BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAI`I

In the Matter of the Petition of	)	DOCKET NO. A17-804
	)	
HAWAIIAN MEMORIAL LIFE PLAN, LTD.	)	HAWAIIAN MEMORIAL LIFE PLAN, LTD.
	)	
To Amend The Conservation Land Use District Boundary Into The Urban Land Use District For Approximately 53.449 Acres Of Land At Kāne'ohe, Island of Oahu, State of Hawai`i, Tax Map Key: (1) 4-5-033: por. 001	)	

PETITIONER HAWAIIAN MEMORIAL LIFE PLAN, LTD.'S:

(1) FIRST AMENDED LIST OF EXHIBITS;
(2) EXHIBITS 23 - 43

AND

CERTIFICATE OF SERVICE

BENJAMIN M. MATSUBARA, #993-0
CURTIS T. TABATA, #5607-0
Matsubara, Kotake & Tabata
888 Mililani Street, Suite 308
Honolulu, Hawai`i 96813

Attorneys for Petitioner
HAWAIIAN MEMORIAL LIFE
PLAN, LTD.

DOCKET NO./PETITIONER: A17-804/HAWAIIAN MEMORIAL LIFE PLAN, LTD.

PARTY: Petitioner HAWAIIAN MEMORIAL LIFE PLAN, LTD.

FIRST AMENDED LIST OF EXHIBITS

EXHIBIT NUMBER	DESCRIPTION	PARTY: OBJECTIONS	ADMIT
1	A map identifying the location of the Property **(attached to the Petition as Ex. 1, previously filed and served on all parties)**		
2	Metes and Bounds Map and Written Description of the Petition Area, A survey map and metes and bounds description of the Property **(attached to the Petition as Ex. 2, previously filed and served on all parties)**		
3	Real Property Tax Map showing the Petition Area **(attached to the Petition as Ex. 3, previously filed and served on all parties)**		
4	Deeds for Petition Area and Status Report by Title Guaranty of Hawaii, Incorporated **(attached to the Petition as Ex. 4, previously filed and served on all parties)**		
5	Draft Environmental Impact Statement Preparation Notice, dated November **(attached to the Petition as Ex. 5, previously filed and served on all parties)**		
6	Hawaiian Memorial Park Cemetery Expansion Project Final Environmental Impact Statement, dated April 2019 **(attached to the First Amendment to Petition as Ex. 6, previously filed and served on all parties)**		
7	March 31, 2019 Financial Statement of Petitioner **(attached to the First Amendment to Petition as Ex. 7, previously filed and served on all parties)**		
8	Letter dated April 8, 2019 from State Historic Preservation Division re: acceptance **(attached to the Second Amendment to Petition as Ex. 8, previously filed and served on all parties)**		

DOCKET NO./PETITIONER: A17-804/HAWAIIAN MEMORIAL LIFE PLAN, LTD.

PARTY: Petitioner HAWAIIAN MEMORIAL LIFE PLAN, LTD.

FIRST AMENDED LIST OF EXHIBITS

EXHIBIT NUMBER	DESCRIPTION	PARTY: OBJECTIONS	ADMIT
9	Testimony of the Acting Director of the Department of Planning and Permitting Kathy Sokugawa on April 23, 2019 at the Land Use Commission Hearing **(attached to the Second Amendment to Petition as Ex. 9, previously filed and served on all parties)**		
10	Comment letters received after the comment period deadline and the responses **(attached to the Second Amendment to Petition as Ex. 10, previously filed and served on all parties)**		
11	Petition for Land Use District Boundary Amendment filed November 13, 2017 **(Previously filed and served on all parties)**		
12	Affidavit of Service of Petition for District Boundary Amendment **(attached to the Petition, previously filed and served on all parties)**		
13	Affidavit of Sending Notification of Petition Filing **(attached to the Petition, previously filed and served on all parties)**		
14	First Amendment to Petition for Land Use District Boundary Amendment filed May 10, 2019 **(Previously filed and served on all parties)**		
15	Affidavit of Service of First Amendment to Petition for District Boundary Amendment **(attached to the First Amendment to Petition, previously filed and served on all parties)**		
16	Affidavit of Sending First Amended Notification of Petition Filing **(attached to the First Amendment to Petition, previously filed and served on all parties)**		
17	Supplemental Affidavit of Sending First Amended Notification of Petition Filing, filed May 13, 2019 **(Previously filed and served on all parties)**		

DOCKET NO./PETITIONER: A17-804/HAWAIIAN MEMORIAL LIFE PLAN, LTD.

