject: Request to set up a meeting to discuss mitigation for the AES West O'ahu Solar Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu, TMK: [1] 9-2-002:007 (por.)

Aloha Sam, Tanya and Susan:

I am following up on Dr. Lebo's recommendation (of a few minutes ago) to set up a virtual meeting regarding our:

- *Draft Archaeological Inventory Survey Report for the AES West O'ahu Solar Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu, TMK: [1] 9-2-002:007 (por.) (Welser et al. 2020) (CSH job HONOULIULI 171)*

(Link supplied below)

<https://culturalsurveys.sharepoint.com/:b:/g/EXyFGboxtchNhVjwLqwrU7EB7riuVYZJ-PMvZ7KIEW-NEQ>

received by SHPD and assigned TO ARCHEOLOGY WITH LOG 2020.00290 on Feb 6, 2020.

My understanding is we are now agreeing to "Effect with Agreed Upon mitigation

RECEIVED

20 DEC 14 P 1:59

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU



West O'ahu Solar + Storage Project

Planning Commission Hearing State Special Use Permit

Wednesday, January 6, 2021

University of Hawai'i West O'ahu Mauka Lands
Honouliuli Ahupua'a, 'Ewa District, O'ahu EXHIBIT "2"
TMK: 9-2-002:007



PROJECT TEAM



AES West O‘ahu, LLC

Nick Molinari, Sr. Project Manager
Kirstin Punu, Community Relations

Tetra Tech, Inc.

Lisa Kettley

Scott Enright - Agriculture

Scott Enright

Cultural Surveys Hawai‘i

David Shideler

Matsubara, Kotake and Tabata

Ben Matsubara
Curtis Tabata

Peters Communications

Shane Peters

OVERVIEW

Technical Specifications

- 12.5 MW Photovoltaic
- 50 MWh Battery Storage

Utility Scale Project

- HECO
- Serves all O'ahu
- 100% Renewable Energy Goal

Temporary Use

- 25-Year Term (PPA)
- Decommission
- Return Land to Original Condition

UH Partnership

- UH West O'ahu - Mauka Lands
- "Energy Farm" in Long-Range UHWO Land Use Plan

Agriculture + Energy

- Cattle and Honey Production
- NO COST Ag Leases



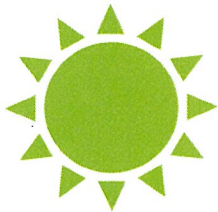
BENEFITS - ENVIRONMENTAL



4,600 Homes Powered



545,794 Barrels of Oil Avoided



Clean, Local Renewable Energy

BENEFITS - ECONOMIC



\$0.106/kWh Low and Stable Cost



118 Jobs Generated



\$20 Million Economic Activity

BENEFITS – OTHER



Agriculture + Energy: Cattle, Honey, Solar



Native Plants: Landscaping and Reintroduction



UHWO + State: Revenue, 100% Renewable Goal, Sustainability

LAND USE AREA



Acreeage

- SUP Area = 96.353 Acres
- Active Uses = ~66 Acres

Land Ownership

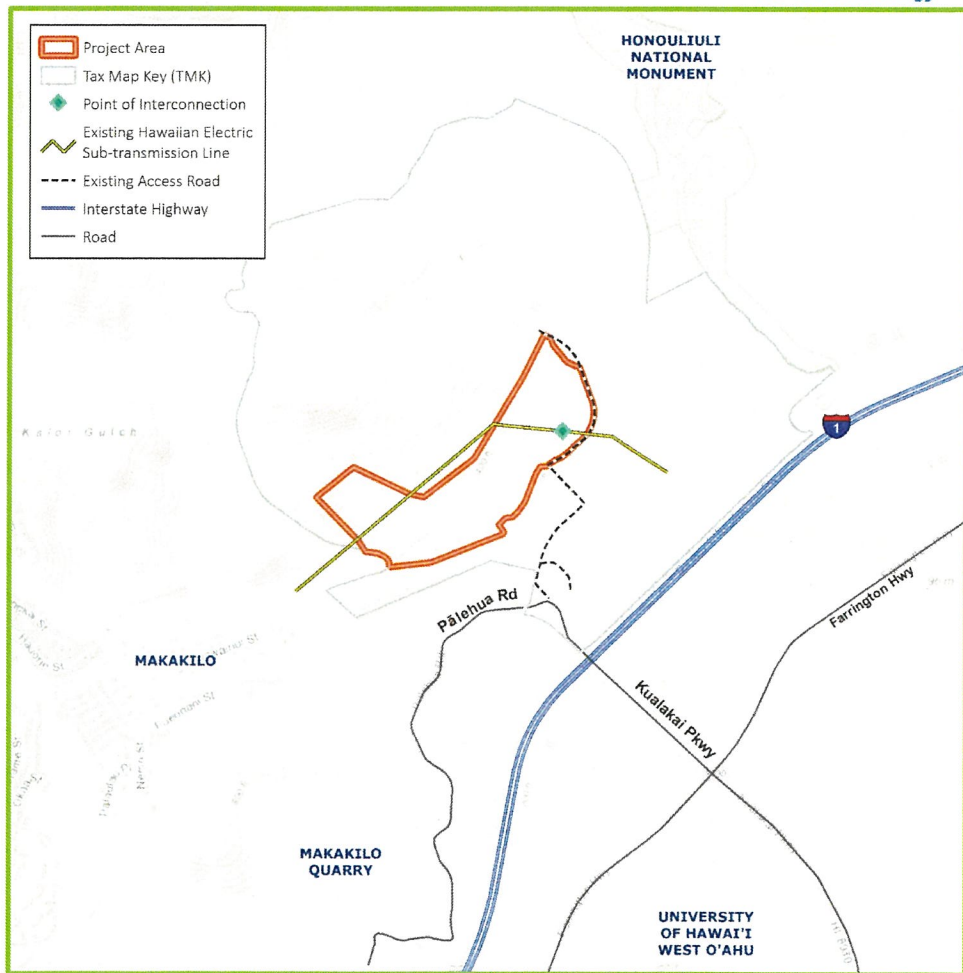
- State Land - UHWO Mauka Lands
- Environmental Review (HRS § 343)

State Land Use District

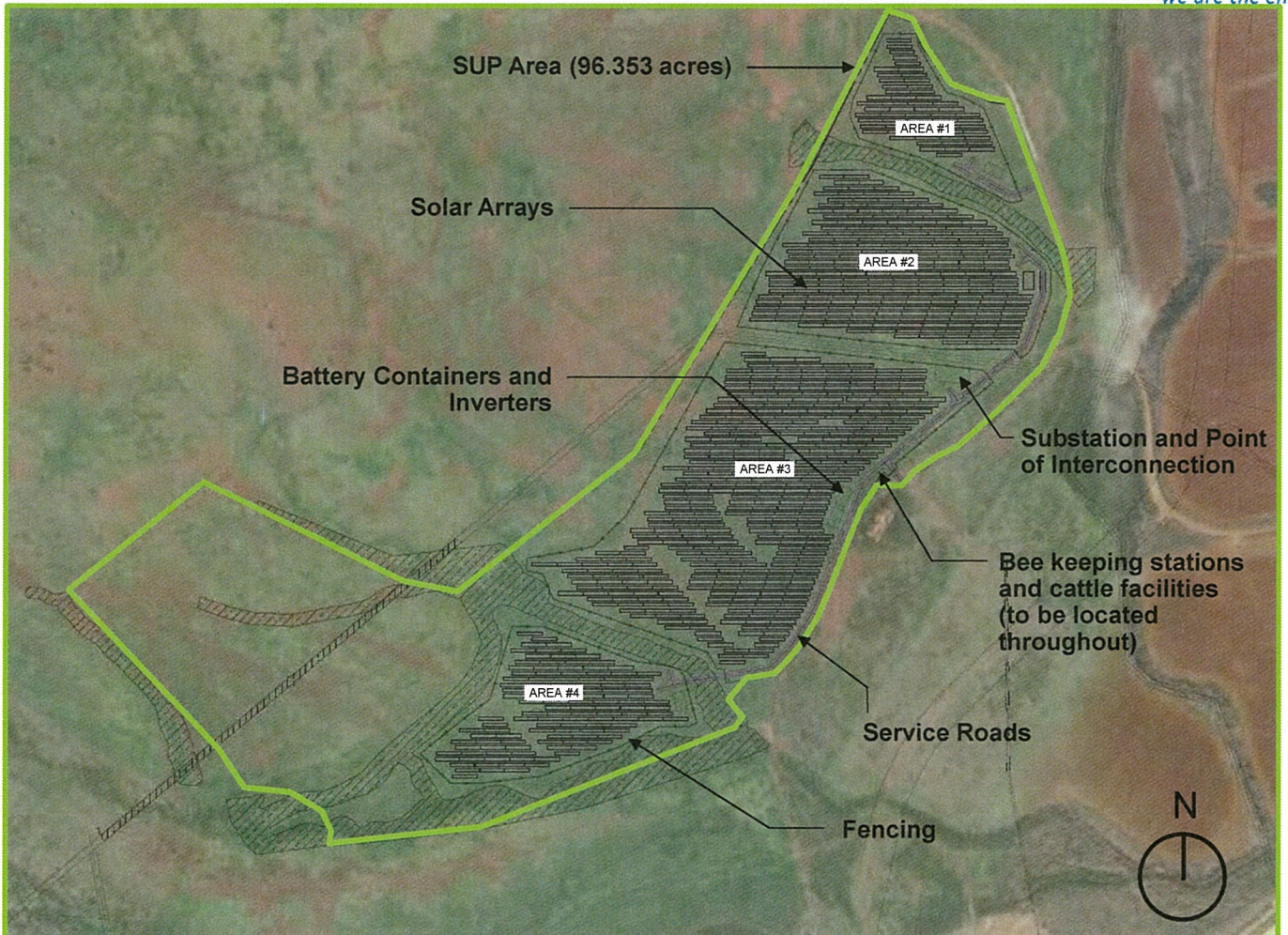
- Agricultural
- LSB Class B, D and E
- Allowed - Special Use Permit (HRS § 205)

County Zoning

- AG-1
- Allowed - Conditional Use Permit (minor)



SITE LAYOUT



COMPONENTS

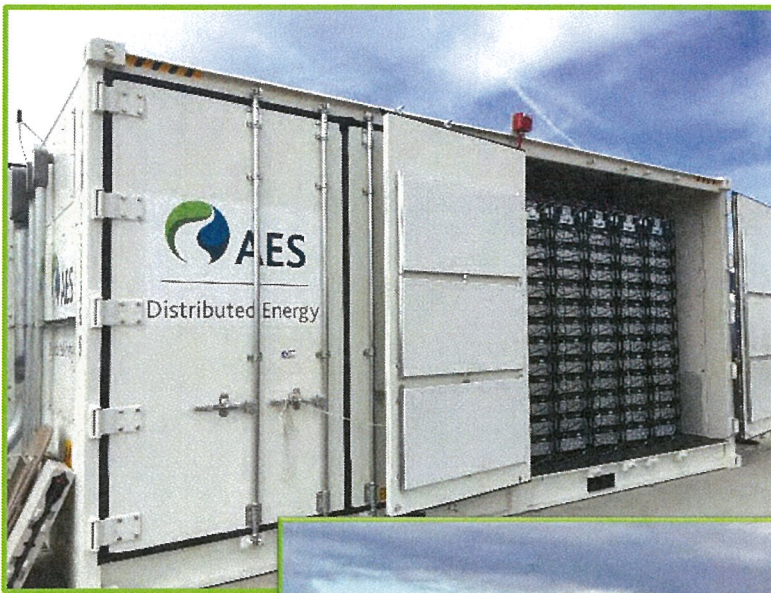


Photovoltaic Panels and Racking System



COMPONENTS

Containerized Lithium-Ion Batteries



COMPATIBLE AGRICULTURE



SOURCE: <https://medium.com/ensia/how-land-under-solar-panels-can-contribute-to-food-security-229908f8dcbe>

Honey Production (Aloha Bee, LLC)

- Est. 500 Gallons of Honey Annually
- Four Beekeeping Stations
- Up to 60 Hives
- Forage on Area Native Species ('Ilima, Kiawe, etc.)
- NO COST Lease

Cattle Production and Grazing (Rocker G Livestock)

- Local Beef Production
- Sustainable Vegetation Management
- Stocker-Size (smaller) Steer and Heifers
- Rotational Pasture System
- Sustaining Historic Use
- NO COST Lease



Photo of existing site by project team member

NATIVE SPECIES – REINTRODUCTION AND LANDSCAPING



- Reintroduction of Native and Area Endemic Species
- Limited-to-No Water Resources
- Drought-Tolerant Native Plant Palette
- Support Agricultural Activities (Honey)
- Community Input
- Balances PV Performance, Water, Landowner Requirements and Community Feedback



Kulu'i (*Nototrichium sandwichense*)



'Ilima (*Sida fallax*)



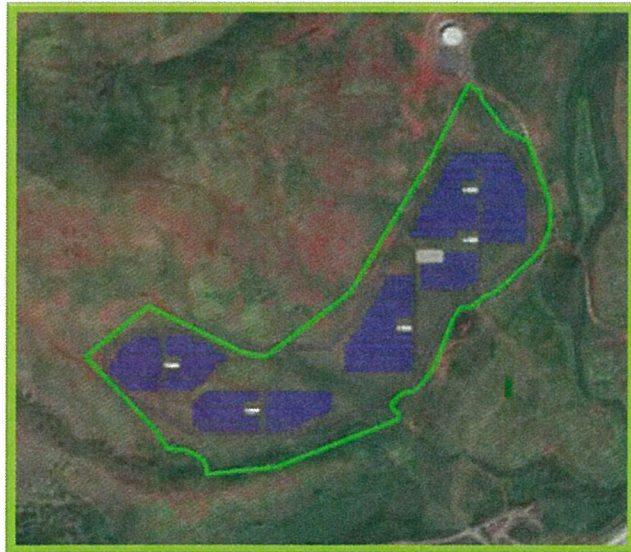
'A'ali'i (*Dodonaea viscosa*)

ADDRESSING VISUAL IMPACT

20% REDUCTION

- Original Acreage vs. Current
- Reduced Use of Higher Elevations
- Move Away From Nearest Residences
- Consolidated Layout
- High-Efficiency Panels
- Batteries and Ancillary Facilities to Lower Elevations

ORIGINAL LAYOUT



CURRENT LAYOUT



VISUAL SIMULATIONS

FARRINGTON HWY



EXISTING

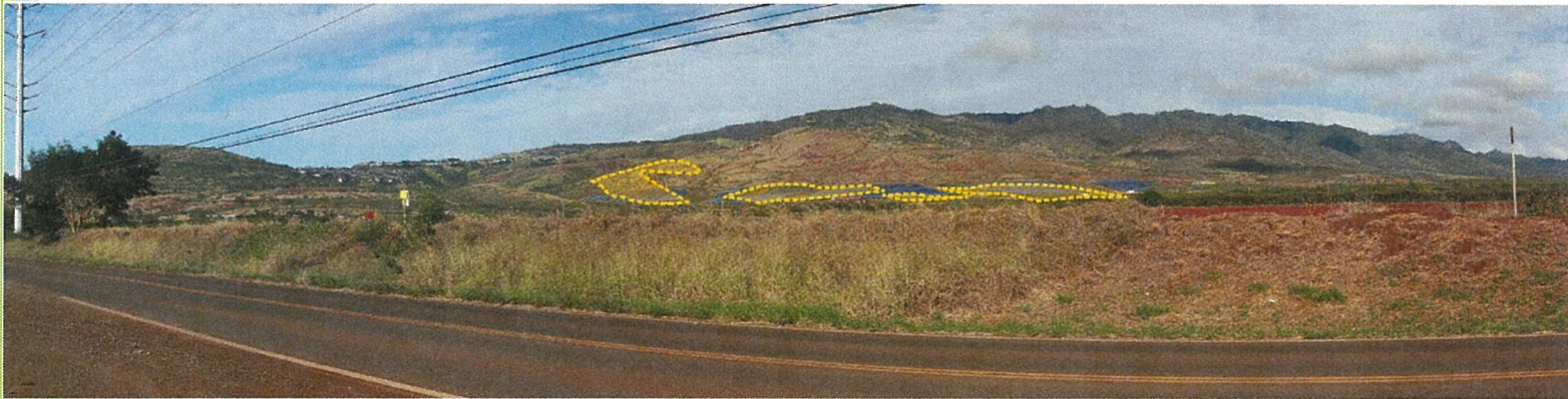


VISUAL SIMULATIONS

FARRINGTON HWY



ORIGINAL



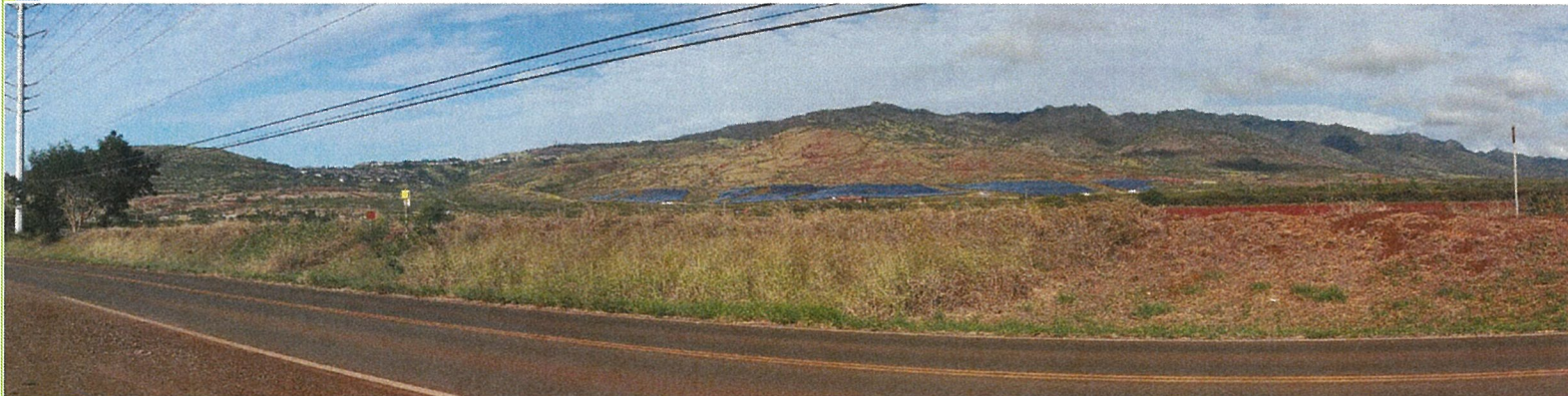
NOTE: Location of solar arrays based on original layout approximated for comparison purposes.

VISUAL SIMULATIONS

FARRINGTON HWY



CURRENT

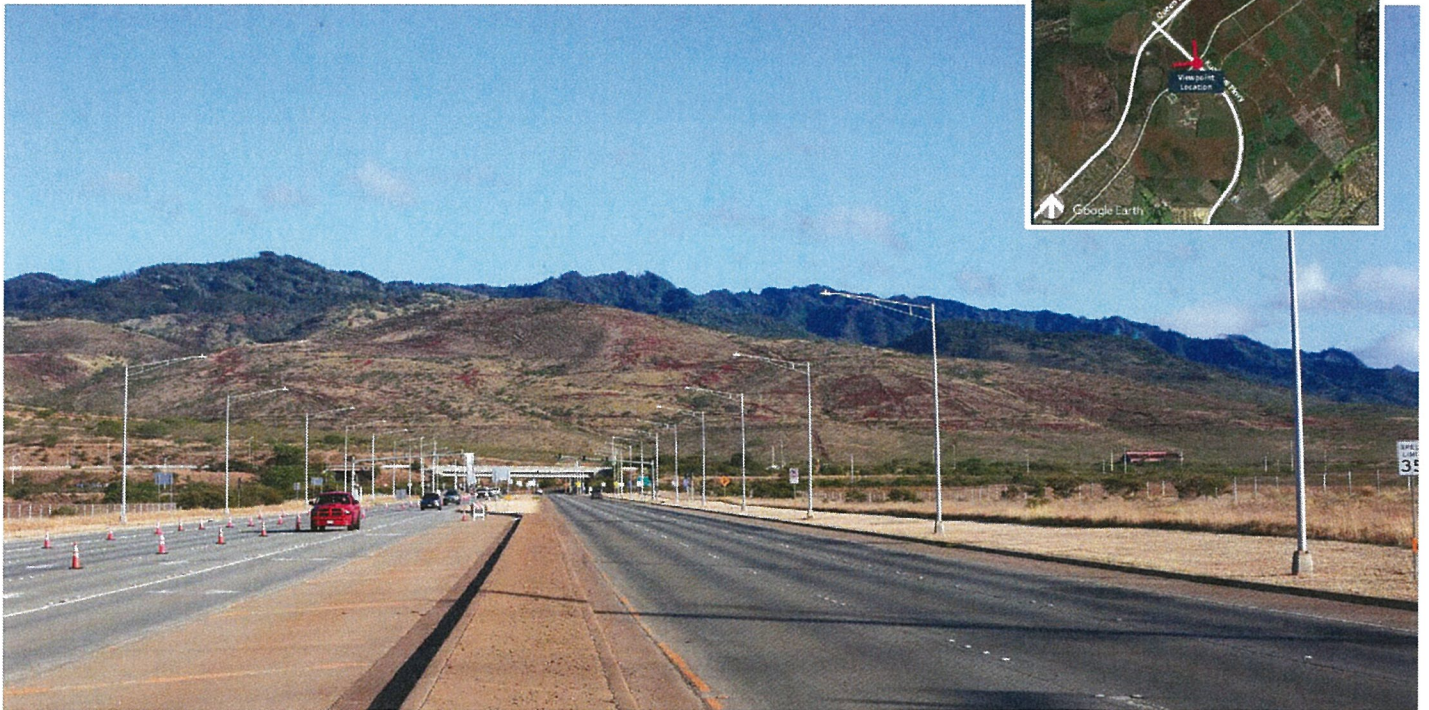


NOTE: Location of solar arrays based on original layout approximated for comparison purposes.