PARTY: Petitioner HAWAIIAN MEMORIAL LIFE PLAN, LTD.

FIRST AMENDED LIST OF EXHIBITS

EXHIBIT NUMBER	DESCRIPTION	PARTY: OBJECTIONS	ADMIT
18	Second Amendment to Petition for Land Use District Boundary Amendment filed June 19, 2019 **(Previously filed and served on all parties)**		
19	Affidavit of Service of Second Amendment to Petition for District Boundary Amendment **(attached to the Second Amendment to Petition, previously filed and served on all parties)**		
20	Affidavit of Sending Second Amended Notification of Petition filing **(attached to the Second Amendment to Petition, previously filed and served on all parties)**		
21	Affidavit of Service Re: Notice of Hearing, filed October 22, 2019 **(Previously filed and served on all parties)**		
22	Findings of Fact, Conclusions of Law, and Decision and Order Accepting Petitioner's Final Environmental Impact Statement, filed April 26, 2019 **(Previously filed and served on all parties)**		
23	Letter dated July 16, 2019 from the State of Hawaii, Land Use Commission to Benjamin M. Matsubara, Esq. and Curtis T. Tabata, Esq. re: Petition for District Boundary Amendment is deemed a proper filing and accepted for processing as of July 16, 2019		
24	Letter dated July 9, 2019 from the State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife to HHF Planners re: Hawaiian Memorial Park Cemetery Expansion Project with attachment		
25	Letter dated August 7, 2017 from Hawaiian Islands Land Trust to Hawaiian Memorial Life Plan, Ltd. re: Proposed Conservation Easement at the Hawaiian Memorial Park		

DOCKET NO./PETITIONER: A17-804/HAWAIIAN MEMORIAL LIFE PLAN, LTD.

PARTY: Petitioner HAWAIIAN MEMORIAL LIFE PLAN, LTD.

FIRST AMENDED LIST OF EXHIBITS

EXHIBIT NUMBER	DESCRIPTION	PARTY: OBJECTIONS	ADMIT
26	Letter dated April 23, 2019 from Ko`olaupoko Hawaiian Civic Club to Land Use Commission re: Proposed Expansion of Hawaiian Memorial Park Cemetery – SUPPORT		
27	Pages one and seven of Hawaiian Memorial Park Briefing provided to City Council Transportation and Planning Committee August 1, 2017		
28	Letter dated October 23, 2018 from the Department of Transportation re: Hawaii Memorial Park Cemetery Expansion Project		
29	Written testimony and resume of Scott Ezer		
30	Written testimony of Jay Morford		
31	Written testimony and resume of Tom Holliday		
32	Written testimony and resume of Jami Hirota		
33	Written testimony and resume of Tom Nance		
34	Written testimony and resume of Robin M. Lim		
35	Written testimony and resume of Steven L. Montgomery		
36	Written testimony and resume of Steve Spengler		
37	Written testimony and resume of Susan Burr		
38	Written testimony and resume of Reginald David		
39	Written testimony and resume of Maya LeGrande		
40	Written testimony and resume of Todd Beiler		
41	Written testimony and resume of Matt Nakamoto		
42	Written testimony and resume of Rosanna Thurman		
43	Written testimony and curriculum vitae of Trisha Kehaulani Watson		

LAND USE COMMISSION
Department of Business, Economic Development & Tourism
State of Hawai'i

July 16, 2019

Benjamin M. Matsubara, Esq.
Curtis T. Tabata, Esq.
888 Mililani Street, Suite 308
Honolulu, Hawai'i 96813

Dear Mr. Tabata:

Subject: Land Use Commission Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

This is to acknowledge receipt of the subject Petition For Land Use Boundary Amendment ("Petition") seeking to reclassify approximately 53.449 acres of land from the State Land Use ("SLU") Conservation District to the SLU Urban District for cemetery expansion (the "Project") situated at Kāne'ohe, O'ahu, TMK No.: (1) 4-5-033: portion of 001 (the "Petition Area") filed in the subject docket on November 13, 2017, by Hawaiian Memorial Life Plan, Ltd. ("Petitioner").

The following documents in the subject docket were filed with the LUC on November 13, 2017:

1) Petition for Land Use District Boundary Amendment;
2) Petitioner's Exhibits 1-5;
3) Verification of Jay Morford;
4) Affidavit of Curtis T. Tabata, Esq. Attesting to Service of Petition;
5) Affidavit of Curtis T. Tabata, Esq. Attesting to Mailing of the Notification of Petition Filing;
6) Certificate of Service.

EXHIBIT "23"

235 SOUTH BERETANIA STREET ✱ SUITE 406 ✱ HONOLULU, HAWAI'I 96813 ✱ TEL (808) 587-3822 ✱ FAX (808) 587-3827 ✱ EMAIL: luc@dbedt.hawaii.gov
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

9) Affidavit of Service of Second Amendment to Petition for Land Use District Boundary Amendment;
10) Affidavit of Sending Second Amended Notification of Petiton Filing;
11) Certificate of Service.

We have reviewed the information contained in the Petition pursuant to §15-15-50, Hawai'i Administrative Rules ("HAR"). With the filing of the above documents the Petition for Land Use District Boundary Amendment is hereby deemed a proper filing and accepted for processing as of July 16, 2019.

Please be advised that in the event a notice of intent to intervene is filed with the LUC pursuant to §15-15-52(b), HAR, the Petitioner is required to serve a copy of the Petition upon the potential intervener and file an affidavit of Petitioner or its agent attesting to its compliance with §15-15-48(b), HAR.

Should you require clarification or further assistance in this matter, please contact Scott A.K. Derrickson, AICP, of my staff at 587-3921.

Sincerely,

Daniel E. Orodenker
Executive Officer

cc: Rodney Funakoshi, OP
Dawn Takeuchi-Apuna, Esq., deputy Attorney General
Kathy Sokugawa, Director, Department of Planning and Permitting
Paul S. Aoki, Esq., Acting Corporation Counsel

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

July 9, 2019

Mr. Scott Ezer, Principal
HHF Planners
Pacific Guardian Center, Makai Tower
733 Bishop Street, Suite 2590
Honolulu, HI 96813

SUBJECT: Hawaiian Memorial Park Cemetery Expansion Project
TMK: (1) 4-5-033: por. 001
Kāne'ohe, O'ahu, Hawai'i

Dear Mr. Ezer:

Thank you for your June 14, 2019 letter addressing the Hawaiian Memorial Park Cemetery Expansion Project. The seep located within the project site that includes the endangered black-line damselfly (*Megalagrion nigrohamatum nigrolineatum*) is an important resource for this endangered species and of interest to the State Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW).

We appreciate the briefing on the project, discussions with your staff, and efforts made to better understand the seep and subsurface water flow to ensure measures are implemented to continue its flow on a long-term basis. Provided the minimization measures identified in your letter are included as conditions of approval to ensure their implementation, we believe the seep and endangered damselfly would not be negatively impacted by the project. A Habitat Conservation Plan as part of an Incidental Take Permit application under Section 10 of the Endangered Species Act would also not be required for this project.

If you have any questions regarding this letter, you may contact me at 587-4181.

Sincerely,

David Smith, Administrator
Division of Forestry and Wildlife

EXHIBIT "24"

Attachment: DOFAW Conditions Letter June 13, 2019

HHF PLANNERS
places for people

June 13, 2019

Mr. David G. Smith, Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
State of Hawai'i
1151 Punchbowl Street, Room 325
Honolulu, Hawai'i 96813

SUBJECT: Hawaiian Memorial Park Cemetery Expansion Project
TMK: (1) 4-5-033: por. 001 (Private Property)
Kāne'ohe, O'ahu, Hawai'i

Dear Mr. Smith:

Thank you for taking the time to meet with us on Friday, April 19, 2019 to discuss the Hawaiian Memorial Park Cemetery Expansion Project. We appreciate the opportunity to discuss the proposed project and address the seep located within the project site that includes the endangered black-line damselfly (*Megalagrion nigrohamatum nigrolineatum*). The meeting allowed us to explain the considerable efforts undertaken to better understand the seep and subsurface water flow that supports the damselfly's habitat along this seep.

The importance of the seep and subsurface water flow was documented in the Draft Environmental Impact Statement (EIS), and discussion was expanded in the Final EIS. As noted, our project team has conducted hydrological and geotechnical engineering studies to evaluate the seep. The technical expertise from these firms provide us with confidence that the project would not negatively impact subsurface water flow to the seep. Several minimization measures are proposed to ensure continued subsurface water flow to the seep, in addition to providing a long-term back-up plan for water supply redundancy.