VISUAL SIMULATIONS KUALAKA'I PKWY



EXISTING



VISUAL SIMULATIONS

KUALAKA'I PKWY



ORIGINAL



NOTE: Location of solar arrays based on original layout approximated for comparison purposes.

VISUAL SIMULATIONS

KUALAKA'I PKWY



CURRENT



NOTE: Location of solar arrays based on original layout approximated for comparison purposes.

VISUAL SIMULATIONS

PUEONANI ST



EXISTING



VISUAL SIMULATIONS

PUEONANI ST



ORIGINAL



NOTE: Location of solar arrays based on original layout approximated for comparison purposes.

VISUAL SIMULATIONS

PUEONANI ST



CURRENT



NOTE: Location of solar arrays based on original layout approximated for comparison purposes.

TIMELINE



SELECTION	DESIGN AND PERMITTING	CONSTRUCTION	OPERATION
<p>Site Control Awarded by UH Apr 2018</p> <p>Selected through Hawaiian Electric RFP Process Dec 2019</p>	<p>Power Purchase Agreement (PPA) - PUC Approval Aug 2019</p> <p>Due Diligence and Engineering 2019-2020</p> <p>Final EA + FONSI - Agency and Public Scoping - Public Review of Draft EA - Distribution of Final EA Aug 2019 - Jul 2020</p> <div style="border: 2px solid orange; padding: 5px;"> <p>Special Use Permit - Public and Agency Comments - Planning Commission Hearing - LUC Hearing Aug 2020 – Mar 2021</p> </div> <p>Conditional Use Permit Summer 2021</p> <p>Construction Permits Fall-Winter 2021</p>	<p>Construction - After obtaining all permits / approvals - Approximately 9-12 months 2021 - 2022</p>	<p>Operation - 25-year operational period (per PPA) 2023 – 2048</p> <p>Decommissioning - Return Project area to existing condition (or comparable) 2049 - 2050</p>

CONCLUSION



Clean, Local Energy for ALL O'ahu

- 4,600 Homes Powered
- 545,794 Barrels of Oil Avoided
- Supports 100% Renewable Energy Goal
- Sunset of Fossil Fuel Plants - Kahe and Campbell

Agriculture + Renewable Energy

- Cattle
- Honey
- Solar
- NO COST Ag Leases



Green Jobs & Economic Benefits

- 118 Jobs Generated
- ~\$20 Million Economic Output
- \$0.106/kWh Low and Stable Cost

UHWO + AES Partnership

- Revenue to UHWO and State
- Sustainability Goals Supported for State and UHWO
- Long-Range Plan - Implements UHWO Land Plan





Mahalo!

0-1752

Rpt. ent'd.

TMK: 9-2

SCS Project Number 130-3

AN ARCHAEOLOGICAL INVENTORY SURVEY
 OF THE UNIVERSITY OF HAWAII,
 WEST O'AHU CAMPUS,
 DISTRICT OF 'EWA, ISLAND OF O'AHU, HAWAII
 (TMK 9-2-02:01, 9-2-02:03, 9-2-02:05)

By:
 Michael F. Dega, M.A.,
 Randy Ogg, B.A.,
 Michael T. Carson, M.A.,
 and
 Leina'ala Benson, B.A.,
 Revised June, 1998

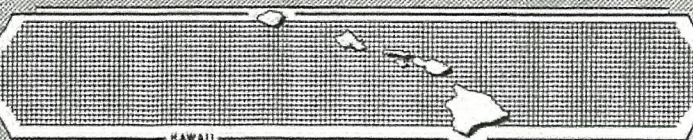
DEPT OF PLANNING
 AND PERMITTING
 CITY & COUNTY OF HONOLULU

20 DEC 14 9:59

RECEIVED

Prepared For:
 PBR Hawaii

SCIENTIFIC CONSULTANT SERVICES Inc



711 Kapiolani Blvd. Suite 777 Honolulu, Hawaii 96813

ABSTRACT

At the request of PBR Hawai'i, Scientific Consultant Services, Inc. (SCS) conducted an archaeological inventory survey of approximately 1,000 acres in Honouliuli Ahupua'a in the 'Ewa District of the island of O'ahu (TMK 9-2-02:01, 9-2-02:03, 9-2-02:05). Survey was performed during the week of March 16, 1998.

No traditional sites were documented during survey. Of historical interest were the multitude of flumes, aqueducts, ditches, pumps, and other irrigation features occurring within the heavily modified landscape of the project area. Included near one pumping station is a large, dilapidated wooden building housing steam engine driven pumps. These historical features form a complex, inter-connecting system of irrigation features representing extensive sugarcane production in this 'Ewa location from c. 1920s through more recent times. The irrigation system has been assigned State Site Number 50-80-08-5593. In addition, the Waiahole Ditch System (50-80-09-2268) crosses the subject parcel and its flumes are evident from the northwestern section of the parcel toward the lower agricultural fields to the southwest.

Site 5593 has also been assessed as significant under criterion A and D as the site is associated with events making a significant contribution to broad patterns of history (i.e. sugar cane production in Hawai'i) and has also yielded information important for understanding the culture history of the 'Ewa Plain and by extension, the areas adjacent to Pu'u Kapua'i. Site 2268, the Waiahole Ditch System, has been previously assessed for site significance (Goodman and Nees 1991).

However, since sufficient data has been collected from Site 5593, the site is considered no longer significant and development of the property may proceed. No further archaeological work is required for this project area.

TABLE OF CONTENTS

ABSTRACT	i
TABLE OF CONTENTS	ii
LIST OF FIGURES	ii
INTRODUCTION	1
PROJECT AREA DESCRIPTION	1
GEOLOGY AND SOILS	4
Vegetation	5
Hydrology	5
TRADITIONAL LAND USE	6
HISTORIC SETTING	10
ARCHAEOLOGICAL SETTING	11
RESEARCH METHODS	14
RESEARCH RESULTS	14
THE WAIHOLE DITCH SYSTEM AND HISTORIC IRRIGATION NETWORK ..	17
DISCUSSION AND CONCLUSIONS	19
HISTORIC IRRIGATION SYSTEM-SITE 5593	20
SETTLEMENT PATTERN	21
SIGNIFICANCE ASSESSMENT	22
REFERENCES CITED	24

LIST OF FIGURES

Figure 1: USGS 'Ewa Quadrangle Showing Project Area	2
Figure 2: Planview Map Showing Project Area.	3
Figure 3: Pump House No. 12. View to Northwest.	15
Figure 4: Water Pump in Sugarcane Field. View to West.	15
Figure 5: Pumping Machinery at Mill Adjacent to Pump House No. 12. View to North.	16
Figure 6: Irrigation System Bridge. Note Date of 1928 in Center of Bridge. View to Southeast.	16
Figure 7: Site 2268, a Section of Water Flume. View to Northeast.	18

INTRODUCTION

At the request of PBR Hawaii, Scientific Consultant Services, Inc. (SCS) conducted an archaeological inventory survey of approximately 1,000 acres in Honouliuli Ahupua`a in the `Ewa District of the island of O`ahu (TMK 9-2-02:01, 9-2-02:03, 9-2-02:05). Fieldwork was performed during the week of March 16, 1998 by Michael Dega (Field Director), Randy Ogg, and Leina`ala Benson, under the overall direction of Robert L. Spear, Ph.D.

PROJECT AREA DESCRIPTION

The project area is situated in Honouliuli Ahupua`a in the `Ewa District of the Island of O`ahu (Figure 1). More specifically, the project area is located at TMK: 9-2-02:01, 9-2-02:03, and 9-2-02:05, covering a total area of 991 acres and including three parcels labeled 1A, 3A, and 3B, the parcel designated "1A" consisting of some 941 acres, a majority of the survey area (Figure 2).

Honouliuli Ahupua`a is a primary component of the `Ewa Plain. The `Ewa Plain was known by at least three different names, including Kaupe`a, Pu`ukapolei, and Kai`ona (Kamakau 1964: 29, 47). Various other names have also been recorded, these possibly referring to particular portions of `Ewa (Maly 1996: 1-10; Sterling and Summers 1978: 39).

On a general geographic scale, `Ewa may be characterized as a dry expanse of grasses and low shrubs. Within this context, Honouliuli Ahupua`a may also be seen as "a land of contrasts" (Tuggle 1997: 11), encompassing the scorched plain, parts of the central O`ahu plateau, the more productive lowlands of Honouliuli Stream, and a portion of the bounteous Pearl Harbor. The project area occupies one portion of this varied region, here limited to an inland setting befitting of uplands along the lower, southeastern slope of the Wai`anae Mountain Range. This "upland" area, occurring above the flat `Ewa Plains, contains hills, ridges, and gulches of various sizes. The lower portion of the project area consists of slightly to moderately sloping terrain, the former more conducive toward larger-scale agricultural production of sugarcane.

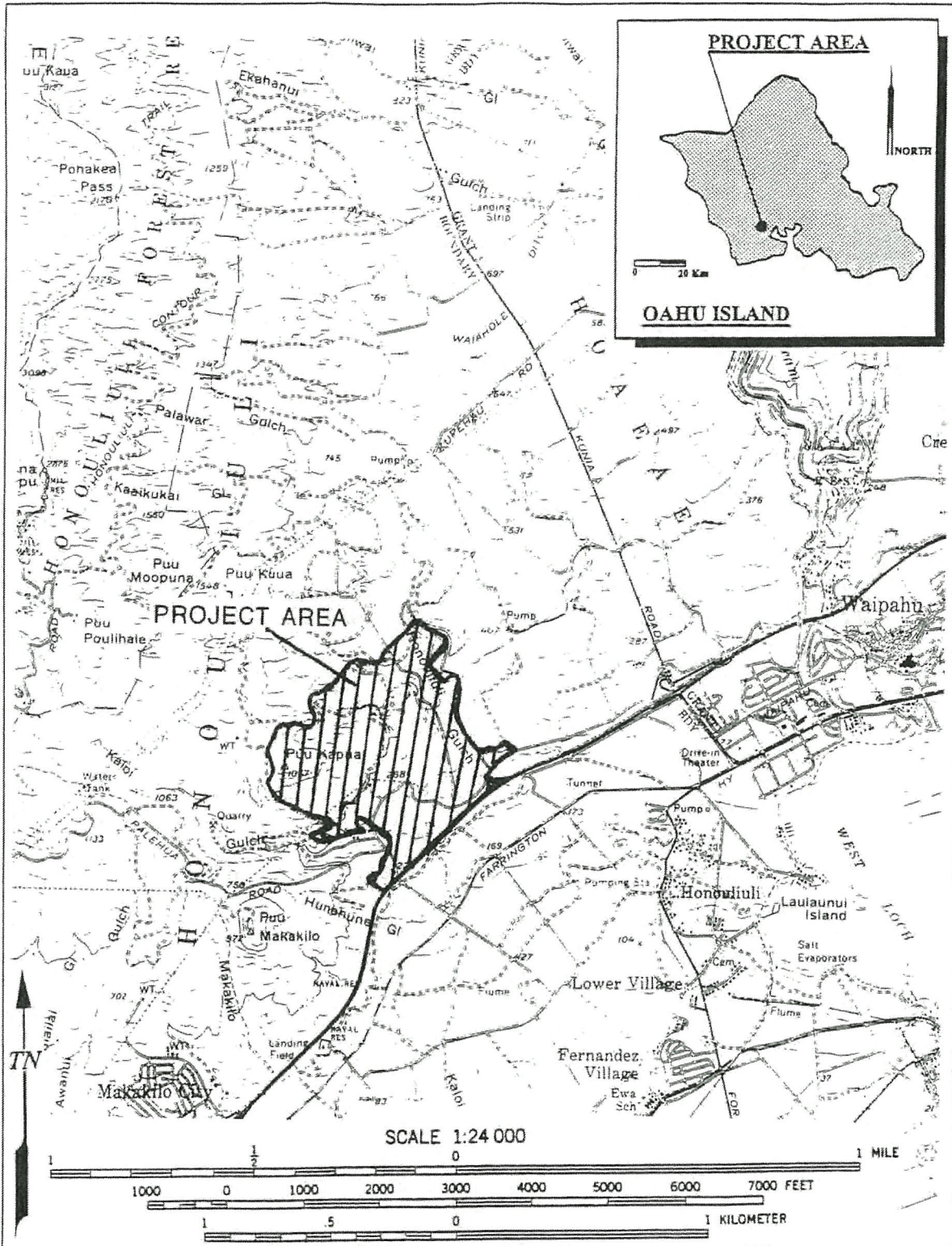


Figure 1: USGS O'ahu Topographic Map Showing Project Area

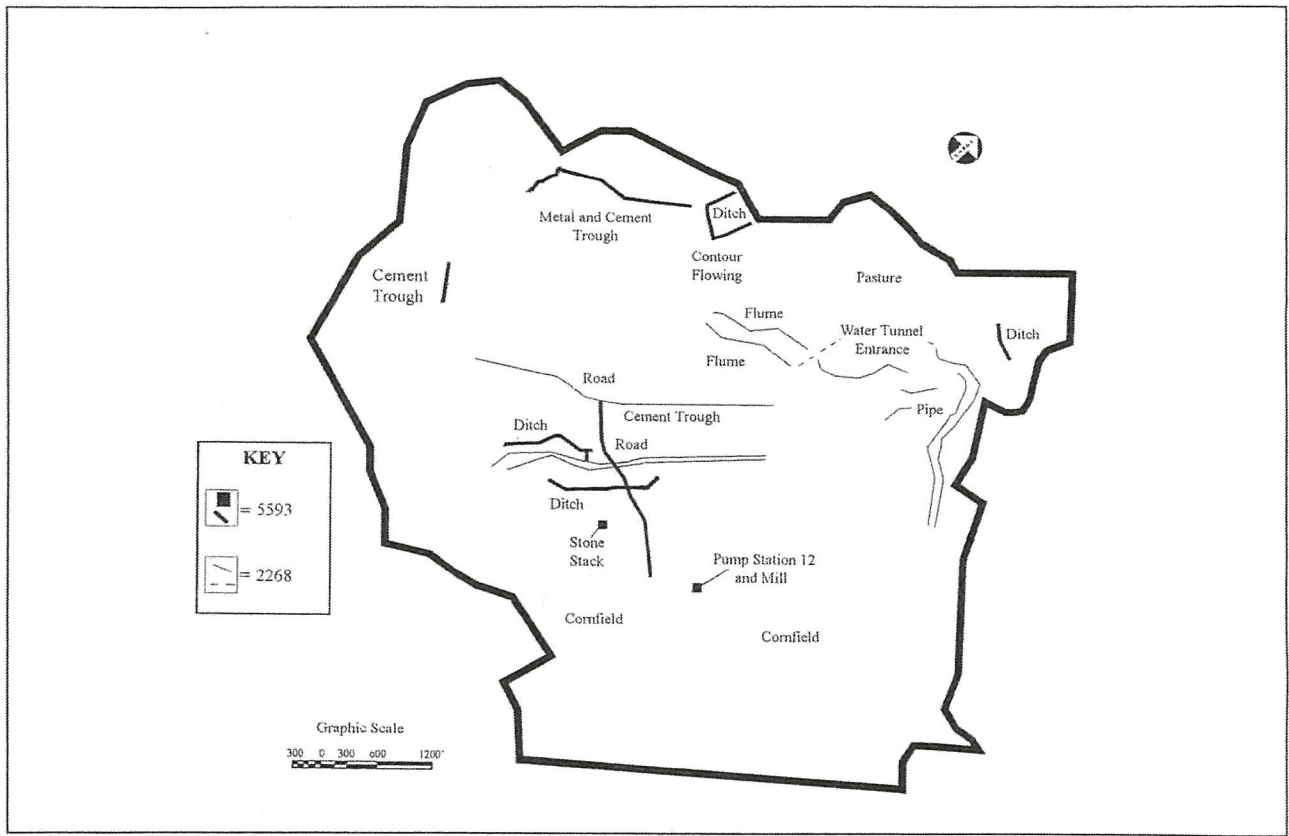


Figure 2: Planview Map Showing Project Area.

GEOLOGY AND SOILS

Pu`u Kapua`i, composing a majority of the project area, lies on the southeastern slope of the Wai`anae Range and, in geologic time, represents a later-period volcanic cone which is composed of cinder, splatter, and lava flows (Macdonald *et al.* 1983:428-429). This landscape is exposed to much erosion yet compared to that of the west Wai`anae side of the mountain range, erosion is minimal.

Foote *et al.* (1972: Sheet 43) depict soils occurring within the project area that may be roughly characterized as two general types, with some variation due to slope gradient. These soil types, including Helemano silty clay and Mahana silty clay loam, are typically well-drained soils occurring on sides of gulches, gullies, and ridgetops, landscape characteristics consistent with the present project area. Helemano silty clay generally occurs on the plateau of Pu`u Kapua`i and on the sides of its gulches. These soils, derived from basic igneous rock, are common on steep to extremely steep slopes and V-shaped gulches. Small areas of rock outcrop, steep stony land, and eroded spots are common near the summit of Pu`u Kapua`i. Much like the past, today, the plateau of Pu`u Kapua`i and adjacent grasslands are utilized for pasture.

The second general soil series occurring within the project area is Mahana silty clay loam and may be divided into two sub-series based upon slope gradient. In general, both soil sets are typically present of moderate sloping upland and ridgetop soils in the area, both being derived from volcanic ash. The surface and subsurface soils are frequently removed by erosional processes and the soil type falls into a definite erosional hazard class. These two soils, separated by a slope gradient of 12-20% slope and 20-35% slope respectively, are often utilized, as is the case today, for irrigated sugarcane production, water supply, and pasture lands (Foote *et al.* 1972:86). At present, portions of these soil types underlie former sugarcane fields. Corn pastures, watermelon groves, and bell pepper fields occupy much of the lower project landscape.

In addition to the above general soil types present within the project area, raised limestone does occur and is well-drained, the limestone here allowing little opportunity for water catchment. Some portions of the terrain is karstic, although no sinkholes observed during survey. Weathering and erosion appears to be well developed, as evidenced by the rounded surfaces of rock formations.

Vegetation

The present vegetation of the project area contains a low diversity of plant species. Large expanses of the project area, mainly the *pu`u* area, are covered in Guinea Grass (*Panicum maximum*) and *koa haole* (*Leucaena leucocephala*). A majority of the lower project area, near the project's southern border, contains active cash crop production (corn and small scale vegetable plots) and tall grasses and feral sugarcane. The SCS crew also identified other plants occurring in various concentrations throughout the project area. These include naturalized plants such as castor bean (*Ricinus Communis* L.), Java Plum (*Syzygium cumini*), silver oak (*Grevillea robusta* A.) and various cactus (*Cactaceae*), endemic plants such as *akia* (*Thymelaeaceae*), and indigenous plants including *uha loa* (*Waltheria* L.), *o`i* (*Stachytarpheta*), *a`ali`i* (*Dodonea viscosa*) (see Wagner *et al.* 1990).

In addition to the plants identified by the archaeological survey crew, Char & Associates (letter report to PBR Hawaii 1998) conducted a walk-through botanical survey of the project area and identified several native lowland species of plants in a large outcrop of rocks on the top of the *pu`u*. These included *nehe* (*Lipochaeta* sp.), *pili grass* (*Heteropogon contortus*), *kumu niu fern* (*Doryopteris decipiens*), and spur flower (*Plectranthus parviflora*). In the gulches the botanists found native *wiliwili* trees (*Erythrina sandwicensis*) and a stand of more than 30 *iliiahalo`e* or coast sandalwood (*Santalum ellipticum*).

Hydrology

Perhaps the most important commodity within the project area, as far as land utilization and habitation (temporary or permanent) are concerned, is water and associated hydrological networks. The low availability of water is clearly a limiting factor in the project area. Annual rainfall fluctuates wildly from near zero to as much as 67 inches *per annum* (Athens *et al.* 1997; see also Price 1983:62). The long-range pattern of rainfall may be summarized as several periods of prolonged drought punctuated by occasional downpours, the latter causing much erosion along the area's slopes and ridges. Despite the lack of rainfall, there is evidence of a subterranean aquifer, the main aquifer feeding the general `Ewa area being in Pearl Harbor (Wilcox 1996). Artesian well drilling and subsequent intensive use of this water for sugarcane irrigation has drained the underlying water table to an estimated one-third of its former level (Culliney 1988:233). Despite the dramatic decrease in the local water table, it can still be found to fill the bases of some of the deeper sinkholes in the `Ewa area but not occurring within the project area.