Based upon follow-up discussion with our staff since our meeting, we understand that the Division of Forestry and Wildlife (DOFAW) believes the minimization measures being proposed would ensure continuation of subsurface water flow to the seep and protection of the damselfly habitat. Consequently, a Habitat Conservation Plan as part of an Incidental Take Permit application under Section 10 of the Endangered Species Act would not be required for this project. Proposed minimization measures consist of the following:

1. A subsurface drainage system designed utilizing a herringbone configuration would be implemented in the cemetery expansion area planned for fill activities above the seep. The system would be comprised of three subsurface drainage mainlines with smaller subdrains branching laterally from them. This system would ensure water flow to the well and seep is maintained.
2. A well monitoring gauge or other appropriate device would be installed inside the well located upslope from the seep to monitor water levels prior to, during, and after project

construction. Once project earthmoving activities conclude, a permanent water line would be extended to the well from the expanded cemetery's irrigation system. This irrigation line would serve as a long-term means of ensuring continued water flow to the seep. If the gauge indicates water levels have declined to levels potentially affecting the seep, water from the irrigation line to the well could be provided to stabilize water levels. During construction, a temporary water line would also be extended to the well to support water levels, if necessary.

3. Small sticks upright and away from the edges of waterlogged areas would be placed along the seep to serve as molting safe zones to avoid predation during molting. These sticks would protect naiads because ants would not cross water barriers.
4. Habitat boundaries currently shown in the Final EIS would be reviewed during project final design based upon more accurate data collected from a topographic survey. Habitat boundary would be revised as appropriate. Fencing would be constructed around the damselfly habitat boundary to protect native damselfly from disturbance by feral pigs. Fencing should consist of hog wire designed with a lower barbed strand to resist digging by feral pigs.
5. Regular inspection of the seep would be scheduled to ensure the present low trickle flow of water is continued. Inspection could involve through development of a monitoring plan during the project's design phase. The plan would include BMP measures (i.e. erosion control) and would be implemented during the project's construction phase.
    a. Inspection of the seep should be conducted before the start of construction to establish baseline water flow conditions. Monitoring would occur during construction with the seep area inspected on a weekly basis to evaluate water flow in coordination with BMP measures.
    b. Once construction concludes, monitoring would continue for an additional six months to ensure continued seep water flow. Inspections would occur weekly for the first three months and every two weeks thereafter if conditions are satisfactory.
    c. After the six month period elapses, HMP staff would conduct monthly water flow inspections. If water flow is significantly disrupted, measures would be implemented to supplement short-term water flow (i.e. piping in of water).
    d. Appropriate measures would be determined through consultation between the contractor and the design team or other specialists to evaluate conditions and resulting measures. This has been successful at another site for a related endangered damselfly.
6. Monitor as part of seep inspections to ensure non-native fish, such as the Western Mosquitofish, are not present within this habitat area. Individuals conducting seep water flow inspections should be aware of the presence of alien fishes and should notify experienced biologists if fishes are sighted to ensure prompt identification and removal.

DOFAW would like assurance that the minimization measures proposed are included as conditions of approval to ensure they are implemented. To meet this request, proposed measures have been included with supplemental material submitted to the State Land Use Commission (LUC) as amendments to the initial Petition. This letter would be submitted to the LUC as another amendment to the Petition to further document the Petitioner's commitment to implement minimization measures. We would like to request a confirmation letter from DOFAW in response to this letter. DOFAW's confirmation letter would also be included in the amendment to the Petition. These measures would be included as conditions of approval for the project.

Thank you for providing us with the opportunity to meet with you and for having further discussions with our staff to clarify your understanding of the project and proposed minimization measures.

If you have any questions, please contact me at 457-3158 or sezer@hhf.com.

Sincerely,

Scott Ezer, Principal

cc: Mr. Jay Morford, Hawaiian Memorial Life Plan, Ltd.
Mr. Ben Matsubara & Mr. Curtis Tabata, Matsubara, Kotake & Tabata

HAWAIIAN ISLANDS
LAND TRUST

August 7, 2017

Jay Morford
President
Hawaiian Memorial Life Plan, Ltd.
1330 Maunakea Street
Honolulu, HI 96817

Re: Proposed Conservation Easement at the Hawaiian Memorial Park

Aloha Mr. Morford,
Thank you for contacting Hawaiian Islands Land Trust ("HILT") regarding the potential donation of a conservation easement on the Hawaiian Memorial Park ("HMP") land in Kaneohe.

HILT is a non-political, non-profit, land conservation organization committed to working with private landowners, community groups, community leaders, and government partners to protect lands in Hawaii with unique natural and cultural resources through our voluntary land conservation programs. HILT has protected over 17,800 acres by working collaboratively with landowners and communities across Hawaii.