Some debate revolves around the usability of the local water as the ground water in this area has been characterized as brackish, with chlorides present in concentrations greater than 500 ppm (parts per million) (Traverse Group 1988: A-7). However, this water was probably much more pure in the past when the water volume was considerably greater relative to the constituent chlorides and other particles. Initial use of the water drew from the upper portions of the aquifer, free from impurities (chlorides, usually heavier than water) which were found in greater concentrations in the deeper reaches of the local aquifer. It is possible that impurities are found in enough concentration in the lowered water table to compromise the usability of the water. It seems likely that measures must have been made and are being made to ensure a relatively pure water supply for irrigating the produce of the lower fields.

TRADITIONAL LAND USE

The project area's location on the edge of the 'Ewa Plain allies it with important Hawaiian figures, principles, and Hawaiian oral traditions. 'Ewa is known in Hawaiian tradition as a place of powerful and ill-intentioned spirits (T'i 1963: 27, 29; Nakuina 1990: 54; Fornander 1916-1920, V: 318; Pukui 1943: 60). Much of this spiritual force is attributed in one way or another to Kamapu`a and his grandmother Kamauna-Niho as well as to the sisters of Pele, specifically Hi`iaka and Kapo`ulakia`u (Tuggle 1997: 8-11). In addition, the area is seen as rather mystical and uninviting, local workers describing stories of apparitions appearing on many occasions and unusual occurrence that have taken place in and adjacent to the project area. Of direct relevance to the project area, a strong connection is proposed between Kamapu`a and Honouliuli (the project area *ahupua`a*) (Pukui *et al.* 1974), but the exact nature of this connection cannot be reconstructed from the fragmentary preservation of known oral traditions of the subject.

Unfortunately, the project area occupies a region much neglected by historians and prehistorians, this presumably owed to the fact that comparatively, no major population centers occurred within the project area and land utilization was likely minimal until sugarcane production began in earnest during the c. 1920's. Likewise, Hawaiian oral traditions do not offer more than scant, fragmentary, and contradictory pieces of information regarding past traditional use of the project area. The general opinion regarding this area is that it has always been, in an ecological sense, an impoverished land. Given these hardships, traditional Hawaiian settlement of the area would likely have related to people "on the edge of survival" if they did not have regular and abundant access to resources outside of this area (Tuggle 1997:16).

Early settlement of the project area, if any actually occurred and could be detected, most likely was made possible by a subsistence strategy aimed at both marine and avifauna resources. Occupation of the area, it is presumed, would have been temporary rather than permanent, this factor owing simply to the lack of water resources in the area and the difficulty in obtaining these resources. As these faunal resources became depleted and as population density increased, a shift towards domestic and terrestrial resources (i.e., animal husbandry, horticulture, and agriculture) became prevalent. This pattern, in general, is common to the islands of Remote Oceania. In the case of the project area, though, direct access to marine resources is problematic given that the inland location of the project area precludes easy access to the coast simply due to variable distances to the coast.

Although the project area itself does not occupy a coastal location, inhabitants of this area, if any, could have exploited the bounty of nearby coastal ecological zones, particularly in Pearl Harbor. In fact, Pearl Harbor's marine resources are considered the primary "blessings" of the occupants of the 'Ewa Plain (Kamakau 1964: 83-84). In particular, pearl oysters, shrimp, and coastal fish were targeted. Pearl Harbor's West Loch was identified as a productive location for acquisition of 'o'io (*Albula vulpes*) and also *lipoa* (*Dictyopteris* sp.) (Kelly 1991: 155). *Lipoa* is considered one of the most favored of all Hawaiian seaweeds (Pukui and Elbert 1986: 208). Archaeological investigation of 'Ewa settlements (including inland areas) has shown that local subsistence included reef fish and shellfish available from nearby coastal waters (Charvet-Pond and Davis 1992; Davis 1990a: 136; Tuggle and Tomonari-Tuggle 1994: 93; Wickler and Tuggle 1996: 131-141).

Although early settlement of the 'Ewa region, in general, is thought to have involved significant attention to avifauna resources (Davis 1990a: 136; James *et al.* 1987; Olson and James 1982), thus far, only minimal evidence has been found to support this claim (Hammatt and Shideler 1995; Tuggle and Tomonari-Tuggle 1994). The lack of evidence may relate in part to incomplete archaeological survey of inland areas where bird predation was more prevalent. Also, bird bones may have been deposited elsewhere, having been acquired by the residents of other areas. In this view, visiting bird hunters may have been the first people to carry on traditional use of the project area, contributing to the utilization of temporary task-specific bird hunting sites. Sinkholes full of the bones of extinct bird species indicate that the general area witnessed large-scale depletion of avifauna (Sinoto 1976). Sinkholes containing ubiquitous

avifaunal remains were not documented within the present project area. Humans are thought to have played a major role in the depletion of bird life throughout the Pacific Islands (Steadman 1989, 1995, 1997). In `Ewa, however, the subsistence relationship has not yet been made clear between human and bird populations.

The production and cultivation of plants, particularly cash crops such as sugarcane and more recently, corn, was certainly a difficult endeavor due to the landscape exhibiting shallow soils and sparse rainfall. In the lower, southern portion of the project area, a thin layer of soil occurs across the moderately sloping lands. This area most likely supported horticulture, small-scale agriculture, and later, more intensive sugarcane cultivation during the early 20th century through more recent times.

Although no lands were awarded by the Land Commission to claimants, land claims in the Māhele of the late 1840s nonetheless indicate the presence of a concentration of house lots around *lo`i* lands in Honouliuli (Silva 1987; Tuggle and Tomonari-Tuggle 1994, Appendix G). This evidence suggests that the lowland portion of the project area proved to be reasonably productive agriculturally. Soil suitable for cultivation is rare in the upland portions where small soil pockets are distributed unevenly. Sugarcane production was common later though, as evidenced by a multitude of furrowing marks closely spaced around the *pu`u*, the close furrows limiting erosion of agricultural soils. Irregularly located sinkholes and small gulches often served to catch soil deposition appropriate for limited gardening activity (McAllister 1933: 109). In the upland portions of the project area, traditional gardening areas included not only some of these sinkholes but also some prepared stone mounds.

Hawaiian traditions refer to several plant species grown in the `Ewa District, including food-plants and others (Emerson 1978: 167; Maly 1996). Most interesting among the local traditions is the role of breadfruit (*Artocarpus altilis*). Reportedly, Hawaii's first breadfruit was planted at `Ewa (Fornander 1916-1920, V: 224-228, 678-679; Kamakau 1991: 110). Other details of the story conflict except to say that the breadfruit was acquired from a distant location. Analysis of wood charcoal and pollen successfully identified at least 50 species of indigenous, endemic, or Polynesian-introduced plants in the `Ewa District (Athens *et al.* 1996; Franklin *et al.* 1995; Murakami 1995, 1996a, 1996b; O'Hare *et al.* 1996). This evidence, combined with flora documented during the present survey, shows that the project area could have supported the growth of several useful plant species important in traditional Hawaiian society.

Domesticated animals were certainly present in the project area from traditional times through the present. The extent to which they were important to local subsistence is, at present, limited to the extensive grazing lands observed during modern times. Only a very small representation of dog (*Canis familiaris*), pig (*Sus scrofa*), and fowl (*Gallus gallus*) have been identified in archaeological sites in `Ewa (Charvet-Pond and Davis 1992: 282; Collins 1990: 349; Davis 1990a: 256; O'Hare *et al.* 1996: H-20; Wickler and Tuggle 1996: 138). The increased importance of domestic animals in subsistence is expected concomitantly with increased agricultural activity.

Lithic resources such as volcanic glass and basalt are notably absent from the `Ewa Plain. The prevalent limestone, however, could be used for structures, hearths, cooking stones, and a limited number of tools. Basalt and volcanic glass needed to be imported from some distance, implying the establishment of an exchange network or acquisition of the lithics by other means. Pu`upalailai, at the edge of the Wai`anae Mountains, is reputed to be a source of volcanic glass (Manhoff and Uyehara 1976), but this source has not been confirmed. The nearest known source of volcanic glass is the Kolekole Pass. Basalt and volcanic glass tools and flakes have been found archaeologically throughout the Western portion of the `Ewa Plain, but they are rare in the eastern portions of the plains and also in the vicinity of the project area (Charvet-Pond and Davis 1992: 108-127; Davis 1990a: 274, 277; O'Hare *et al.* 1996: 255; Wickler and Tuggle 1996: 126). Traditional settlement of the project area, if any occurred on either a temporary or permanent basis, probably involved measures to account for the difficulty of procuring these lithic resources.

Overall, the environmental setting of the project area provides a set of limiting factors to traditional settlement. The dry `Ewa Plain may be considered similar to other extremely dry regions of leeward Hawaii where the remains of small communities have been found in agriculturally-impooverished lands (Tuggle 1997). Some of these dry leeward areas witnessed the development of complex dryland agricultural field systems as along the western coast of Hawai`i Island (Kirch 1985: 228-230; Rosendahl 1994). In contrast, the `Ewa Plain more closely fits the model proposed for dry areas of Moloka`i (Tuggle 1993; Weisler and Kirch 1985) and for lower Makaha Valley on O`ahu (Hommon 1969; Green 1980), where settlements represented "gardening families on the edge of survival" (Tuggle 1997: 16).

HISTORIC SETTING

Kamehameha's successful conquest of O`ahu resulted in a large-scale redistribution of lands and this event set the stage for an ongoing series of land sales and transfers of ownership. Honouliuli Ahupua`a was given as *punala`au* (conquered land) to Kalanimoku (Kame`eleihiwa 1992: 58, 112). Subsequently, Kalanimoku gave this land to his sister Wahinepi`o, whose daughter Kekau`onohi in turn received the land during the Māhele of the late 1840s (LCA 11,216; Royal Patent 6971). Kekau`onohi, however, died only a few years later, in 1851. Honouliuli was then transferred to her husband Ha`alelea.

Despite the rapid and widespread changes of land ownership in Hawaii in the late 1800s, Honouliuli Ahupua`a retained a semblance of its traditional form. Ha`alelea's marriage to Kekau`onohi brought him title to large expanses of Hawaiian lands, bringing some degree of unity to these lands (including the *ahupua`a* of Honouliuli) at least during his lifetime. In the few decades following Ha`alelea's death in 1864, his extensive lands became fragmented as they were sold or auctioned. Over subsequent decades, land parcels became increasingly fragmented and subdivided with further sales. The *ahupua`a* of Honouliuli fortunately escaped this fate, as it was under lease to Captain John Meek for ranching at the time when Ha`alelea's lands were auctioned. Three years later (in 1867), Ha`alelea's survivors regained a clear title to Honouliuli, and the *ahupua`a* was immediately sold in its entirety to John Coney. One decade later, in 1877, John Coney's wife sold Honouliuli Ahupua`a (again in its entirety) to James Campbell for a sum of US\$95,000.

James Campbell was convinced that the coast of the `Ewa Plain could be used successfully for sugar plantation land, despite the overwhelming public opinion at the time that `Ewa was a barren wasteland best utilized for cattle ranching. Campbell hired an expert well-digger from California to sink a well in Honouliuli in 1879. At a depth of 240 feet (ca. 71 m), water commenced to flow. This well gained recognition as Hawaii's first artesian well, called *wai aniani* ("crystal waters"). This well was productive until it was sealed 60 years later (in 1939) by the City and County of Honolulu. Additional wells found equal success in water flow. James Campbell proceeded to establish profitable cattle ranches and to engage in sugar plantation ventures in Honouliuli (James Campbell Estate n.d.).

Honouliuli played an important role in the sugar plantation business in Hawaii. In 1889, James Campbell leased land in Honouliuli to Benjamin F. Dillingham. Dillingham subleased the Honouliuli lowlands to W.R. Castle. Castle and Cooke then were in a position to organize the 'Ewa Plantation Company. A few years later, in 1897, Dillingham formed the O'ahu Sugar Company, Ltd., utilizing the artesian well water to irrigate sugarcane plantations in the Honouliuli uplands. In 1970, the O'ahu Sugar Company merged with the 'Ewa Plantation Company. The lease to the Honouliuli lands lasted through 1996.

Presently, the James Campbell Estate is managed by its trustees. James Campbell's will committed the Estate to "providing a safe and certain income" for Campbell's heirs. The Estate Trustees were thereby obliged to adopt long-range perspectives in land management (James Campbell Estate n.d.). These goals have been realized with the assistance of professional planning firms retained to analyze the values, resources, and potential uses of the Estate's lands.

ARCHAEOLOGICAL SETTING

Historic period activities in 'Ewa District, in general, have virtually erased all material record of traditional occupation in the project area. Sugarcane plantations have effectively destroyed all surface architecture as well as sub-surface cultural remains. However, sugarcane lands are expected to have at one time provided the agricultural base important to settlement in the area. Even aside from sugarcane lands, no part of the 'Ewa District went unharmed during the historic period (Hammatt and Folk 1981). Stone-robbing for cattle control irreversibly damaged traditional structures. Subsequent trampling by cattle further destroyed these structures and also contributed to the destruction of sub-surface cultural deposits. Finally, military occupation systematically eliminated the archaeological record with extensive bulldozing to support large areas for training courses, camps, and other facilities (Albert 1981; Denfeld 1995).

As a result of the collective damage to the landscape, archaeological remains in the 'Ewa District are found in patches, mostly concentrated around sinkholes near the coastline or other areas where land-alteration activities such as bulldozing were minimized. Alternatively, this pattern reflects a traditional practice to establish settlements in the vicinity of sinkholes. Sinkholes often provide

deeper soil deposits as well as access to the underlying water table, these providing more attractive settlement location.

Identified traditional settlements in 'Ewa include a variety of features. These features include C-shaped structures, thick-walled rectangular house areas, platforms of small surface area, low walls or alignments enclosing sinkholes, mounds or piles of cobbles, and piles of cracked limestone (Tuggle 1997: 15). The thick-walled rectangular house areas are similar in form to features documented in Makaha Valley (Green 1980: 59). This list of features was expected to be found within the project area, indicative of the remains of habitation sites.

Given the lack of basalt building material, people needed to rely on limestone and coral for non-perishable elements of their structures. Construction technique was generally a form of traditional "frame and fill," utilizing limestone slabs for "framing" material and coral cobble rubble for "fill" material. These archaeological remains offer only a partial picture of past architecture. Traditional Hawaiian houses were made mostly of perishable woods and plant fibers. Nonetheless, the limestone and coral foundations and other architectural components can be interpreted to infer past function.

The C-shapes and thick-walled enclosures served as habitation areas for cooking and sleeping. Some of these features may have supported eating houses, but most eating is thought to have occurred outdoors or under lean-to structures with no remnant structural evidence (Tuggle 1997: 15). Enclosed sinkholes and clusters of cobble mounds functioned as agricultural features.

In addition to these common features, a few other features are known to be found in rare occurrences, these described as "vaulted mounds." Vaulted mounds are small chambers or cupboards constructed of stone slabs. The slabs are then covered by a mound of cobbles. The result is a mound containing a vault (Davis 1990b: 540-548; O'Hare *et al.* 1996: 80). These vaults are, at present, not known to contain burials, although they may possibly have contained burials in the past. They may have functioned as storage areas. The thick layer of cobbles provided insulation from the oppressive heat characteristic of the area.

Traditional trails are expected to have been "constructed" in the project area. The rough terrain would have necessitated some facilitation of transport. Also, oral traditions refer to several trails in the region (Kame`eleihiwa 1992: 63; Emerson 1978: 167; Maly 1996). Only one portion of a single trail was identified previously in the `Ewa District. This trail was found in the Kualaka`i Region of the `Ewa Plain (Wickler and Tuggle 1996), and it may be the same trail previously identified in A.D. 1825 (Figure 33 in Fitzpatrick 1986).

Religious or ceremonial structures have only very rarely been identified in `Ewa. Notably, three platforms were found in association with impressive amounts of fish bone. These features were interpreted as fishing shrines (Wickler and Tuggle 1996: 157). Other important features in the religious or ideological realm are burials. Burials in `Ewa are commonly found in settlement areas (Charvet-Pond and Davis 1992; Tuggle and Tomonari-Tuggle 1994: 154). In these burials, individuals were placed beneath overhangs of sinkholes, buried inside sinkholes, or placed within platforms.

The settlement chronology for the project area can be explained within more general models for the Hawaiian Islands. Initial settlement of the archipelago targeted areas with abundant natural resources, expansion to marginal ecological areas occurring some time later. This period of expansion is expected to have included settlement of the project area. Data from sediment cores suggest that human activity commenced in Hawaii around A.D. 800 (Athens and Ward 1993). Similar activity is found in `Ewa around A.D. 1000 (Athens *et al.* 1997). This date implies a short but measurable time lag between settlement of Hawaii and expansion into marginal ecological zones such as in the project area.

Fortunately, `Ewa has yielded a suite of 178 radiocarbon dates capable of lending to the development of a refined settlement chronology. When plotted in a frequency profile, these radiocarbon dates may be grouped into three temporal units or phases (Tuggle 1997: 16). In this scheme, A.D. 1000 to 1250 refers to "initial settlement," A.D. 1250 to 1400 refers to "rapid expansion," and A.D. 1250 to 1800 refers to "intensive occupation." The number of radiocarbon dates per time period may be interpreted as a reflection of the local population size (Dye 1994; Dye and Komori 1992). However, the quantity of dates is more appropriately interpreted in a general sense as an indication of the intensity of human activity.

RESEARCH METHODS

Inventory survey consisted of 100% pedestrian survey of the approximately 1,000 acre project area including and encircling Pu`u Kapua`i. Survey was accomplished by three persons walking parallel to each other across the landscape through pre-determined transects. All areas where archaeological remains were most likely to occur, including stream valleys and plateau locations, were explicitly surveyed on several occasions.

While no pre-Contact archaeological features were documented during survey, the field crew mapped and recorded the extensive irrigation network and pumping stations spanning the project area. Measurements and descriptions of the features were followed by recording the system on a project area map. Flumes, ditches, dams, pumps, and other water control features were plotted on this map (see Figure 2).

No subsurface testing was required within the project area nor accomplished. No artifacts, soils, or other materials pertinent to the project were recovered or taken back to the SCS, Inc. laboratory for analysis.

Photographic documentation of the historic irrigation networks and pumping stations, project area plants and physiographic features, and general project overview photographs have been cataloged at SCS, Inc. in Honolulu, Hawai`i, some of which have been included in this report.

RESEARCH RESULTS

Archaeological Inventory Survey of the 991 acre project area parcel was performed during the week of 16 March 1998. The 100% pedestrian survey failed to reveal any evidence of traditional utilization of the area. Extensive remains of water transport systems, composed of architectural features such as flumes, dikes, dams, and pumps utilized to secure water for the cultivation of sugarcane, were recorded (see Figure 2; Figures 3, 4, 5, and 6). Included in this complex is a dilapidated wooden building housing steam engine driven pumps near Pumping Station 12 (see Wilcox 1996:106). This irrigation complex was assigned State Site Number 50-80-08-5593. In addition, portions of the Waiahole Ditch System (State site number

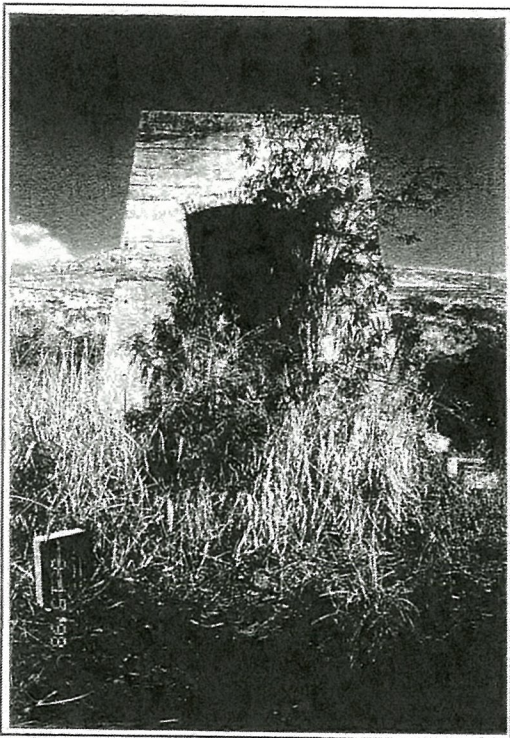


Figure 3: Pump House No. 12. View to Northwest.



Figure 4: Water Pump in Sugarcane Field. View to West.

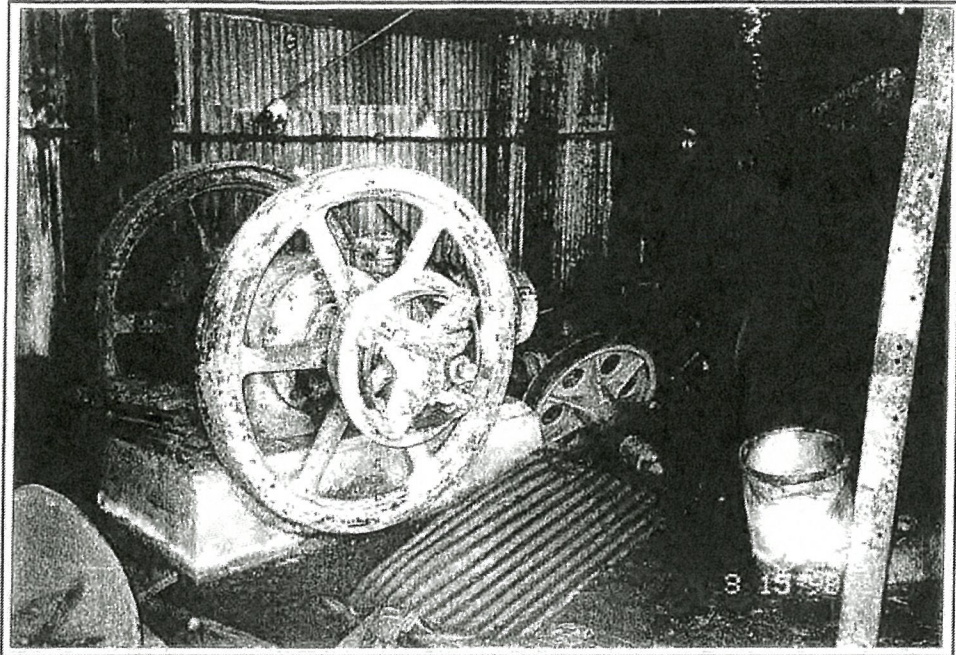


Figure 5: Pumping Machinery at Mill Adjacent to Pump House No. 12. View to North.



Figure 6: Irrigation System Bridge. Note Date of 1928 in Center of Bridge. View to Southeast.

50-80-09-2268), most of the system having been previously reported in Goodman and Nees (1991), were identified within the project area. Thus, a total of two historic sites occur within the project area, portions of the Waiahole Ditch System and a smaller irrigation complex.

No cultural materials from traditional or historic times, beyond recently deposited trash, were noted in the survey area. Land utilization within the project area seems to have reached a discernible maximum of use from the late 1920's and continued through the 1980s, land use being associated with massive cultivation of sugarcane and the remainder being cattle grazing lands. Modern utilization of project area lands included less intensive cultivation of corn and smaller plots containing bell peppers and watermelon. Cattle continue to graze on the upland areas and higher plateaus of the area.

THE WAIAHOLE DITCH SYSTEM AND HISTORIC IRRIGATION NETWORK

The historic irrigation network, designated herein as state site number 50-80-08-5593, is described briefly above as partially containing a complex network of flumes and pumping stations, these features constituting a major water source for the production of sugarcane. Today, the Waiahole ditch, combined with the irrigation network noted above, provides water for irrigating corn and other vegetable plots in lower project reaches.

The Waiahole Ditch system (50-80-09-2268) itself enters the subject property at its northeastern boundary after having crossed the Honouliuli Gulch through a siphon. The ditch was encountered on the western slope of the westernmost gulch which trends north-south through the eastern portion of the property. The major flume crosses the bottom of the gulch through a concrete flume and enters a c. 1000 m long tunnel. A branch within this tunnel is also connected to the Waiahole Ditch System via a more northerly route. This ditch exits the tunnel, crosses the bottom of another smaller gulch through a shorter concrete flume and then enters another tunnel. The ditch follows along the 400 to 440 foot contour in this manner along the eastern and southern slopes of Pu'u Kapua'i and exits the property to the west near Kaloi Gulch. There are, altogether, seven tunnels of various lengths along the ditch within the project area.

The flume itself is 60 cm deep and about 1 m across (Figure 7). The sides of the ditches have been shored with stone masonry. The tunnels are 90 cm wide and about 140 cm high. Cement was used to support the sides and roofs of the tunnels only near the entrances. At greater



Figure 7: Site 2268, a Section of Water Flume. View to Northeast.

depth within the tunnels cement was used only to shore up the walls. The tunnel roofs in these areas consist of bare rock.

Along the south-facing slope of Pu'u Kapua'i there are segments of the ditch which are lined with concrete and smaller segments lined with corrosive metal. Differing channels appear to divert some of the water to the sugarcane fields which occur at and near the base of the slope. There is also a small, rectangular, concrete basin in this area measuring about 12 by 10 m and 2 m deep which perhaps served to store small quantities of water for later diversion downslope.

Site 5593

Also found on the subject parcel are the remnants of a system which appears to have been designed to gather and transport water for local use. This sites includes a network of small concrete troughs c. 45 cm wide and 45 cm high. These were observed along the summit ridge-line to the northeast of Pu`u Kapua`i, from where it entered a ditch system on the lower slopes. Remnant sections of these troughs were also found on the western and southern slopes of Pu`u Kapua`i and within the 38 acre parcel which forms the northeastern corner of the project area. Smaller earthen ditches are found throughout the project area, particularly on the east-facing slope at the northern area of the project. Connections of this system with the Waiahole Ditch system were not observed. Water collected and transported through this system was probably used for local ranch operations, extensive sugarcane cultivation, and small-scale agriculture. Because of the leeward location of this parcel, water would flow into this system almost exclusively during Kona or southerly storms. Thus, a total of eight features comprise Site 5593: metal and cement troughs (2), small earth-lined water transport ditches (4), solely cement constructed ditches or troughs (2) and an area containing large clearing mounds adjacent to the lower agricultural fields (1) (see Figure 2).

Of additional interest is a large wooden building (part of Site 5593), presumably constructed in the late 1920's and utilized through the 1950's, that occurred on the southern flank of Pu`u Kapua`i's base. This structure and associated pumping system, designated as Pump 12 by Wilcox (1996:106), contained steam engine driven pumps. The preponderance of coal within the building and mechanisms observed through the structure allow for the inference that this indeed was a steam-driven pumping station. These steam pumps were likely needed for transport of water to fields as gravity alone was not enough to propel the water into lower `Ewa Plain sugarcane fields. Steam-driven pumps allowed cultivators to propel water into these lower reaches.

DISCUSSION AND CONCLUSIONS

Two phases of research, including pedestrian survey of the project parcel and recordation of historic irrigation network were accomplished during the week of March 16, 1998 at the proposed University of Hawai`i, West O`ahu Campus, `Ewa District, Island of O`ahu. Survey

and mapping of the approximately 1,000 acres only revealed a historic-period irrigation system (Site 5593) designed to provide water for cultivating sugarcane crops in lower (southern) reaches. No associated artifacts or traditional artifacts were recovered during the survey and mapping phases.

HISTORIC IRRIGATION SYSTEM-SITE 5593

The O`ahu Sugar Company was established in 1897 on the "fertile but dry `Ewa Plain", these lowlands irrigated from the Pearl Harbor aquifer (Wilcox 1996:98). Wilcox (1996:98) further states that this method of irrigation was much too costly an endeavor and the plantation was forced to look for a cheaper source, notably, from the mountains. The nearest source was in the Windward Ko`olau Mountain Range. Water from this area was carried through what was to be known as the Waiahole Ditch. Later, when the tunnel was completed, high-level groundwater ran into the ditch system and traveled by pipe and inverted siphon to Kunia and Ewa (Wilcox 1996:100). Pump Station 12 was located within the southern bounds of the project area (see Wilcox 1996:106) and an accompanying, adjacent, historic-period wooden, pumping station housing steam-driven pumps. Ironically, while the Pearl Harbor aquifer pumps were abandoned due to costs, the stream-driven pumps were later brought in to supplement ground water and water flowing from the Waiahole Ditch system, the remains of which are the pumping station itself and the dilapidated building.

By 1931, the `Ewa Plantation had "70 artesian and 4 surface wells with 18 pumps. . . its groundwater use, combined with that of Oahu Sugar Company and Honolulu Plantation, amounted to over 200 mgd from the Pearl Harbor aquifer to irrigate sugar on the Ewa Plains. The comparatively small amount of water from Waiahole supplemented this, a reminder of sugars' endless thirst" (Wilcox 1996:107).

Wilcox (1996:46) notes that the `Ewa Plantation Company, owned by Castle and Cooke, cultivated sugarcane in the `Ewa area from the 1920's through 1970. In 1970, the land was merged with the O`ahu Sugar Company, an Amfac investment, and production of extensive sugarcane ceased between 1990 and 1996. Explaining the reason why these plantations expired through the 1980's, Wilcox states that "neither of these had an extensive surface-water supply system" that would provide a less expensive investment for sugarcane cultivation. The irrigation system and remnants documented during the present inventory survey constitute a portion of the large `Ewa Plains system and by extension, is tied with the Waiahole Ditch system.

SETTLEMENT PATTERN

While many traditional activities occurred near the 'Ewa coastlines through time, few of these activities were expanded to more upland areas such as the present project area. The project area discussed here appears to contain only post-Contact sites relating exclusively to commercial agricultural interests. Following a traditional model of *ahupua`a* resource zones, it was expected that a majority of archaeological sites occur near the coast in the form of habitation (temporary) and religious structures as well as aquacultural components such as fishponds. This has been shown to be the case from past investigations of coastal areas along the 'Ewa Plain (see Davis 1990a, Wolforth 1998). Pre-Contact agricultural sites have been reported on the 'Ewa Plain though, Wolforth (1998) reportedly identifying burial pondfield horizons near the West Loch of Pearl Harbor. A majority of agricultural sites related to 'Ewa District itself are located along the Pearl Harbor coastline. Following traditional settlement models, most temporary habitation would occur near coastal areas, habitation and formal architecture on the 'Ewa Plain decreasing as topography and resources decreases toward the uplands. As was evident through the present survey, no traditional architecture nor artifact clusters were recovered from the upland Pu`u Kapua`i area.

It was proposed that little evidence related to traditional upland habitation and/or use would be recovered during survey and such was the case. Like other *ahupua`a*, these upland reaches, particularly just above the scorched 'Ewa Plain, would have been utilized during traditional times on a temporary basis. While the present survey failed to reveal any faunal catchments or evidence of temporary occupation, it is still proposed that activities such as gathering natural resources, including hunting birds, may have been practiced in the area. Further upland from the project area includes expanded natural resources, including arboreal resources, available for exploitation and by extension, temporary use of the area.

The *Ahupua`a* of Honouliuli, as seen from previous and present research, indicates that a majority of traditional activities occurred near the shoreline, with a fall-off in activities and associated structures in more upland regions of the *ahupua`a*.

SIGNIFICANCE ASSESSMENT

A total of two historic complexes, designated as Site 50-80-09-2268 (Waiahole Ditch System) and Site 50-80-08-5593 (historic irrigation network), were identified within the Honouliuli Ahupua`a project area during present investigations. The Waiahole Ditch System has previously been assessed as significant (see Goodman and Nees 1991). The historic-period irrigation network or complex (Site 5593) was evaluated for significance according to the broad criteria established for the State and National Register of Historic Preservation. The five criteria include the following:

- A Site is associated with events that have made a significant contribution to the broad patterns of our history.
- B Site is associated with the lives of persons significant in our past.
- C Site is an excellent site type; it embodies distinctive characteristics of a type, period or method of construction, or represents work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual construction.
- D Site has yielded or has the potential to yield information important in prehistory and history.
- E Site has cultural significance; probable religious structures or burials present.

Site 5593, the historic irrigation complex suggested herein to have been associated with sugarcane activities initiated during the late 1920s and continuing through the early 1990s, has been assessed as significant under criterion A. As a majority of land utilization in the project area corresponds to sugarcane production and this site facilitated this production, the importance of the overall irrigation network should be realized. This report has suggested that the historic irrigation complex (Site 5593) was constructed and utilized between the 1920s through more recent times, thus representing a large portion of history associated with the `Ewa Plain.

Site 5593 has also been assessed as significant under criterion D as the site has yielded information important for understanding the culture history of the `Ewa Plain and by extension, the areas adjacent to Pu`u Kapua`i. Important information gleaned from the site is historical in nature. The utilization of this enigmatic area, again, is important to the historical sequence of the `Ewa Plain and less general, to the relationship between the `Ewa Plain and the smaller uplands below the Wai`anae Mountain Range.

RECOMMENDATIONS

Since sufficient data has been collected from Site 5593, the site is considered no longer significant and the development of the property may proceed as planned. No further archaeological work is required for this project area.

REFERENCES CITED

- Albert, R.W.
1981 Appendix III: A Study of the Wartime History of Camp Malakole, 1950-1956. In *Archaeological and Paleontological Investigation at Kalaeloa (Barber's Point), Honouliuli, 'Ewa, O'ahu, Federal Study Areas 1a and 1b, and State of Hawaii Optional Area 1*. Report prepared for U.S. Army Corps of Engineers by Archaeological Research Center Hawaii, Inc., Lawa'i.
- Athens, J.S. and J. Ward
1993 Environmental Change and Prehistoric Polynesian Settlement in Hawaii. *Asian Perspectives* 32: 205-223.
- Athens, J.S., J. Ward, and H.D. Tuggle
1997 *Environment, Vegetation Change, and Early Human Settlement on the 'Ewa Plain: Paleoenvironmental Investigations*. Report prepared for Belt Collins Hawaii by International Archaeological research Institute, Inc., Honolulu.
- Charvet-Pond, A. and B.D. Davis
1992 *Volume I: West Beach Data Recovery Program, Phase 4 - Archaeological and Paleontological Excavations, Ko Olina Resort, Land of Honouliuli, 'Ewa, Island of O'ahu*. report prepared for West Beach Estates by Paul H. Rosendahl, Ph.D., Inc., Hilo.
- Collins, S.L.
1990 Technical Report 4: Analysis of Vertebrate Remains from Barbers Point, Southwestern O'ahu. In *Archaeological and Paleontological Investigations at the Barbers Point Deep Raft Harbor, 'Ewa, O'ahu*, edited by P. L. Cleghorn and B.D. Davis. Final report prepared for Army Corps of Engineers, Pacific Division, Honolulu by Applied Research Group, Bishop Museum, Honolulu.
- Culliney, J.C.
1988 *Islands in a Far Sea: Man and Nature in Hawaii*. Sierra Club Books, San Francisco.
- Davis, B.D.
1990a *Human Settlement in Pristine Insular Environments: A Hawaiian case Study from Barbers Point, Southwestern O'ahu*. Ph.D. dissertation, Department of Anthropology, University of Hawaii, Honolulu.
1990b Appendix II: Archaeological Site Descriptions. In *Archaeological and Paleontological Investigations at the Barbers Point Deep Draft Harbor, 'Ewa, O'ahu*, edited by P. L. Cleghorn and B.D. Davis. Final report prepared for U.S. Army Corps of Engineers, Pacific Division, by Applied Research Group, Bishop Museum, Honolulu.

- Denfeld, D.C.
 1995 Appendix B: History of Naval Air Station, Barbers Point, and Survey of Cold War Facilities. In *A Cultural Resource Inventory of Naval Air Station, Barbers Point, O'ahu, Hawaii: Part I: Phase I Survey and Inventory Summary*, edited by H.D. Tuggle and M.J. Tomonari-Tuggle. Report prepared for Belt Collins Hawaii by International Archaeological Research Institute, Inc., Honolulu.
- Dye, T.
 1994 population Trends in Hawaii before 1778. *Hawaiian Journal of History* 28: 1-20.
- Dye, T. and E. Komori
 1992 A Pre-censal Population History of Hawaii. *New Zealand Journal of Archaeology* 14: 113-128.
- Emerson, N.D.
 1978 [1915] *Pele and Hiiaka: A Myth from Hawaii*. Charles E. Tuttle, Rutland.
- Fitzpatrick, G.L.
 1986 *The Early Mapping of Hawaii*. Editions Unlimited, Honolulu.
- Fornander, A.
 1916-1920 [1880s] *Fornander Collection of Hawaiian Antiquities and Folk-lore*.
 Memoirs of the Bishop Museum, Vols. IV-VI. Bishop Museum Press, Honolulu.
- Franklin, L.J., S.T. Goodfellow, and W. Wulzen
 1995 Data Analysis. In *Volume I: West Beach Data Recovery Program, Phase 4 - Archaeological and Paleontological Excavations, Ko Olina Resort, Land of Honouliuli, Ewa, Island of Oahu*, by A. Charvet-Pond and B.D. Davis. Report prepared for West Beach Estates by Paul H. Rosendahl, Ph.D., Inc., Hilo.
- Goodman, W., and R. Nees
 1991 Archaeological Reconnaissance and Inventory Surveys of 3,500 Acres in Waiawa Ahupua'a, 'Ewa, O'ahu. On file at State Historic Preservation Office.
- Green, R.C.
 1980 *Makaha before 1880 A.D.* Pacific Anthropological Records 31. Department of Anthropology, Bishop Museum, Honolulu.
- Hammatt, H.H. and W.H. Folk
 1981 *Archaeological and Paleontological Investigation at Kalaeoloa (Barber's Point), Honouliuli, 'Ewa, O'ahu, Federal Study Areas 1a and 1b, and State of Hawaii Optional Area 1*. Report prepared for U.S. Army Corps of Engineers by Archaeological Research Center Hawaii, Inc., Lawa'i.

Hammatt, H.H. and D.W. Shideler

- 1995 *Data Recovery Plan for Archaeological Sites in the Proposed Barbers Point Expansion Area*. Prepared for the Estate of James Campbell by Cultural Surveys Hawaii, Inc., Kailua.

Hommon, R.J.

- 1969 An Interim Report on Archaeological Zone 1. In *Makaha Valley Historical Project, Interim Report No. 1*, edited by R.C. Green, pp. 41-53. Pacific Anthropological Records 4. Department of Anthropology, Bishop Museum, Honolulu.

Ōi, J.P.

- 1963 [1869] *Fragments of Hawaiian History*. Bishop Museum Press, Honolulu.

James, H.F., T.W. Stafford, D.W. Steadman, S.L. Olson, P.S. Martin, A.T. Jull, and P. McCoy

- 1987 Radiocarbon Dates on Bones of Extinct Birds from Hawai'i. *Proceedings of the National Academy of Science* 84: 2350-2354.

James Campbell Estate

- n.d. James Campbell and the Campbell Estate. Unpublished manuscript, Hawaii State Archives, Honolulu.

Kamakau, S.M.

- 1964 [1866-1871] *Ka Po'e Kahiko, The People of Old*. Bishop Museum Special Publication 51. Bishop Museum Press, Honolulu.

- 1991 [1865-1869] *Tales and Traditions of the People of Old; Na Mo'olelo a ka Po'e Kahiko*. Bishop Museum Special Publication 94. Bishop Museum press, Honolulu.

Kame'eleihiwa, L.

- 1992 *Native Land and Foreign Desires. Pahea La e Pono Ai?* Bishop Museum Press, Honolulu.

Kelly, M.

- 1991 Appendix A: Notes on the History of Honouliuli. In *An Archaeological Survey of the Naval Air Station, Barber's Point, O'ahu, Hawai'i*, by A.E. Haun. Prepared for Naval Facilities Engineering Command, Pearl Harbor by Applied Research Group, Bishop Museum, Honolulu.

Kirch, P.V.

- 1985 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory*. University of Hawaii Press, Honolulu.

Maly, K.

- 1996 [translation of] *He Mo`olelo Ka`ao no Hi`iaka-i-poli-o Pele. (Ka Hoku o Hawai`i, September 18, 1924 - July 17, 1928).* In *Prefinal Report, Phase II - Intensive Survey and Testing, Naval Air Station, Barbers Point*, by C. O'Hare, T.R. Wolforth, and P.H. Rosendahl. Paul H. Rosendahl, Ph.D., Inc., Hilo.

Manhoff, M. and M. Uyehara

- 1976 *Rockhounding in Hawaii: Our Rocks, Minerals, and Semi-Precious Stones.* Hawaiian Almanac Publishing Company, Honolulu.

McAllister, J.G.

- 1933 *Archaeology of Oahu.* Bishop Museum Bulletin 104. Bishop Museum Press, Honolulu.

Muakami, G.

- 1995 Appendix B: Macroscopic Screening Results of Charcoal Samples from NAS Barbers Point, O`ahu. In *Archaeological Inventory Survey for Construction Projects at Naval Air Station, Barbers Point, O`ahu, Hawaii*, by H.D. Tuggle. Report prepared for belt Collins Hawaii by International Archaeological Research Institute, Inc., Honolulu.
- 1996a Appendix E: Identification of Taxa in Archaeological Charcoal Samples, Barbers Point Naval Air Station Data Recovery. In *Phase II - Intensive Survey and Testing, Naval Air Station Barbers Point*, by C. O'Hare, T.R. Wolforth, and P.H. Rosendahl. Prefinal report prepared for Naval Facilities Engineering Command, Department of the Navy, by Paul H. Rosendahl, Ph.D., Inc., Hilo.
- 1996b Appendix G: Identification of Taxa in Archaeological Charcoal Samples. In *A Cultural Resource Inventory of Naval Air Station, Barbers Point, O`ahu, Hawaii: Part II: Phase II Inventory Survey of Selected Sites*, by S.K. Wickler and H.D. Tuggle. Report prepared for Belt Collins Hawaii by International Archaeological Research Institute, Inc., Honolulu.

Nakuina, E.

- 1990 [1900] *The Wind Gourd of La`amaomao.* Translated by E.T. Mo`okini and S. Nakoa. Kalamaku Press, Honolulu.

O'Hare, C., T.R. Wolforth, and P.H. Rosendahl

- 1996 *Phase II - Intensive Survey and Testing, Naval Air Station Barbers Point.* Prefinal report prepared for Naval Facilities Engineering Command, Department of the Navy by Paul H. Rosendahl, Ph.D., Inc., Hilo.

- Olson, S.L. and H.F. James
1982 *Prodromus of the Fossil Avifauna of the Hawaiian Islands*. Smithsonian Contributions to Zoology No. 365. Smithsonian Institution Press, Washington, D.C.
- Pukui, M.K.
1943 *Ke Awa Lau o Pu'uloa*. Hawaiian Historical Society Report No. 52, Honolulu.
- Pukui, M.K. and S.H. Elbert
1986 *Hawaiian Dictionary*. Revised and enlarged edition. University of Hawaii Press, Honolulu.
- Pukui, M.K., S.H. Elbert, and E. Mo'okini
1974 *Place Names of Hawai'i*. University of Hawaii Press, Honolulu.
- Rosendahl, P.H.
1994 Aboriginal Hawaiian Structural Remains and Settlement Patterns in the Upland Agricultural Zone at Lapakahi, Island of Hawai'i. *Hawaiian Archaeology* 3: 14-70.
- Silva, C.L.
1987 Appendix A: Historical Documentary Research - West Loch Estates Project Area. In *Archaeological Reconnaissance Survey for Environmental Impact Statement, West Loch Estates Golf Course and Park*, by A.M. Dicks, A.E. Haun, and P.H. Rosendahl. Prepared for City and County of Honolulu by Paul H. Rosendahl, Ph.D., Inc., Hilo.
- Sinoto, A.
1976 *A Report on Cultural Resources Survey at Barbers Point, Island of Oahu*. report prepared for Army Corps of Engineers, Pacific Division by Department of Anthropology, Bishop Museum, Honolulu.
- Steadman, D.W.
1989 Extinction of Birds in Eastern Polynesia: A Review of the Record, and Comparisons with Other Pacific Island Groups. *Journal of Archaeological Science* 16: 117-205.

1995 Prehistoric Extinctions of the Pacific Island Birds: Biodiversity Meets Zooarchaeology. *Science* 267: 1123-1130.

- 1997 Extinctions of Polynesian Birds: Reciprocal Impacts of Birds and People. In *Historical Ecology in the Pacific Islands: Prehistoric Environmental and Landscape Change*, edited by P.V. Kirch and T.L. Hunt, pp. 51-79. Yale University Press, New Haven.
- Sterling, E.P. and C.C. Summers
1978 *Sites of Oahu*. Bishop Museum Press, Honolulu.
- Traverse Group
1988 *Natural resources management Plan, Naval Air Station Barbers Point*. Report prepared for the U.S. Navy by Traverse Group, Inc., [location unspecified].
- Tuggle, H.D. and M.J. Tomonari-Tuggle
1994 *Synthesis of Cultural Resource Studies of the 'Ewa Plain. Task 1a: Archaeological Research Services for the Proposed Cleanup, Disposal, and Reuse of Naval Air Station Barbers Point, O'ahu, Hawaii*. Draft report prepared for Belt Collins Hawaii by International Archaeological Research Institute, Honolulu.

1995 *A Cultural Resource Inventory of Naval Air Station, Barbers Point, O'ahu, Hawaii: Part I: Phase I Survey and Inventory Summary*. Prefinal report prepared for Belt Collins Hawaii by International Archaeological Research Institute, Inc., Honolulu.
- Weisler, M. and P.V. Kirch
1985 The Structure of Settlement Space in a Polynesian Chiefdom: Kawela, Moloka'i, Hawaiian Islands. *New Zealand Journal of Archaeology* 7: 129-158.
- Wickler, S.K. and H.D. Tuggle
1996 *A Cultural Resource Inventory of Naval Air Station, Barbers Point, O'ahu, Hawaii: Part II: Phase II Inventory Survey of Selected Sites*. Prefinal report prepared for Belt Collins Hawaii by International archaeological Research Institute, Inc., Honolulu.
- Wilcox, C.
1996 *Sugar Water: Hawaii's Plantation Ditches*. University of Hawai'i Press, Honolulu.
- Wolforth, T.
1998 Buried Pondfields at West Loch, Island of O'ahu. Paper Presented at 11th annual Hawaiian Archaeology Conference Kailua-Kona, Hawai'i.

BENJAMIN J. CAYLTANO
GOVERNOR OF HAWAII



MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

GILBERT COLOMA-AGARAN

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

LOG NO: 21708 ✓
DOC NO: 9806SC02 ✓

June 15, 1998

Mr. Michael Dega, MA
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 777
Honolulu, Hawai'i, 96813

Dear Mr. Dega:

SUBJECT: Chapter 6E-8 Historic Preservation Review of a
Draft Report on an Archaeological Inventory Survey of the
Proposed University of Hawai'i, West O'ahu Campus
Hono'uli'uli, 'Ewa, O'ahu
TMK: 9-2-002: 001 por.; 9-2-004: 005 por.

Thank you for the recent submission of a draft report documenting the results of an archaeological inventory survey of a 998-acre property near Makakilo, O'ahu (An Archaeological Inventory Survey of the University of Hawai'i, West O'ahu Campus, District of 'Ewa, Island of O'ahu, Hawai'i [TMK: 9-2-2: 1 por.; 9-2-4: 5 por.]. 1998. Dega et al.). We provide the following comments.

We believe that the survey was conducted acceptably, with a total of 2 historic sites found: 2268, the Waiahole Ditch, a historic irrigation feature; 5593, a complex of water transport and irrigation features related to 20th century sugar cane production. Before we can accept the report as final, however, we would like to see several minor corrections made. Once we receive these revisions (and they may be submitted on separate pages), we anticipate accepting the report and concluding that the survey was successfully executed.

Should you have any questions, please feel free to call Sara Collins at 587-0013.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

SC:amk

RECEIVED
20 DEC 14 P1:59
DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

JUN 15 1998

EXHIBIT "4"

M. Dega
Page 2

ATTACHMENT I: SPECIFIC COMMENTS ON A REPORT ON THE
INVENTORY SURVEY OF THE PROPOSED WEST O'AHU CAMPUS SITE
SCIENTIFIC CONSULTANT SERVICES, INC.

Research Results

Page 17, Paragraph 2: The Waiahole Ditch system has a SIHP No. (50-80-09-2268) and was previously reported in Goodman & Nees (1991. *Archaeological Reconnaissance and Inventory Surveys of 3,500 Acres in Waiawa Ahupua'a, 'Ewa, O'ahu*). Please add this information and also indicate the location of the site in the project area on Figure 2. Also, could you please provide a summary statement of the numbers and types of features that compose SIHP No. 5593?

Page 18, Figure 7: Is this flume part of SIHP 2268 or 5593?

Page 20, Settlement Pattern: While the project area appears to contain only post-contact sites relating exclusively to commercial agriculture, a couple of additional points should be made in this discussion: (1) Were traditional habitation sites in 'Ewa permanent or temporary? (2) Were agricultural sites of any kind reported in some of the studies you cite? For example, you refer to Wolforth's (1998) recently presented evidence for buried pondfields at the West Loch project area.

Recommendations

General: This section will need to be divided into two, separately headed parts: Significance Assessments and Recommendations.

Page 21, Paragraph 4: In view of the above comments, this section will need to be revised to reflect the presence of two, not one, historic sites in the project area.

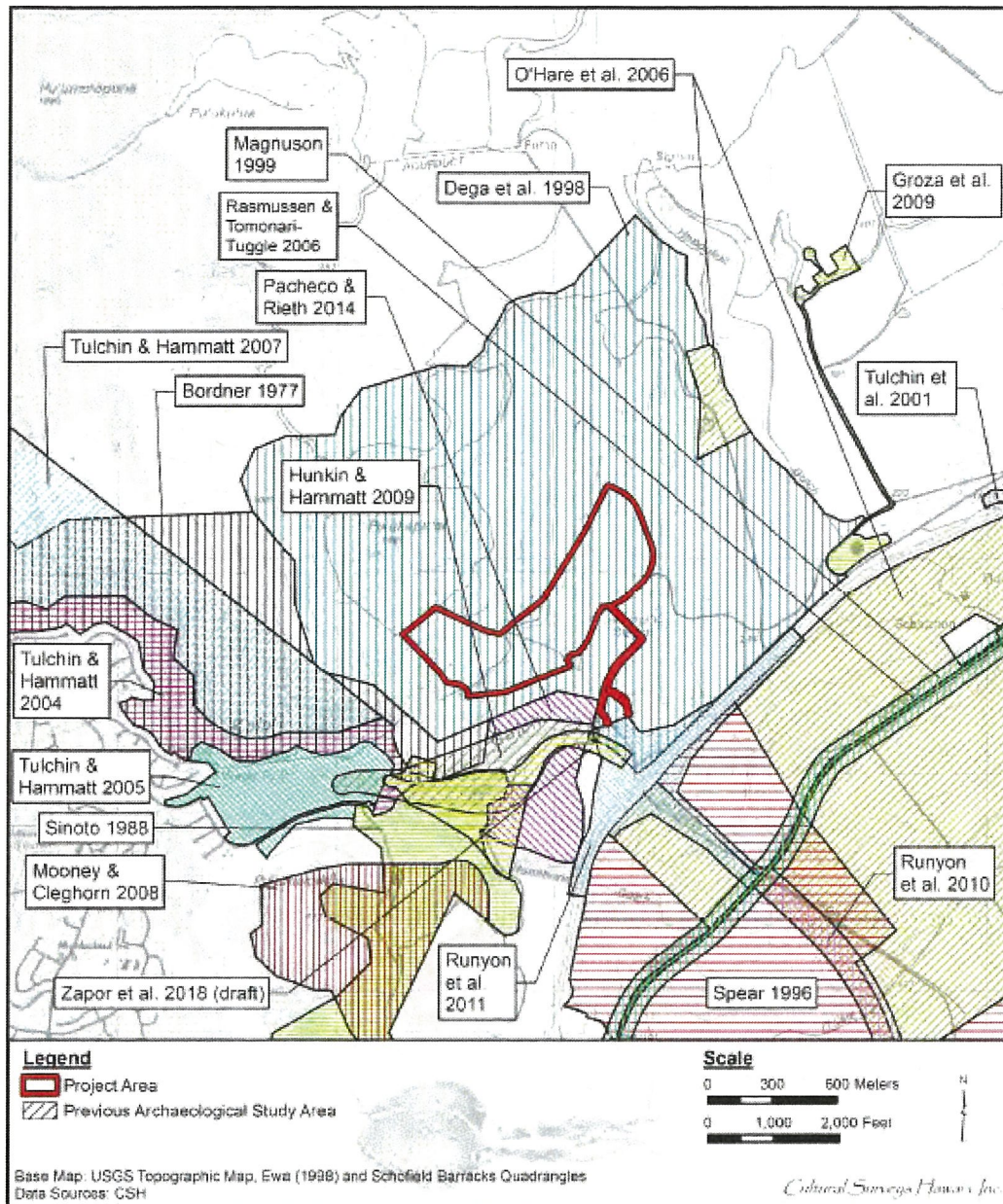


Figure 24. Portion of the 1998 Ewa and Schofield Barracks USGS topographic quadrangles showing the locations of previous archaeological studies in the vicinity (within approximately 1.5 km) of the project area

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
801 Kamohala Boulevard
Kapolei, Hawaii 96707

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
GILBERT COLOMA-AGARAN
TIMOTHY E. JOHNS

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

February 3, 1999

Mr. Michael Dega, MA
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 777
Honolulu, Hawaii 96813

LOG NO: 22959 ✓
DOC NO: 9901EJ28

Dear Mr. Dega:

**SUBJECT: Historic Preservation Review of An Archaeological Inventory Survey of the University of Hawai'i, West O'ahu Campus, District of 'Ewa, Island of O'ahu, Hawai'i (1998 Dega et al.)
Honouliuli, 'Ewa, O'ahu
TMK: 9-2-002:001 por.; 9-2-004:005 por.**

Thank you for the submittal of the replacement pages for the above report which completes the historic preservation review for this project. We can now conclude that the inventory survey was successfully executed. The report has been added to our library for public use.

Should you have any questions, please feel free to call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027.

Aloha,

Don Hibbard, Administrator
Historic Preservation Division

EJ:jk

RECEIVED
20 DEC 14 P 1:59
DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

EXHIBIT "5"

FEB 9 1999

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

20 DEC 14 P1 59

RECEIVED

West O'ahu Solar
Plus Storage Project

PANORAMIC PHOTO
SIMULATION

Representative
Viewpoint 01
Farrington Highway

Existing Conditions



Simulated Conditions



VICINITY MAP

Photograph Information

Time of photograph: 8:40 a.m.
Date of photograph: 11/15/2019
Weather condition: Partly Cloudy
Viewing direction: Northwest
Latitude: 21.368050° N
Longitude: -158.050300° W
Photo Location: The photo was taken from along Farrington Highway approximately 4500 feet southeast of the Project.

EXHIBIT "6"



EXPERIENCE SUMMARY

A senior biologist and natural resources project manager with over 14 years of experience in environmental consulting and natural resource management. Ms. Agostini has extensive experience developing and conducting a broad range of on-the-ground biological surveys and assessments and desktop analyses in various habitats. Her wide-ranging technical and consulting skills include plant identification, ecology, and mapping; threatened and endangered species studies; wetland and Waters of the U.S. determinations and delineations; stream and water quality surveys; impact assessments and resource condition assessments; environmental compliance and planning; extensive literature reviews; data analysis; report preparation; client liaison; agency consultation; and project management. She is experienced in the preparation and implementation of Hawai'i's various regulatory requirements including U.S. Army Corps of Engineers Nationwide Permits, state and federal Habitat Conservation Plans, Endangered Species Act Section 7 Biological Assessments, and Environmental Assessments for Chapter 343 of the Hawai'i Revised Statutes.

EDUCATION

M.S., Botany, University of Hawai'i, Mānoa, 2011

B.A., Urban Studies & Planning/Environmental Science (magna cum laude), University of California, San Diego, 2005

TRAINING

DoD Natural Resource Compliance Course Certification; 2007

First Aid/CPR Training; American Red Cross; 2016

Project Management Bootcamp; PSMJ; 2007

Project Management Training Level 1 and 2, Tetra Tech

Status of the Clean Water Act Training; National Association of Environmental Professionals; 2016

SWCA Comprehensive NEPA Training Course; 2008

Wetlands Delineation and Permitting Training Course Certification; 2010

REPRESENTATIVE EXPERIENCE

West O'ahu Solar Project, AES Renewable Energy, O'ahu, Hawaii; 2019 - present. As lead biologist, Ms. Agostini conducted terrestrial biological surveys and delineated potential Waters of the U.S. for this renewable energy project on O'ahu. She was the primary author of the reports for these surveys. Ms. Agostini played a critical role in consulting with the U.S. Fish and Wildlife Service (USFWS) and Hawai'i Division of Forestry and Wildlife (DOFAW) with regards to potential impacts to threatened and endangered species, and with the U.S. Army Corps of Engineers (USACE) Honolulu District regarding Waters of the U.S.

Paeahu Solar Project, Innergex Renewables USA, LLC, Maui, Hawaii; 2018 – present. As lead biologist, Ms. Agostini conducted botanical surveys and delineated potential Waters of the U.S. for this renewable energy project in Maui County. She was the primary author of the draft reports for these surveys. She led consultation efforts with USFWS and DOFAW with regards to potential impacts to threatened and endangered species. She also led consultation efforts with the USACE regarding potential impacts to Waters of the U.S.

RECEIVED
20 DEC 14 P1:59
DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

Kuihelani Solar Project, AES Renewable Energy, Maui, Hawaii; 2018 – present. As the senior biologist, Ms. Agostini delineated three streams, conducted a wetland assessment, and managed the biological survey crew for this 60-megawatt renewable energy project in central Maui. She was the primary author for survey reports. Ms. Agostini played a critical role in consulting with USFWS and DOFAW with regards to potential impacts to threatened and endangered species, and with the USACE regarding potential Waters of the U.S.

Hale Kuawehi Solar Project, Innergex Renewables USA, LLC, Hawai'i County, Hawaii; 2018 -present. As lead biologist, Ms. Agostini conducted terrestrial biological surveys and assisted with delineation of potential Waters of the U.S. for this renewable energy project in North Kohala, Hawai'i Island. She authored portions of the reports for these surveys and coordinated with the USACE on potential impacts to ephemeral streams.

Mikilua #4 Distribution Relation Project, Hawaiian Electric Company, Mt. Kaala, Hawaii; 2017 – 2020. As Project Manager and biologist, Ms. Agostini assisted the Hawaiian Electric Company with various biological surveys in preparation to potentially relocate a distribution line located at Mt Ka'ala. Ms. Agostini assisted and coordinated the biological surveys for the project and led coordination with USFWS and DOFAW with regards to potential impacts to threatened and endangered species.

Confidential Client, Confidential Renewable Energy Project, Various Hawaiian Islands; 2017 – present. Ms. Agostini has prepared several Critical Issues Analyses, Environmental Assessments, and Permit Assessments for proposed renewable energy projects located throughout the Hawaiian Islands. These included a desktop review of biological resources and wetlands and waters potentially present in the study areas as well as identification of applicable avoidance and minimization measures for threatened and endangered species.

Palehua, Eurus Energy America, O'ahu, Hawaii; 2017 – 2019. Ms. Agostini conducted botanical surveys and avian point count surveys for a proposed wind facility on O'ahu. She assisted with preparing a Critical Issues Analysis and attended public outreach meetings as a subject matter expert.

Compliance Manager, Kawailoa Wind Farm Habitat Conservation Plan, Kawailoa Wind, LLC; 2016 – 2020. Ms. Agostini provided operational compliance support for the Kawailoa Wind Farm regarding the joint Habitat Conservation Plan (HCP) and USFWS incidental take permit (ITP) and DOFAW incidental take license (ITL). She coordinated the post-construction mortality monitoring (PCMM) program which includes overseeing the fatality monitoring schedule; managing searcher efficiency and carcass removal trials; ensuring the proper documentation and reporting protocol is followed; and conducting agency notification and coordination. She is one of the authors of the HCP annual and quarterly reports and participates in semi-annual meetings with USFWS and DOFAW. Ms. Agostini was also one of the authors for the Kawailoa Wind HCP Amendment.

Hawaiki Submarine Fiber Optic Cable Project, TE Subcom, Hawaii; 2016 – 2017. As the Deputy Project Manager, Ms. Agostini assisted with the completion of federal, state, and county permit applications for a subsea fiber optic telecommunications cable project making landfall in Kapolei, O'ahu. She prepared the Preconstruction Notification for a Nationwide Permit 12 authorization from the USACE and the 401 Water Quality Certification Notification for the Hawaii Department of Health. Other tasks included preparation of sections of the Hawaii Environmental Policy Act Environmental Assessment, Special Management Area application, Conservation District Use Permit application, and Shoreline Setback Variance application.

Hawaiian Hawk Surveys for Various Verizon Wireless Projects, Verizon Wireless, Hawaii; 2016. Conducted a literature review of previous relevant endangered Hawaiian hawk (*Buteo solitarius*) surveys in the general vicinity of six potential project sites. Conducted Hawaiian hawk nest surveys within a 1,600-foot radius of two of the six project sites, and provided relevant data, photographs, and recommendations for a final report.

PREVIOUS EXPERIENCE

Natural Resources Team Lead, SWCA Environmental Consultants; Honolulu, Hawaii; 2015 – 2016. Responsible and accountable for a variety of operations, project management activities, and professional development/mentoring to maximize office utilization, client satisfaction, and revenue, in coordination with the Office Director. Initiated and maintained office QA/QC processes to ensure high quality, timely deliverables and client satisfaction within budget. Responsible for development and implementation of cost estimates, scope of work, budgets, subcontractor agreements, environmental permits, schedules, and agency and other stakeholder negotiations. Managed staff productivity and workload to ensure results-oriented projects and project profitability. Authored Biological Assessments and performed both formal and informal Section 7 consultation with the U.S. Fish and Wildlife Service. Oversaw and managed the 5-year implementation of a Habitat Conservation Plan under Hawai'i Revised Statutes Chapter 195D for an endangered Hawaiian plant. Provided jurisdictional determinations and delineations for wetlands and other waters of the United States, as well as permitting support and project coordination with the USACE. Subject Matter Expert for botanical projects, providing expertise and oversight. Oversaw field staff, assistant project managers, and select project managers.

Project Manager, SWCA Environmental Consultants, Honolulu, Hawaii; 2011 – 2015. Started wetlands and Waters of the U.S. service line for Honolulu Office. Prepared scope of work and budgets, and led technical staff, fieldwork, and reports for natural resource projects. Hired technicians and supervised field crews in surveys and data collection. Planned and conducted field research related to plant ecology and native plant restoration. Conducted comprehensive botanical inventories and mapping surveys in varied vegetation types. Conducted data analysis and reporting. Authored Natural Resource Condition Assessments for Hawai'i National Parks which included developing meaningful reference conditions/values, analyzing trends in resource condition, and identifying critical data gaps.

Environmental Specialist, SWCA Environmental Consultants, Honolulu, Hawaii; 2006 – 2011. Co-authored federal and state Environmental Assessments (EA) for wind facility and mixed-use housing developments. Authored Comprehensive Conservation Plans for National Wildlife Refuges (NWR) in the Pacific. Conducted stream surveys to assess impacts of dams, diversions and other barriers to amphidromous native stream animals and stream ecosystem functioning. Developed impact methodologies, summarized existing conditions, impact analysis, and review of and response to public comments. Assisted senior botanist with experimental research project to control invasive grasses at the Marine Corps Training Area at Bellows by collecting pre- and post- treatment botanical measurements using various techniques.

Environmental Field Technician, Pono Pacific, Ecosystem Restoration Services, Kaneohe, Hawaii; 2005 – 2006. Monitored approximately 35 endangered O'ahu elepaio (*Chasiempis sandwichensis ibidis*) territories and collected data on reproductive success, avian disease prevalence, and predator populations. Set up and monitored diphacinone poison stations and snap traps to remove predators and increase populations. Surveyed for listed Hawaiian tree snail populations.

Environmental Intern, City of San Diego Mitigation Monitoring; San Diego, CA; 2005 – 2005. Coordinated field implementation of CEQA documents and development permit conditions during all phases of development (biology, paleontology, air quality, water quality, noise, etc.) Analyzed grading, building, improvement, and planting plans and gave input to project managers, biologists, contractors, and other sections of the City for in the field changes. Performed site observations with biologists and contractors to ensure plants installed per plan and developed punch list for remedial measures. Assisted in drafting the language for the City of San Diego Mitigation Monitoring Reporting Program (MMRP) biology shell and consultant qualification worksheet with two senior planners. Assisted in developing online procedures for landscape inspection requests and performed clerical functions to coordinate city inspections with contractors.

EXPERIENCE SUMMARY

Joshua Burdett is a project manager with more than six years of experience in the environmental consulting and environmental laboratory industries including specific experience in site development and transactional environmental due diligence, active environmental remediation and operations and maintenance of remedial techniques and permitting and managing renewable energy projects. Joshua's environmental consulting experience specifically includes holistic client and project management, solar glare analyses, discretionary and ministerial environmental and engineering permitting, site suitability and critical issues analysis, Phase I and Phase II environmental due diligence, and GIS spatial analysis and mapping. Joshua has managed and/or assisted with more than 80 solar energy projects all across the United States including California, Hawaii, Illinois, Indiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, New York, Ohio, Oregon, and Washington.

EDUCATION

B.S., Chemistry Concentration in Biochemistry, St. John Fisher College, 2014

TRAINING / CERTIFICATIONS

OSHA 1910.120 (e) 8-Hour

Refresher Training, 2019

40-Hour OSHA Hazardous Waste Health and Safety Training, 2017

DOT/HM-126F Hazmat Training, 2017

NYSDEC 4-Hour Division of Water: Erosion & Sediment Storm Water Training, 2017

ONLC Training Centers AutoCAD Essentials, 2018

Tetra Tech Project Management Level 1, 2019

Tetra Tech Project Management Level 2, 2019

RECEIVED
20 DEC 14 P1:59
DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

REPRESENTATIVE EXPERIENCE

Solar Energy Glint and Glare Analysis Services, Multiple Clients; California, Hawaii, Illinois, Indiana, Maryland, Michigan, Minnesota, New York, Ohio, Oregon, Texas, and Washington. Performed over 50 glint and glare analyses in several different states for confidential solar clients as part of the environmental permitting and risk assessment processes using the Solar Glare Hazard Analysis Tool (SGHAT) technology developed by Sandia National Laboratories and recommended by the Federal Aviation Administration (FAA). Produced several technical reports summarizing the quantity, intensity and estimated occurrences of glare at defined receptor locations including federally-obligated airport runways. Filed and monitored projects through analysis with the FAA Obstruction Evaluation Group pursuant to CFR Title 14 Part 77.9.

Solar Energy Permitting Management, Distributed Solar Development, Maryland and Massachusetts. Project and client manager for over 20 solar site permitting efforts in Maryland, eastern Massachusetts and Cape Cod. Managed the development of preliminary desktop environmental critical issues analyses, environmental due diligence, discretionary permitting packages, stormwater analyses, and local regulatory communication efforts for solar development projects. The projects were located on two closed municipal landfills, three telecommunications developed parcels, several solar canopies on existing parking lots, and one greenfield ground-mount system.

Solar Energy Construction Civil and Stormwater Design, Signal Energy, Illinois, Massachusetts and New York.

Project and client manager for construction civil engineering, stormwater design, construction surveying, and construction permitting at over 15 ground-mount solar energy projects in Illinois, one ground-mount project in Massachusetts, and two ground-mount projects in New York. The provided services included preparation of civil engineering drawings for construction, Storm Water Pollution Prevention Plans (SWPPPs), submittal of Notices of Intent (NOI), coordination for construction surveying and communications and permitting efforts with local regulatory agencies.

Solar Energy Permitting Review and Risk Assessment Services, Clearway Energy Group, Illinois.

Conducted permitting document reviews on approximately 40 solar energy sites in Illinois at various stages of their respective permitting processes to identify and qualify potential portfolio purchase risk. Document reviews included site plan applications, cultural and natural resource management, civil engineering layouts, FAA reviews, etc. Assessed project risks due to environmental conditions, engineering measures, and permitting status and provided risk levels and potential risk mitigation measures to the client.

Post Construction Inspection Management, Soltage, Massachusetts. Project and client manager for post construction compliance inspections at three solar energy projects on closed landfills in Massachusetts. The provided services include, post construction monitoring, report preparation, client communication, and Massachusetts Department of Environmental Protection (MassDEP) communication.

Solar Energy Environmental Permitting Services, Confidential Clients, New York. Assisted in the preparation of a Public Involvement Plan, Preliminary Scoping Statement and Article 10 Application to the New York State Board on Electric Generating Siting and the Environment (NYS Siting Board) pursuant to the New York State Public Service Law (PSL) §164 and 16 New York Codes, Rules and Regulations (NYCRR) §1000.6. Prepared Exhibits, Glare Analysis and technical report, and assisted in the preparation of several figures and maps using GIS spatial analysis.

Solar Development Feasibility, Summit Ridge Energy, Massachusetts, Illinois, and Maryland. Prepared or assisted in approximately 22 Phase I ESAs, SSAs, natural resource consultations, and constraints mapping for the design of approximately 40 MW of solar capacity in northern and southwestern Illinois. Prepared discretionary permit applications for two solar projects in Maryland including permitting assistance on the Prince George's County Mandatory Referral Process. In addition, provided consultation and permit assistance for eight solar projects in central Massachusetts.

Wetland Delineation/Phase I Site Reconnaissance, Conti Enterprises, New York. Assisted with wetland delineation services and performed the site reconnaissance visits for eight potential utility scale solar projects in upstate New York. Input GPS data into ArcGIS Collector in order to map wetland boundaries and potential areas of Recognized Environmental Conditions (RECs, as they pertain to ASTM Practice E1527-13).

Environmental Due Diligence Services, AES Distributed Energy, Massachusetts. Prepared or assisted on three Phase I ESAs for current solar energy facilities as part of a potential real estate acquisition. Conducted comprehensive reviews of historical documentation of the properties, searched for recorded environmental cleanup liens including a review of federal, tribal, state and local government records and determined potential RECs at the properties.

Solar Energy Environmental Permitting Services, Greenwood Energy, Florida, New York, Vermont. Assisted with permitting certification evaluations for six ground-mounted solar energy projects. Three of the projects are located on Brownfields (one Superfund site, one ash landfill, and one utility-owned Brownfield).

EXPERIENCE SUMMARY

Ms. Chester has more than 20 years of experience in environmental resource and utility planning projects. Technical skills include geographic information systems (GIS), cartographic and graphic design, remote sensing, visual simulations, natural and cultural resource mapping, and AutoCAD. Ms. Chester is also a Senior Project Manager with extensive experience in leading project teams and working with clients to execute successful projects. Ms. Chester applies her skills to a variety of energy projects including generation and transmission work, specializing in energy facility routing and siting and permitting.

EDUCATION

Bachelor Science, Environmental Science, 2000

AREAS OF EXPERTISE

- Visual impact assessment
- Geographic Information Systems
- Spatial analysis, routing/siting, utility project permitting

REPRESENTATIVE EXPERIENCE

Visual Impact Assessment Coordinator, Various Offshore Wind/Solar/Electric Substation and Transmission Line Projects. Visual impact assessment coordinator responsible for completion of viewshed analysis, line of sight creation, field work, visual impact assessment, visualizations such as simulations, and public outreach materials. Extensive experience with controversial projects, agency coordination, and strategic and creative thinking on visual issues associated with projects. Project locations in New York, Colorado, Hawai'i, Ohio, Kentucky, Kansas, Texas, Oklahoma, offshore Atlantic Coast from Massachusetts to North Carolina.

Greene County Solar Facility, Hecate Energy Greene 1 LLC, Hecate Energy Greene 2 LLC, and Hecate Energy Greene County 3 LLC, New York. Hecate is proposing to construct the Greene County Solar Facility, an approximately 50-megawatt photovoltaic solar facility in Greene County New York. Ms. Chester and the Tetra Team developed the visual impact assessment and associated Article VII exhibit in support of project permitting. consulted with NYSDPS prepared the acoustic assessment for the project. The work included development of visibility studies, identification of potentially sensitive visual resources, photographic simulations, line of sight analysis, systematic review of potential project effects.

Coeymans Solar Farm, Hecate Energy Albany 1 LLC and Hecate Energy Albany 2 LLC, New York. Hecate is proposing to construct the Coeymans Solar Farm a 40-megawatt photovoltaic solar facility in Albany County, New York. Ms. Chester and the Tetra Team developed the visual impact assessment and associated Article VII exhibit in support of project permitting. consulted with NYSDPS prepared the acoustic assessment for the project. The work included development of visibility studies, identification of potentially sensitive visual resources, photographic simulations, line of sight analysis, systematic review of potential project effects.

Empire Offshore Wind Project, Equinor, New York and New Jersey. Equinor proposes to construct and operate an offshore wind facility located in the designated lease area and is located approximately 22 km south of Long Island, New York and 31.4 km east of Long Branch, New Jersey. The offshore infrastructure will consist of wind turbines, foundations, offshore substations, interarray and submarine export cables, and

RECEIVED
 20 DEC 14 P1:59
 DEPT OF PLANNING
 AND PERMITTING
 CITY & COUNTY OF HONOLULU

scour protection. Onshore infrastructure will be constructed at cable landfall locations. Tetra Tech completed a comprehensive visual impact assessment for onshore and offshore project facilities in support of the Construction and Operations Plan submittals. Work included development of viewshed analysis, identification of sensitive visual resources across several states, field visual inventories, photo simulations, and systematic evaluation of potential project effects.

Bay State Offshore Wind Project, Ørsted, Massachusetts. Ørsted proposes to construct and operate an offshore wind facility located in the designated lease area approximately 14 miles of the southern coast of Martha's Vineyard, MA. The offshore infrastructure will consist of wind turbines, foundations, offshore substations, interarray and submarine export cables, and scour protection. Onshore infrastructure will be constructed at cable landfall locations. Tetra Tech completed a comprehensive visual impact assessment for onshore and offshore project facilities in support of the Construction and Operations Plan submittals. Work included development of viewshed analysis, identification of sensitive visual resources across several states, field visual inventories, photo simulations, and systematic evaluation of potential project effects.

Emerson Creek Wind Farm Transmission Interconnection, Apex Wind Energy, Ohio. Apex Wind Energy (Apex) proposed the single-circuit, 230-kV Emerson Creek Wind Farm transmission line interconnection as a means to deliver power from the Emerson Creek Wind Farm in north-central Ohio to load centers in the region. Apex contracted Tetra Tech to perform an opportunities and constraints analysis and a detailed routing study to identify preferred and alternative transmission line routes for the purposes of interconnecting the wind farm with the electric transmission grid. As part of the routing study, Tetra Tech collected resource data, performed an opportunity and constraints analysis, participated in a windshield level field reconnaissance, and analyzed the alternative transmission line routes in a comparative matrix. The routing study identified preferred and alternative transmission line routes, to be submitted by Apex to the Ohio Power and Siting Board as part of their permitting requirements.

Tri-State Generation and Transmission Association, Inc., Various Projects, Colorado, New Mexico, Wyoming, Nebraska. Tetra Tech provided cultural, biological, permitting, and visual resource services for several projects across Tri-State's service territory in Wyoming, Colorado, and New Mexico. Projects included: La Jara – San Ysidro 115-kV Transmission Line, Structure 447 Vehicle Access Project, Lazy Dog Delivery Point, Gateway Delivery Point, Pierce Switching Station, Boyd Substation Shoo-Fly, Lyons Substation Improvement Project, and San Luis Valley and Poncha cultural investigations. For these projects, Tetra Tech completed biological resource assessments (noxious weeds, wetlands and water of the U.S., special status species habitat assessment), special status species surveys including burrowing owls and raptors, wetland delineation, cultural resources review and pedestrian surveys, visual impact assessment, landscape screening plan development, and photographic simulations.

Plains & Eastern Transmission Line Environmental Impact Statement, Plains and Eastern Clean Line, LLC, and U.S. Department of Energy, Oklahoma, Arkansas, Tennessee. GIS Manager for a third-party contract with Plains and Eastern Clean Line, LLC and U.S. Department of Energy (DOE) for the Environmental Impact Statement (EIS) for the Plains & Eastern Project. Services provided include preparation for and attendance at 13 public scoping meetings, preparation of a public scoping summary report, development of a project website, review of alternative transmission line routes, and review of applicant prepared technical reports, assisting DOE with cooperating agency and Section 106 consultation, and preparation of the Draft EIS and administrative record. The six cooperating agencies included the U.S. Bureau of Indian Affairs, U.S. Department of Agriculture, Natural Resources Conservation Service, Tennessee Valley Authority, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and U.S. Fish and Wildlife Service.

Thornton Substation, Public Service Company of Colorado/Xcel Energy, Colorado. Tetra Tech is providing siting/routing, public outreach, and land use permitting support for a new substation and associated underground transmission line in the City of Thornton and Adams County, Colorado. Tetra Tech is also providing construction drawing support for the site civil engineering work and landscape architecture design. Tetra Tech has developed permit applications, visual simulations, public meeting materials and notifications, website design, provided general project support, and assisted in strategy development for the project.

Lazy Dog Substation, United Power & Tri-State Generation and Transmission Assoc., Inc., Colorado. Project manager for a new greenfield substation development project. Tetra Tech performed biological and cultural resource surveys, development of three concurrent land use applications including visual simulations, and is providing ongoing project support, including avian nest monitoring prior to and during construction.

Palmetto Express Pipeline (Mountain Valley), Equitrans, L.P., Virginia and West Virginia. Routing Lead for the Palmetto Express Pipeline project routing study and fatal flaw analysis. Assisted in development of the siting study for the natural gas pipeline route including identification of opportunity and constraint criteria, coordination of collecting and mapping and analysis of over 150 layers of vector and raster GIS data from federal, state, and local private and public agencies. Identified alternative routes and route evaluation criteria and presented to the client team and conducted analysis for Critical Issues Analysis report.

Project Manager Working for Tri-State Generation & Transmission Association, Inc., Colorado, Wyoming, New Mexico. Project manager for a variety of greenfield substation development projects, new transmission line development, and maintenance and replacement project work across a multi-state service territory. Responsibilities included project initiation and coordination with member cooperatives and customers, contract development, cost estimate coordination, routing and site review, permitting, and construction tracking through project energization. Projects included two solar interconnections in the San Luis Valley and southeastern areas of Colorado.

EXPERIENCE SUMMARY

Mr. Dadswell has 25 years of experience conducting economic and social impact analysis and preparing EIS and EA documents for energy and natural resource management projects throughout the United States. Specific project experience includes renewable energy projects, transmission lines, and pipelines; hydroelectric facilities; federal land management; military base closures; and port developments. The following projects highlight his recent experience preparing economic and fiscal impact analyses for utility-scale renewable energy projects.

EDUCATION

PhD Candidate, Geography, 1995 to 1997, University of Washington

MA, Geography, 1990, University of Cincinnati

BA, Economics and Geography, 1988, Portsmouth Polytechnic, England

SELECTED PROJECT EXPERIENCE

AES Distributed Energy, Kuihelani, West Oahu and Waikoloa Solar Plus Storage Projects, Various Counties, HI (2020). Estimated the economic impacts of three utility-scale ground-mounted solar photovoltaic and battery energy storage projects being developed on Maui, Oahu, and Hawaii Island. Assessed the regional economic impacts of construction and operation of each proposed facility in terms of employment, labor income, and economic output using the IMPLAN economic modeling package. Impacts were assessed at the state level.

Hecate Energy, Greene County Solar Facility, Greene County, NY (2019). Evaluated the economic and fiscal impacts of a 50-megawatt solar photovoltaic electric generating facility proposed in Greene County, New York. Assessed the regional economic impacts of construction and operation of the proposed facility in terms of employment, labor income, and economic output using the IMPLAN economic modeling package. Impacts were estimated separately at the local (Greene County) and state level.

ConnectGen, Economic and Fiscal Impact of the Rail-Tie Wind Project, Albany County, WY (2019). Evaluated the economic impacts of a proposed 500 MW wind energy project to be constructed in two phases in Albany County, Wyoming. Estimated total (direct, indirect, and induced) economic output, employment, and labor income at the county and state levels using a modified version of the DOE National Renewable Energy Laboratory's Jobs and Economic Development Impact (JEDI) Land-based Wind Model (JEDI Wind model) and data obtained from IMPLAN. Estimated local and state tax revenues that would be expected to accrue as a result of Project construction and operation.

Hecate Energy, Hecate Solar Energy Center, Albany County, NY (2019). Evaluated the economic and fiscal impacts of a 40-megawatt solar photovoltaic electric generating facility proposed in Albany County, New York. Assessed the regional economic impacts of construction and operation of the proposed facility in terms of employment, labor income, and economic output using the IMPLAN economic modeling package. Impacts were estimated separately at the local (Albany County) and state level.

Avangrid Renewables, Inc., Economic Impact Study of the La Joya Project, Tarrant County, NM (2018). Evaluated the economic impacts of a proposed 500 MW wind energy project to be constructed in two phases in Tarrant County, New Mexico. Estimated total (direct, indirect, and induced) economic output, employment, and labor income at the state level using a modified version of the DOE National Renewable Energy Laboratory's JEDI Wind model and data obtained from IMPLAN. Modified the JEDI Wind and Transmission Line models to incorporate detailed actual construction data from a nearby similar project.

Lendlease Energy Development LLC, Economic and Fiscal Impact of Nestlewood Solar, Clermont and Brown Counties, OH (2018). Evaluated the economic and fiscal impacts of a proposed 80-MW solar photovoltaic electric generating facility in Clermont and Brown Counties, Ohio. Estimated total (direct, indirect, and induced) economic output, employment, and labor income using a modified version of the DOE National Renewable Energy Laboratory's JEDI Photovoltaics (PV) model. Estimated tax revenues that would be expected to accrue as a result of Project construction and operation.

Seneca Wind LLC, Economic and Fiscal Impact of Seneca Wind, Seneca County, OH (2018). Evaluated the economic and fiscal impacts of a proposed 212 MW (85 turbines) wind energy project in Seneca County, Ohio. Estimated total (direct, indirect, and induced) economic output, employment, and labor income at the county and state levels using a modified version of the DOE National Renewable Energy Laboratory's JEDI Wind model and data obtained from IMPLAN. Estimated tax revenues that would be expected to accrue as a result of Project construction and operation.

Rocky Mountain Power, Gateway West Transmission Line Project Wyoming Industrial Site Permit Application, Multiple Counties, WY (2017 to 2018). Prepared the social and economic impact assessment for the Gateway West Project in Carbon and Sweetwater counties. Addressed impacts to population, economic and fiscal conditions, housing, municipal services, fire protection and law enforcement, education, health care, and human services. Estimated regional economic impacts using a multi-county IMPLAN model. Developed estimates of the property and sales and use taxes associated with construction and operation of the proposed facility. Assessed the availability of labor and impacts to housing and other local and regional socioeconomic resources.

NextEra Energy Resources, LLC, Economic and Fiscal Impact Study for the Chicot Solar Energy Project, Chicot County, AR (2017). Evaluated the economic and fiscal impacts of a proposed 100 megawatt (MW) solar photovoltaic project on approximately 860 acres of private land in Chicot County, Arkansas. Assessed the regional economic impacts of construction and operation of the proposed facility in terms of employment, labor income, and economic output using the IMPLAN economic modeling package. Impacts were estimated separately at the local (Chicot County) and state level. Estimated local and state tax revenues that would be expected to accrue as a result of Project construction and operation.

NextEra Energy Resources, LLC, Economic Impact of the Pratt Wind Energy Project, Pratt County, KS (2017). Evaluated the economic impacts of a proposed 220 MW (96 turbines) wind energy project and 15-mile electric transmission line in Pratt County, Kansas. Estimated total (direct, indirect, and induced) economic output, employment, and labor income at the county and state levels using a modified version of the JEDI Wind model and data obtained from IMPLAN.

NextEra Energy Resources, LLC, Economic and Fiscal Impact Study for the Stuttgart Solar Energy Project, Arkansas County, AR (2016). Evaluated the economic and fiscal impacts of a proposed 81 megawatt (MW) solar photovoltaic project on approximately 475 acres of private land in Arkansas County, Arkansas. Assessed the regional economic impacts of construction and operation of the proposed facility in terms of employment, labor income, and economic output using the IMPLAN economic modeling package. Impacts were estimated separately at the local (Arkansas County) and state level. Estimated local and state tax revenues that would be expected to accrue as a result of Project construction and operation.

Ninnescah Wind Energy LLC, Economic Impact of the Ninnescah Wind Energy Project, Pratt County, KS (2015). Evaluated the economic impacts of a proposed 209 MW (121 turbines) wind energy project and 60-mile electric transmission line in Pratt County, Kansas. Estimated total (direct, indirect, and induced) economic output, employment, and labor income at the county and state levels using a modified version of the JEDI Wind model and data obtained from IMPLAN.

Plains and Eastern Clean Line, LLC, and U.S. Department of Energy, Plains & Eastern Transmission Line NEPA EIS, TX, OK, AR, TN (2013 to 2015). Evaluated the social and economic impacts of a 700 mile, overhead 600-kV high voltage direct current (HVDC) electric transmission system and associated facilities. The proposed transmission line and facilities cross 33 counties in four states (Texas, Oklahoma, Arkansas, and Tennessee). Assessed the availability of labor and impacts to housing and other local and regional socioeconomic resources. Estimated regional economic impacts using multipliers derived from the U.S. Bureau of Economic Analysis RIMS II model. Developed estimates of the property and sales and use taxes associated with construction and operation of the proposed facilities. Evaluated the impacts of potential wind facilities (connected actions) using IMPLAN and NREL's JEDI Wind model.

Scott E. Enright Company, LLC

Scott Enright served as the Director for the Hawaii Department of Agriculture, therefore HDOA, and also Chairperson of the Hawaii Board of Agriculture (BOA) from January 1, 2014 to January 1, 2019. Previously, he served as Deputy Director of the HDOA from January 1, 2012 to January 1, 2014. In that capacity, he was the Administrator of HDOA's Divisions of Plant Industry and Agricultural Development. Additionally, he managed the USDA Speciality Crop Block Grant funding program and directed Human Resources. He also directed bio-security programs, led initiatives to revitalize the state's livestock industry with special focus on developing the grass-fed beef industry, and provided direction for improving infrastructure for irrigation systems statewide.

Experience:

- Served on the Board of the National Association of State Departments of Agriculture from 2012-2016; Served as President in 2015.
- Served on the Board of the Western Association of State Departments of Agriculture from 2016-2019; Served as Vice President in 2018.
- Served on the Board of the Western United States Agricultural Trade Association from 2015-2019; Served as President in 2018.
- Worked as a consultant for the Hawaii Sustainable Agriculture Renewable Energy Project
- Project manager for the ITC Water Management Inc.
- Served as cultivation and irrigation superintendent for the Hamakua Sugar Co.
- Served as orchard superintendent for Kilauea Agronomics
- Past member of the Governor's Council of Neighbor Islands Advisors for East Hawaii
- Past member of the Community Development Plan Steering Committee for the Hamakua District
- Past chair of the Hawaii County Environmental Management Commission
- Past member of the Hilo-Hamakua Community Development Corporation Board
- Member and founding president of the Ookala Community Association

Enright earned his bachelor's degree in psychology and philosophy from the University of Hawaii at Hilo.

EXHIBIT "11"

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

20 DEC 14 P1:59

RECEIVED

Cameron Haughey, C.E.M.

7382 Buckingham Court - Boulder, Colorado 80301 •
(302) 542-3758 • cameron.haughey@gmail.com

RECEIVED
20 DEC 14 11:59
DEPT OF PERMITS
AND PERFORMANCE
CITY & COUNTY

Core Competencies:

- Project management
- Risk management
- Construction management
- Project development
- Operations management
- Contract negotiations
- Technical sales support
- Quality Inspections
- 11+ years of Solar Industry Experience

Professional Experience:

AES, Distributed Energy Inc.: Boulder, CO

01/2017 - Present

EPC Project Manager, PV + Battery Energy Storage System (BESS) Projects

- Manage PV + BESS projects through development, construction, commissioning and turnover to asset operations; focusing on quality, schedule, budget, and safety
- Develop EPC scopes of work and define RFPs for projects nearing construction; focusing on commercial and utility scale PV + BESS projects
- Create clear and effective project plans and executive level reporting to ensure timely action and decision making in time-pressured scenarios
- Review design drawings and engineering deliverables from EPC contractors to prioritize critical areas for further owner engineering and construction team reviews.
- Manage the request for information and change management processes for all engineering, procurement, and construction scope of work requests
- Facilitate PV+BESS project permitting and jurisdictional approval processes.
- Coordinate with EPC contractors and equipment vendors to ensure adherence to contract terms and delivery of contractual deliverables.
- Manage activities and deliverables of internal team of project engineers, asset managers, legal, and finance staff as well as external team of EPCs, clients, regulatory, and permitting authorities
- Ensure project quality control by conducting on-site inspections as long term systems operation owner's representative and coordinate with 3rd party independent engineering firms
- Manage the collection, organization and filing of all project documentation, both internally and for external third party stakeholders.
- Assist with the development of AES Distributed Energy internal operating policies, standards and procedures.

SunEdison, Inc.: East Coast, remote locations, USA

2015 – 01/2017

Channel Partner Operations, East Coast Portfolio - Construction Manager

- Delivered 100MW+ AC of solar plants covering 18 projects in 5 quarters on schedule and within budget from Vermont to Georgia while maintaining client and end user expectations
- Responsible for construction schedules, quality, and safety in compliance with contract terms and project budget, and prepare all construction documentation for financial closing to yieldcos
- Operational Excellence Green Belt Program graduate – created company-wide process improvement initiative in lean construction practices and development of construction standards
- Specialize in MW size roof top, canopy, ground mounted PV projects for commercial, industrial, governmental, and utility clients
- Successfully managed large volume of projects continually, with diverse set of project partners
- Experienced in serving Fortune 500 companies

Project Manager, Global Asset Management Team; Remediation Projects 03/2016 – 01/2017

- Troubleshoot and resolve PV system and construction issues on existing solar assets to reach performance and revenue objectives
- Provide technical due diligence for acquisition of PV systems and land development
- Develop scope of work for remediation projects, award bids, and manage construction to increase value and long term performance of operational assets within revenue budget and schedule

Flexera, Inc.: Harbeson, Delaware

2008- 2015

Solar Energy Operations Division - Project Manager, EPC

- Responsible for all utility interconnection agreements, incentive applications, permitting, procurement, design and installation of 3-5 Megawatts of residential, commercial, industrial and municipal PV installation projects annually in DE, MD, PA, NJ, and VA
- Responsible for all estimation and contract pricing, meeting project installation deadlines and all contractual reporting to financiers, sales, and executive team P & L reports
- Install PV roof top, ground mounted, custom structures, carports, on-grid, off-grid, and mobile power systems within budget, on schedule, with secured incentives

LED Lighting Installation Program Manager, Commercial Energy Auditor **2009-2011**

- Developed commercial and residential energy auditing department and LED lighting installation department- increasing company's revenue stream with new services offered
- Developed, performed, and delivered CEM and BPI certified reports meeting ASHREA Level 2/3 energy audit reporting requirements
- Install energy monitoring and control systems, track data to ensure energy systems meet expected production and performance estimates per contract

PV and Wind Project Construction Superintendent **2008-2009**

- Onsite installation team foreman for all PV and wind projects
- Project manager for Flexera's Small Wind Turbine (VA3) research and design team

Delaware Technical Community College: Georgetown, Delaware

2012-2015

Adjunct Professor, NRG 201 Photovoltaic Systems I & NRG 202 Photovoltaic Systems II

- Educate energy management students in renewable energy system design and installation courses and develop curriculum pertaining to energy management and renewable technologies
- Effectively communicate to a diverse population of students and faculty

Envirotech Environmental Consulting, Inc.: Lewes, Delaware

2005-2008

Director of Operations: Environmental Services

- Responsible for the supervision and training of 15 natural resource managers performing environmental management to over 300 community and municipal storm water areas
- Introduced off-grid solar PV+BESS diffuser systems to company product offerings 2006
- Received Exceptional Supervisory Service Award for 2007

Kodiak Salmon Packers: Larsen Bay, Kodiak Island, Alaska

2005

Set Net Wild Salmon Commercial Fisherman

- Developed effective, quick-decision skills necessary in high stress situations while immersed in adverse environmental conditions
- Participated in a NOAA by-catch research project on behalf of the local fisheries organization

Delaware National Estuarine Research Reserve (DNERR): Dover, Delaware

2003-2004

Project Coordinator, Public Ally, Community Leadership Program Member

- Managed individual/group volunteer projects using community asset-based assessment techniques, provided training and instruction in environmental education programs
- Coordinated volunteers for Delaware Beach Grass Planting, Bay-wide Horseshoe Crab Survey, Community Open Space Management, and Delaware Shorebird Monitoring Project
- Attended weekly trainings and conferences covering staff management and development, public speaking, business writing, project/event/change management, problem solving and decision making, performance feedback/evaluation/improvement, leadership and program facilitation

University of Maryland, AGNR: Rehoboth Bay, Delaware

2001-2003

Research Technician: Sub-aqueous Soil Map, Rehoboth Bay Project

- Assisted in the creation of the Rehoboth Bay Sub-Aqueous Soils Map, University of Maryland
 - Developed research techniques and innovated research tools used in underwater soil core extraction
-

Education:

University of Delaware: Newark, Delaware

Graduating Class of 2003

Bachelor of Arts Degree

Major: **Biological Sciences**

Double Minors: **Chemistry** and **Psychology**

GPA (3.6 / 4.0)

Certifications:

- **CEM**, Certified Energy Manager, #21370
American Association of Energy Engineers **2009-present**
- **NABCEP** PV Technical Sales Certification, #PVTS 081112-30
North American Board of Certified Energy Practitioners **2012-present**
- **BPI**, Building Professional Institute, #5015937
Building Analyst and Envelope Professional **2010-present**
- Solar Energy International (SEI) PV Design and Installation Course **2008**
- OSHA construction safety certification **2011-present**
- CPR & First Aid Certified, Adult and Child/Infant **2003-present**
- Qualified Electrical Worker **2009-present**
- LOTO Authorized Worker Certification **2015-present**
- Trench and Excavation Inspection Certification **2015-present**
- Personal Fall Arrest Training Certification **2015-present**
- NFPA- 70E Certification **2017-present**



ERIC K. IMADA, Project Manager

EDUCATION

B.S. Civil Engineering – Oregon State University - 2012

YEARS OF EXPERIENCE

With firm 7 years

PROFESSIONAL REGISTRATION

Professional Civil Engineer - Hawaii - #17280-CE - 2017

PROFESSIONAL ORGANIZATIONS

American Society of Civil Engineers
Institute of Transportation Engineers

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU
20 DEC 14 10:03:00

RECEIVED

ABOUT

As a Project Manager within the Transportation Section of ATA, Eric is responsible for overseeing and managing the production of transportation related work. Work under his supervision includes a wide range of traffic analysis, traffic forecasting, transportation design and review, signal optimization and operational improvement studies. Through experience, Eric has developed technical knowledge and practical skills to support the production and management of a diverse portfolio of projects. Over the last several years Eric has worked closely with the Hawaii Department of Transportation to improve various HDOT facilities statewide. Of recent relevance, Eric managed and produced the Piikoi Street Ramp Closure Study, prepared for HDOT. Findings of the study quantified the regional impacts of the On-Ramp closure for a 7-mile stretch of the H-1 Freeway from Moanalua to Kaimuki and made closure recommendations based upon large scale data collection and analytics. Other notable projects include the following:

Notable Projects:

- HDOT General Traffic Engineering Services, IDIQ Contract; Statewide
- Downtown and Urban Core PM Tow-Away Zone Study; Honolulu, Hawaii
- Makalapua Project District TIAR; Kailua-Kona, Hawaii
- Niimalu Marketplace TIAR; Kailua-Kona, Hawaii
- Traffic Assessment for H-Power circulation; Kapolei, Hawaii
- Dowsett Highlands Relief Sewer Transportation Management Plan and Traffic Control Plans; Honolulu, Hawaii
- Transportation Management Plan for Pali Highway Resurfacing Phase II; Honolulu, Hawaii
- HDOT Traffic Operational Improvements at Various Locations, Hawaii
- Iwilei Costco Fuel Facility Expansion Study and Traffic Signal Design; Honolulu, Hawaii
- University of Hawaii Richardson School of Law Expansion Study; Honolulu, Hawaii
- Goodwill Industries, Honolulu Career & Learning Center; Honolulu, Hawaii
- Honolulu Rail Transit Project – Kamehameha Highway Median Modification Study; Pearl City, Hawaii

EXPERIENCE SUMMARY

Ms. Kettley is senior planner and project manager with more than 20 years of experience in environmental permitting and planning, regulatory compliance, and biological resource issues. She has played a key role in a wide variety of complex, high-profile projects including those related to renewable energy facilities, electrical transmission and power generation systems, infrastructure and natural systems. Her breadth of expertise includes scoping and preparation of environmental review documents in accordance with both the National Environmental Policy Act (NEPA) and Hawaii environmental impact review regulations (Hawaii Revised Statutes [HRS] § 343), coordination and consultation with resource agencies and project stakeholders, and compliance with a variety of federal, state, and local regulations.

EDUCATION

M.S., Biological Sciences, Stanford University, 2000
B.S., Environmental Studies, University of Oregon, 1996

EMPLOYMENT HISTORY

Tetra Tech, Inc.; Honolulu, Hawaii; 2018-2020
CH2M Hill (now Jacobs Engineering); Honolulu, Hawaii; 2005 – 2018
CH2M Hill; Oakland, California; 2001 – 2005
L.C. Lee and Associates, Inc.; Seattle, Washington; 1996 - 2000

PROFESSIONAL ASSOCIATIONS

American Planning Association, National and Hawaii Chapters
Hawaii Association of Environmental Professionals

REPRESENTATIVE EXPERIENCE

Kuihelani, Waikoloa and West Oahu Solar Projects; AES Distributed Energy; Various Locations; 2018 - 2020.

Ms. Kettley is the lead planner for three utility-scale solar and battery storage projects, which include the Kuihelani (60 megawatt [MW]) project on Maui, Waikoloa (30 MW) project on Hawaii Island, and West Oahu (12 MW) project on Oahu. For each project, she is responsible for strategic planning, technical due diligence and land use entitlement processes. Specific requirements for the various projects include environmental review pursuant to HRS § 343, Special Use Permits from the State Land Use Commission and County Planning Commissions, and County zoning approvals.

Lawai Solar Project; AES Distributed Energy; Koloa, Kauai; 2017 - 2018. Ms. Kettley was the lead planner for the 20 MW solar photovoltaic and 100 MW-hour battery storage project located in Lawai, which was selected by the Kauai Island Utility Cooperative (KIUC) through a competitive bid process. She provided support for a variety of technical due diligence studies (including biological, archaeological and cultural resources), stakeholder outreach and agency consultation, and the land use entitlement process. Specific land use permits included a Special Use Permit from the State Land Use Commission, and a Use Permit and Zoning Permit from the Kauai County Planning Commission.

RECEIVED
20 DEC 14 P2:00
DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

Hawaii Bridge Program; Central Federal Lands; Oahu, Kauai and Hawaii Island, Hawaii; 2016-2018. Ms. Kettley was a key member of the team that provided environmental and planning support for the Hawaii Bridge Program, which involved rehabilitation/replacement of nine bridges on Oahu, Kauai and Hawaii Island. Ms. Kettley provided support from scoping through permitting, and contributed to the integration of planning, engineering and design, environmental compliance, permitting, and public involvement efforts. Key regulatory compliance requirements related to NEPA, HRS § 343, Clean Water Act, Endangered Species Act, National Historic Preservation Act, and various state/local requirements.

National Ecological Observatory Network (NEON) Domain 20; National Science Foundation; Pu'u Maka'ala Natural Area Reserve, Hawaii; 2016 – 2017. Ms. Kettley was the lead planner for a project funded by the National Science Foundation involving ecological monitoring infrastructure and sampling for the NEON Domain 20. Ms. Kettley was the lead author of a joint NEPA and HRS § 343 Environmental Assessment (EA), and developed and executed a strategic permitting approach to ensure compliance with various federal, state and local regulations. This effort included close coordination with multiple Federal and State agencies, with specific requirements related to the Endangered Species Act, National Historic Preservation Act, State Conservation District, and the Natural Area Reserve System (NARS).

Waipio, Kawailoa and Mililani Solar Farm Projects; First Wind (Sun Edison); Honolulu, Hawaii; 2014 - 2016. Ms. Kettley was a planner for three solar farm projects on the island of Oahu (Waipio, Kawailoa, and Mililani). For each project, Ms. Kettley was responsible for strategic planning, coordination of technical due diligence studies and land use permitting. These efforts involved analysis of regulatory requirements, stakeholder concerns, and engineering constraints. Specific land use permits included State Special Use Permits from the State Land Use Commission (pursuant to the newly enacted Act 55) and Conditional Use Permits.

Strategic Planning and Permitting Services; Hawaiian Electric Company, Inc.; Honolulu, Hawaii; 2011 – 2020. Ms. Kettley provides ongoing strategic planning and permitting support on a wide range of Hawaiian Electric projects, including those related to substation, power plant, transmission and distribution lines, and communication facilities. Specific tasks include development of strategic permitting plans, preparation of environmental review documents and permit applications, and agency consultation. Regulatory compliance efforts include Clean Water Act Section 404 permitting, Section 401 Water Quality Certification, Conservation District Use Permits, Special Management Area (SMA) Use Permits, and Conditional Use Permits. Ms. Kettley has also developed environmental and land use permit training programs for Hawaiian Electric staff.

Ala Wai Watershed Project; U.S. Army Corps of Engineers; Honolulu, Hawaii; 2008 – 2016. Ms. Kettley served as the lead planner on a U.S. Army Corps of Engineers (USACE) Honolulu District task order providing support for the Ala Wai Watershed Project, identified as a national priority by USACE Headquarters. Ms. Kettley worked in close coordination with USACE staff to complete the feasibility planning process, and was the lead author for an integrated Feasibility Report and joint NEPA and HRS § 343 Environmental Impact Statement (EIS). She also provided oversight of technical environmental studies, agency consultation and regulatory compliance (including Clean Water Act, Endangered Species Act, Coastal Zone Management Act), development of aquatic habitat mitigation plans, and extensive stakeholder involvement.

Kawailoa Wind Farm Project; First Wind; Oahu, Hawaii; 2008-2011. Ms. Kettley assisted with strategic planning, environmental impact assessment, and regulatory compliance activities for the Kawailoa Wind Farm Project on the North Shore of Oahu. She assisted with oversight of the technical due diligence studies, preparation of an HRS § 343 EIS, coordination with the Habitat Conservation Plan (HCP) development, and obtaining environmental permits and land use entitlements (including an SMA Permit, Conservation District Use Permit, and Conditional Use Permit).

SUMMARY OF PROFESSIONAL EXPERIENCE

Over 13 years of experience providing planning, community engagement and outreach, feasibility and financial analysis, project development, implementation and management for complex real estate and renewable and resilient energy projects across government and private sectors. Currently leading AES Distributed Energy's (AES DE) community engagement & strategic partnership efforts for their Hawaii solar + storage projects. Regularly interface with federal, state and local executive leadership, supporting business lines, utility companies, regulatory agencies, policy-makers, social organizations and other relevant stakeholders, cultivating and maintaining relationships to formulate collaborative solutions. Spearhead and implement comprehensive strategies targeting new opportunities, leveraging existing policies and procedures, ensuring legal compliance while focusing on partner cultivation, value creation and management. 5 years supporting Headquarters Department of Navy (DoN) Resilient Energy Program Office (REPO) / Energy Security Program Office (ESPO). Serve as lead Realty Specialist and designated representative to the Real Estate Contracting Officer (RECO) for the Pacific region, outleasing DON land for third-party development of utility-scale renewable and resilient energy projects.

EDUCATION AND TECHNICAL PROFICIENCIES

Harvard University , Graduate School of Design, Cambridge, MA <i>Master in Urban Planning</i> + Award for Overall Achievement in Urban Planning	2013	Jun 2003
Cornell University , Ithaca, NY <i>Bachelor of Science: Landscape Architecture</i>	1999	May 1999
Certified Project Management Professional® , certification no. 1927092		Apr 2016
Certified Planner , American Planning Association's (APA) Professional Institute, American Institute of Certified Planners (AICP), certification no. 30498		Dec 2017
Licensed Real Estate Salesperson , State of Hawaii, RS-79192		Jan 2017

EMPLOYMENT HISTORY

AES Distributed Energy , Honolulu, HI, <i>Community Engagement and Strategic Partnerships</i>	2020 – present
Naval Facilities Engineering Command Pacific, Asset Management , Honolulu, HI, <i>Realty Specialist</i>	2016 – 2019
Booz Allen Hamilton, Inc. , Honolulu, HI, <i>Associate</i>	2014 – 2016
Clifford Planning & Architecture, LLC. , Honolulu, HI, <i>Project Manager</i>	2013 – 2014
Hopewell Housing Limited , Hong Kong, <i>Development Consultant</i>	2006 - 2007; 2012
Agora Development Group , Tokyo, Japan, <i>Director</i>	2003 – 2005
Lehman Brothers Global Commercial Real Estate , Tokyo, Japan, <i>Analyst</i>	2003 – 2003
Morgan Stanley Properties, K.K. , Tokyo, Japan, <i>Summer Analyst</i>	2002 – 2002
RTKL International, Ltd. , Tokyo, Japan, <i>Architectural Designer</i>	1999 - 2001

REPRESENTATIVE EXPERIENCE

AES Distributed Energy

Honolulu, HI, *Community Engagement and Strategic Partnerships*

AES Distributed Energy (AES DE), a division of AES focusing on solar + storage, currently has two projects in operation or under construction on Kaua'i in partnership with the Kauai Island Utility Cooperative totaling 34 MW / 170 MWh and has another 140 MW / 685 MWh of solar + storage projects in development on O'ahu, Maui and Hawai'i Islands, which were awarded under Hawaiian Electric's Stage 1 and Stage 2 RFPs. In total, AES' solar + storage facilities in operation or development across the state will generate clean energy to contribute over 5% towards the state's 100% renewable energy goal.

Projects:

- West O'ahu Solar + Storage 12.5 MW + 50MWh
- Waikoloa Solar + Storage 30 MW + 120MWh
- Kuiuhelani Solar + Storage 60 MW + 240MWh
- Waiawa Phase 2 Solar + Storage 30 MW + 240MWh
- AES Mountain View Solar + Storage 7 MW + 35MWh

Naval Facilities Engineering Command Pacific, Asset Management

Honolulu, HI, *Realty Specialist*

Real estate project and program management support to two of the largest most complex programs serviced by NAVFAC Pacific (PAC) Asset Management. Directly manage a large volume of work requiring timely and efficient coordination and integration amongst multiple public, private, government and regulatory stakeholders in order to execute construction projects estimated in excess of US\$1 billion. Lead Realty Specialist for Resilient Energy Program Office (REPO)/Energy Security Program Office (ESPO) PAC Enhanced Use Leases (EULs) comprising of >400 acres and total contract value of >US\$100 million.

Projects:

- EUL for ~100 MW Distributed Energy Resource providing energy security and resilience for O'ahu
- Pacific Missile Range Facility EUL, 19 MW Solar PV + 70 MWh Battery Energy Storage System (BESS)
- West Loch EUL, Phase I, 28 MW Solar PV
- Guam EUL (5 Sites), 38 MW Solar PV + BESS

ADDITIONAL INFORMATION

Women in Renewable Energy (WiRE) , Executive Board Member (2019 – present)	2014 – present
Trust for Public Land , Advisory Board Member	2018 – present
City and County of Honolulu Office of Climate Change, Sustainability and Resiliency , Climate Change Adaptation Working Group	2018
American Planning Association , Honolulu Chapter, Federal Planning Chapter	2015 – present
Project Management Institute, Honolulu Chapter (PMI)	2015 - present



With over 20 years of experience in the landscape architecture profession, Vivian has managed project teams, generated planning and design concepts and coordinated work with clients and consultants for a variety of project types. Her project work experience includes transportation, environmental restoration, housing, institutional and recreation with a focus on providing a hands-on experience through understanding client needs, community concerns and bringing differing perspectives together to create successful results.

VIVIAN L. ARITA, LEED AP

Owner/Landscape Architect

EDUCATION

Bachelor of Architecture, University of Hawai'i at Mānoa

REGISTRATION

Hawaii, #18181

YEARS OF EXPERIENCE

24

AFFILIATIONS

American Society of Landscape Architects – Hawaii Chapter, Former Board Member and Member at Large

American Society of Landscape Architects – Member

University of Hawai'i School of Architecture Alumni Association – Former Finance Committee Chairperson, Council Member and Treasurer

Hawai'i Society of Urban Forestry Professionals (HSUFP) – Member

U.S. Green Building Council, Hawaii Chapter Member

Landscape Industry Council of Hawaii, Member

LEED AP

Awards:

NOAA Pacific Regional Center, LEED Gold Certified:

LICH Sustainability Award "La'au Ku Kahi Award for Excellence"

ASLA Professional Design Awards: "Merit Award – General Design"

AIA Design Awards: "Juror's Award of Excellence" and "Mayor's Choice Award"

HHF Preservation Honor Awards – Citation for New Addition and Adaptive Use, 2014

RELEVANT PROJECT EXPERIENCE

NOAA Pacific Regional Center Master Plan and Design
Honolulu, Hawaii

UH Culinary Institute of the Pacific
Honolulu, Hawaii

Hanauma Bay Nature Preserve, Bathhouse Landscape Improvements
Honolulu, Hawaii

Kukui'ula Parcel Y Makai Collection Cottages
Koloa Kauai, Hawaii

The Palms at Manele, Site C, Phase 1 & 2
Manele, Lanai, Hawaii

The Villas at Koele, Phase 1, 2 & 3
Lanai, Hawaii

Mililani Town & Mililani Mauka, (Multiple communities)
Mililani, Hawaii

Lalea at Hawaii Kai, Multi-family Townehomes
Honolulu, Hawaii

P-852 Radio Battalion
KMCBH, Kaneohe, Hawaii

P-910 BEQ
KMCBH, Kaneohe, Hawaii

P-923 Regimental Consolidated Comm/Elec Facility
KMCBH, Kaneohe, Hawaii

2019 Holiday Illumination Park, Guam Visitor's Bureau
Tumon, Guam

2019 Christmas Display, Governor of Guam Residence
Tumon, Guam

Skinner's Plaza – 2019 Christmas Display
Hagatna, Guam

RECEIVED
 20 DEC 4 P 2:00
 DEPT OF PLANNING AND PERMITTING
 CITY & COUNTY OF HONOLULU



EXHIBIT "16"

Nicholas J. Molinari

Experienced business and project management professional with 10+ years of renewable energy industry experience; passionate about utilizing local resources to stimulate local economies

Core Competencies:

Project Management • Business Development • Risk Assessment • Project Development
Relationship Building • Communication • Training • Management

RECEIVED
2017 DEC 14 PM 7:00
CITY OF PLANNING
PERMITTING
COMMUNITY DEVELOPMENT

EXPERIENCE

AES Distributed Energy, Inc.

February 2019 - Present

Project Development Manager, Los Angeles, CA

- Manage development of utility-scale solar plus storage project pipeline on O'ahu, Maui and Hawai'i islands.
- Lead all aspects of development and permitting to construction commencement.
- Oversee all development and diligence activities including environmental reviews and site studies.
- Manage all internal and external subject-matter experts and stakeholders to achieve project development objectives.
- Collaborate with community engagement team to ensure responsible project development.

M+W Energy, Inc. (f/k/a Gehrlicher Solar America Corp.)

September 2011 – Feb 2019

Director of Business Development, San Diego, CA (*August 2016 – February 2019*)

- Sourced, negotiated and managed commercial and utility engineering and construction contracts.
- Supported project development efforts of key accounts including IPPs, national/regional developers and corporates.
- Managed cross-functional teams of technical experts to support clients' project development objectives.
- Evaluated risk, commercial and technical terms and made recommendations to senior management.

Project Manager, Kaua'i / O'ahu, HI; Springfield, NJ; New York, NY (*October 2013 – August 2016*)

- Managed all aspects of project portfolio build-out for public and private stakeholders.
- Negotiated prime and subcontracts for EPC work in Northeast and Hawai'i.
- Originated and managed company's first portfolio in the Hawaiian Islands utilizing 100% local labor.
- Led the technical project development team for the first utility-scale PV farms on Maui.

Sales Manager – Components & Systems (C&S) Business, Springfield, NJ (*September 2011 – October 2013*)

- Analyzed and vetted various PV components for wholesale use.
- Generated revenue in direct sales of PV components and systems.
- Managed national network of sales agents responsible for direct sales revenue.
- Developed strategy and business planning for growth of the business unit.

Aztec Solar Power, Wayne, PA

May 2010 – September 2011

Account Executive

- Generated revenue across multiple sectors – residential, commercial and municipal.
- Trained and monitored day-to-day activities of (3) account executives.

US Men's Golf Open Championship, San Diego, CA/Farmingdale, NY

May – June 2008, 2009

Intern – Corporate Hospitality

- Supported corporate clients including MasterCard, Ernst & Young, and Barclays Capital.
- Managed and organized logistics including transportation and deliveries for media and other services.

EDUCATION

Saint Joseph's University, Haub School of Business, Philadelphia, PA

May 2010

Bachelor of Science in Marketing, Minor: English

- SJU Sustainability Club, Marketing Chair, American Marketing Association, Entrepreneurship Society



Aaron Murphy, PE SENIOR PROJECT MANAGER



RECEIVED
20 DEC 14 P2:00
DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

Education

BEngT; University of Southern Queensland

Registrations

Professional Civil Engineer-Colorado, Hawaii, Massachusetts, New York, Oregon, Washington

Affiliations

American Society of Civil Engineers

American Public Works Association, Oregon Chapter

American Water Works Association

Institute of Engineers Australia

Aaron has more than 18 years of experience on a variety of renewable energy, land development, stormwater, civic & transportation projects around the globe. He is a highly skilled engineer and project manager, streamlining processes and maintaining communications to ensure high quality project deliverables.

Aaron spent the first 10 years of his career working in Australia, South-East Asia & the Middle-East. In 2010, Aaron moved to the USA to broaden his experience in civil engineering. During this time, Aaron has worked on solar power, residential & commercial development, K-12 education infrastructure, parks and recreation, and other project types.

Relevant Experience

SOLAR

Aaron has managed the civil design and construction inspection for dozens of solar projects throughout the United States including California, Colorado, Hawaii, Massachusetts, New York and Oregon. Project sites have ranged from 2.2MW AC to 90MW AC.

LAND DEVELOPMENT

Aaron has completed over 15 residential and commercial projects throughout the northwest, including multi-family residential developments, single family subdivisions, and mixed-use and retail developments. Aaron is currently providing civil project management on a 32-acre planned community in Newberg, Oregon, a premiere destination in "Oregon Wine Country". The project will include 244 single family homes, 51 apartment homes, and 4.2-acres of commercial land, parks and walking trails.

STORMWATER

Many of Aaron's projects include stormwater requirements and he is well equipped to help guide clients through the analysis, design, permitting and construction of development projects with water resources engineering needs. A recent project Aaron completed included the realignment of a creek including wetlands, natural habitats and flow conveyance capacity. After an in depth analysis, the new creek was designed to convey up to the 100-year flood event. Aaron's team coordinated with local City and County engineers to develop a design package for review and approval by DSL, DEQ and USACE.

EXHIBIT "18"



David Shideler, M.A.

Principal Investigator

Education:

- 1997 Ph.D. Candidate – Certified ABD (all but dissertation) status, History of Hawaiian Islands, University of Hawai'i at Mānoa
- 1987 M.A. – Asian Religions, University of Hawai'i at Mānoa
- 1984 M.P.H. – Environmental Health Management, University of Hawai'i at Mānoa
- 1977 B.A. – Anthropology and Religion, University of Hawai'i at Mānoa
- 1976 B.S. – Zoology with Minor and Certificate in Environmental Studies, University of Florida

Qualifications:

Mr. Shideler is an original member of CSH's management with a 40-year career in Hawaiian and Pacific archaeology. His experience spans all types of archaeological work from small, short term projects such as preparation of monitoring plans to large scale data recovery efforts. Mr. Shideler is one of CSH's lead researchers and report authors. He has extensive experience conducting historic research and has often uncovered unique primary sources and information. He is familiar with a wide range of Hawaiian texts, making him an invaluable resource to CSH and our clients.

Career highlights include:

- Completed approximately 1000 archaeological projects in Hawai'i and has managed many large scale, multi-task projects, including numerous federal projects at many Hawai'i military installations
- Diverse background and familiarity with all levels of historic preservation regulations
- Extensive experience providing public presentations and consulting with project stakeholders including Native Hawaiian Organizations and individuals
- Provided expert testimony at planning commission and Land Use Commission (LUC) meetings on a number of occasions for large land redevelopment projects and has been recognized repeatedly by the LUC as an expert in both archaeology and cultural impact assessments

Mr. Shideler also has vast experience in academics and in the resolution of cultural issues and concerns. Born in Japan, he has been a lifelong student of Asian cultures. He has taught at Taisho University in Tokyo and worked at Mahidol University in Thailand. Locally, Mr. Shideler periodically lectures at the University of Hawai'i at Mānoa and has taught, among other courses, *Introduction to Hawaiian Religion*, *Introduction to Polynesian Religion*, *Pele and Kamapua'a Traditions*, *History of Hawai'i*, and *History of the Hawaiian Kingdom*.

Special Training, Honors, and Certifications:

- Hawaiian Language Certification, 1996 (fulfilling Ph.D. requirement for proficiency)
- HART's Safety/Environmental Orientation Training
- First Aid / CPR (Current)

Representative Experience:

- Consultation with the State Historic Preservation Division (SHPD), archaeological inventory survey, and cultural impact assessment for the AES UH West O'ahu Solar Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu


EXHIBIT "19"



- Historic Preservation Studies for the Honolulu Harbor 2050 Master Plan Project, Kapālama and Honolulu Ahupua'a, Honolulu District, Island of O'ahu, TMK plats: [1] 1-2-023, 025; 1-5-032 through 042; 1-7-001 and 2-1-001 and 015 (Volume I: Archaeological Literature Review and Field Inspection Report; Volume II: Reconnaissance Level Historic Structures Assessment Report)
- Variety of services over a 20+ year span for the Koa Ridge Makai Development, Waipio and Waikele Ahupua'a, 'Ewa District, Island of O'ahu. Work included/includes cultural impact assessments, archaeological inventory surveys, preparation of a monitoring plan, and recent site-specific data recovery and preservation programs.
- Variety of services over a 4+ year span for the Ho'opili Subdivision Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu. Work included archaeological inventory surveys, a cultural impact assessment, a monitoring plan, and a preservation plan.
- Consultation with SHPD, archaeological literature review and field inspection, and cultural impact assessment for the BWS Waiawa 228 Reservoir Project, Waiawa Ahupua'a, 'Ewa District, Island of O'ahu
- Archaeological Inventory Surface Survey for the Kapaia Solar Photovoltaic and Battery Energy Storage Project, Hanama'ulu Ahupua'a, Lihu'e District, Island of Kaua'i
- Ethnohistoric Study of Kamehameha Schools' Lands in Waiawa, Waiiau, and Kalauao (Ka'ōnohi 'Ili) Ahupua'a, 'Ewa District, Island of O'ahu

Sam Ley, PE

 sam.ley@aes.com

 720-496-8374

 [linkedin.com/in/samley](https://www.linkedin.com/in/samley)

Experience

Director Of Engineering

AES Distributed Energy

Feb 2018 - Present (2 years 11 months +)

Lead a team of 26 technical and engineering team members tasked with renewable product development and innovation, preliminary engineering for development of new utility scale energy projects, engineering project management during the course of construction, commissioning and quality control, and operations support. Areas of focus include vendor qualification, contract negotiation, specifications development, training and mentorship, and growth management.

Projects range from 2 - 200MW, including solar PV, energy storage, wind, and hydro systems, including complex hybrid energy facilities with advanced grid control.

Senior Energy Systems Engineer

AES Distributed Energy

Oct 2014 - Feb 2018 (3 years 5 months)

Technical review and diligence for the purchase, design, construction and operation of photovoltaic, large utility storage and other large-scale distributed renewable energy projects in the Americas and Asia. Manage and support a team of 5 project and development engineers and specialties.

Senior Design Engineer

RGS Energy

Jan 2012 - Oct 2014 (2 years 10 months)

Lead design and engineering efforts for commercial and utility scale Solar Photovoltaic systems from 200kW to 12MW, with a focus on electrical design and interconnection. Manage external engineering resources, project schedules, and project engineering budgets for RGS Energy projects in the West Coast region. Define standards for quality design, arc flash safety, and value engineering for projects nationwide.

Principal Designer

May 2011 - Jan 2012 (9 months)

Principal Designer at Think PV, a photovoltaic design and engineering services company, providing design consultation, RFP review and construction-ready system designs for solar energy projects nationwide.

Design Engineer, Large Commercial

Bella Energy, Inc.

Feb 2011 - Jan 2012 (1 year)

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

20 DEC 14 P2:00

RECEIVED

EXHIBIT "20"

Design and engineering for PV systems 100kW to 2MW and up.

 **Chief Designer, Standard Renewable Energy Division**

GridPoint

Feb 2010 - Dec 2010 (11 months)

After the acquisition of Standard Renewable Energy by Gridpoint, Inc., I manage design standards for residential and commercial renewable energy projects, including small wind, photovoltaic and solar thermal systems.

 **Chief Designer**

Standard Renewable Energy

May 2008 - Feb 2010 (1 year 10 months)

Managed the photovoltaic designs for Standard Renewable Energy. I helped determine the methods, tools and products used throughout the company's divisions.

 **Operations Manager, Colorado Division**

Standard Renewable Energy

Jun 2007 - Mar 2008 (10 months)

I managed the Operations of our Colorado Division. With a team of 15 reporting, including subcontractors, project managers and installation crews, I was responsible for revenue recognition, project completion timelines, revenue forecasting, and general management duties.

 **Owner**

Sunflower Solar

Oct 2006 - Feb 2008 (1 year 5 months)

I helped start and bring to fruition a solar electric installation company, starting from 2 people to 12, before preparing the company for sale, and merging with Standard Renewable Energy.

Education

 **Washington University in St. Louis**

Mathematics, Computer Science

2003 - 2004

 **Colorado State University**

Physics

1999 - 2001

Licenses & Certifications

 **NABCEP Certified Solar PV Installer - North American Board of Certified Energy Practitioners**

Issued Sep 2010 - Expires Oct 2019

091110-69

EXPERIENCE SUMMARY

Mr. Tynan's experience includes development of visual simulations of various energy and construction projects including offshore wind farms, solar and natural gas facilities, and electric substations. Other experience includes working alongside engineering and management teams to prototype marine interior furniture solutions and cost-savings initiatives for the U.S. Navy. He has also created photo-realistic renders and animations of furniture and compartment layouts in a rapid prototyping environment.

EDUCATION

B.S., Computer Science and Audio Technology, The American University, Washington D.C., 2014

EMPLOYMENT HISTORY

Tetra Tech, Inc.; Visualization Specialist; 2018-2020

Trident LLC; Engineering Assistant/Product Designer/3D Artist; 2015-2018

TECHNICAL SPECIALTIES

Advanced modeling, rendering, and animation proficiency with Autodesk 3DS Max and MODO 3D Modeling Software

Thorough working knowledge of AutoCAD and Civil 3D

3D solid body modeling and mechanical engineering with Solidworks 2015

Highly proficient with interfacing between engineering, CAD and visualization software

Advanced working knowledge of Microsoft Office and Adobe Creative Suite products

Experience coding with Java, Python, Pure Data, Max programming languages

REPRESENTATIVE EXPERIENCE

Visualization Specialist, Various Offshore and Onshore Wind Projects, New York, New Jersey, Massachusetts, Hawaii; 2018-Current. Responsibilities included modeling and rendering wind turbines as well as substations and other associated ancillary facilities. Composited 3D renders and animations of project facilities over technical panoramic photography, static video, and drone-captured video to create photorealistic visual simulations of the project area from multiple key observation points. Modified existing photography to represent various times of day and weather conditions for visual impact studies.

Visualization Specialist, Hecate Energy, Coeymans Solar Farm, Albany County, New York; 2019. Responsibilities included modeling and rendering the project facilities, components, and landscape design of a 40-megawatt solar photovoltaic electric generating facility proposed in Albany County, New York. Composited 3D renders of project facilities over technical panoramic photography to create photorealistic visual simulations of the project area from multiple key observation points.

RECEIVED
20 DEC 14 2:00
DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF ORANGE

Visualization Specialist, Clearway Energy Group, 650 Megawatt (MW) Solar Project, San Bernardino County, California; 2019. Responsibilities included modeling and rendering the project facilities and components of a 650-megawatt solar photovoltaic electric generating facility proposed in San Bernardino County, California. Composited 3D renders of project facilities over technical panoramic photography to create photorealistic visual simulations of the project area from multiple key observation points.

Visualization Specialist, Various Solar Projects, California, Hawaii, Kentucky, Michigan, New York, Ohio; 2018-Current. Responsibilities included modeling and rendering of project facilities and components. Composited 3D renders of project facilities over technical panoramic photography to create photorealistic visual simulations of the project area from multiple key observation points. Developed various project information boards and graphics materials for public meetings.

Visualization Specialist, Substation Plan Visual Simulations - Avery Substation Project, Colorado; 2019-2020. Responsibilities included modeling and rendering of substation components, transmission lines, and landscaping objects. Composited 3D renders of project facilities over technical panoramic photography to create photorealistic visual simulations of the project area from multiple key observation points. Developed project information boards and graphics materials for public meetings.

Visualization Specialist, Substation Modification and Plan Visual Simulations - Henry Lake Substation Project, Colorado; 2019. Responsibilities included modeling and rendering of substation components, transmission lines, and landscaping objects. Composited 3D renders of project facilities over technical panoramic photography to create photorealistic visual simulations of the project area from multiple key observation points.

Visualization Specialist, United Power & Tri-State Generation and Transmission Assoc., Inc., Lazy Dog Substation, Town of Erie, Colorado; 2018-Current. Responsibilities included modeling and rendering of substation components, transmission lines, and landscaping objects. Composited 3D renders of project facilities over technical panoramic photography to create photorealistic visual simulations of the project area from multiple key observation points.

Visualization Specialist, Midas Gold Idaho, Inc., Stibnite Gold Project, Valley County, Idaho; 2018. Responsibilities included modeling and rendering transmission line routes as well as generating and modifying 3D terrain to represent a proposed reclamation scenario at end-of-mine operations. Composited 3D renders of project components and terrain over technical panoramic photography to create photorealistic visual simulations of the project area from multiple key observation points.