I appreciate the opportunity to explore the protection of the natural and cultural resources on the HMP property in Kaneohe, and our site visit to the property. The HMP property does contain several unique natural and cultural resources which HILT would potentially be interested in protecting through a conservation easement. However, since HMP is currently seeking entitlements to expand its use on portions of the property where the proposed conservation easement would be located, the timing for a conservation easement would likely best be done after any entitlements or approvals were completed. This will ensure that all proposed uses and any requirements or conditions associated with the property are clearly established prior to the drafting of the conservation easement. The terms of the conservation easement would also be subject to approval by HILT's Board of Directors.

Once again, I appreciate the opportunity to help protect the natural and cultural resources at the HMP property in Kaneohe and look forward to continuing our conversation at the appropriate time.

Sincerely,

Kawika K. Burgess
CEO
Hawaiian Islands Land Trust

KO`OLAUPOKO HAWAIIAN CIVIC CLUB

April 23, 2019

To: Chair and Members
Land Use Commission

From: Leialoha Kaluhiwa, President
Ko`olaupoko Hawaiian Civic Club

Alice P. Hewett, Immediate Past President
Ko`olaupoko Hawaiian Civic Club

Re: Proposed Expansion of Hawaiian Memorial Park Cemetery – SUPPORT

Aloha, Chair and Members of the Commission:

The Ko`olaupoko Hawaiian Civic Club offers its strong support for the proposed expansion of Hawaiian Memorial Park Cemetery.

In past years, our members have debated the proposed expansion and deliberated over changes made to mitigate potential impacts of the project, particularly on Kawaewae Heiau and drainage issues for the neighboring community.

Because we feel the company has made good-faith efforts to address these concerns, and because our members are concerned that the existing capacity of the cemetery is approaching its limits, our members voted to support the expansion.

We should also note that the Association of Hawaiian Civic Clubs, at its 2018 convention held on Kauai, passed a resolution in support of the cemetery expansion and preservation of Kawaewae.

We are committed to working with Hawaiian Memorial Park Cemetery on its efforts to preserve the heiau.

Mahalo for this opportunity to offer our mana`o.

The Ko`olaupoko Hawaiian Civic Club was established in 1937 and is a not-for-profit community organization dedicated to preserving and perpetuating the history, heritage and culture of Native Hawaiians. One of the largest of the Hawaiian Civic Clubs, its membership is open to people of Hawaiian ancestry and those who are "Hawaiian at heart".

P. O. Box 664 * Kaneohe, HI 96744 * Ph. (808) 235-8111 * www.koolaupokohcc.org

ASSOCIATION OF HAWAIIAN CIVIC CLUBS

A RESOLUTION

No. 2018 – 37

SUPPORTING ESTABLISHMENT OF THE KAWA'EWA'E HEIAU CULTURAL PRESERVE AS PART OF THE HAWAIIAN MEMORIAL PARK CEMETARY PLAN AND THE EXPANSION OF THE CEMETARY TO PROVIDE BURIALS SPACES FOR ISLAND FAMILES

WHEREAS, Kawa'ewa'e Heiau is located on Kawa'ewa'e ridge in the 'ili of the same name, in the ahupua'a of Kāne'ohe; and

WHEREAS, the heiau is believed to have been built by Chief Olopana as a Kū heiau centuries ago, and subsequently also used as an agricultural heiau dedicated to the god Lono; and

WHEREAS, during his visits to the Ko'olaupoko moku, Chief Olopana stopped at Kawa'ewa'e Heiau to rest and to receive requests for help or judgment on various matters in the region; and

WHEREAS, the site is legendary as a wahi kapu where Olopana and Kamapua'a met in conflict in ancient times; and

WHEREAS, after the great epidemics of the 19th century, when many of the people who cared for this heiau were stricken with fatal illnesses, there came a time where there was no one left to mālama this wahi kapu; and

WHEREAS, in addition, following the death of Kamehameha I and due to the influence of Ke Ali'i Ka'ahumanu, the people were forbidden to follow the teachings of the priests; and

WHEREAS, in modern times, with the emergence of western society in island communities, the heiau complex lands fell into other hands and were used for cattle grazing and other purposes; and

WHEREAS, nearby residents of the Pikoiloa tract re-discovered the heiau in the 1990s and began efforts to clear and raise awareness of its presence; and

WHEREAS, both the Ko'olaupoko Hawaiian Civic Club and Queen Emma Hawaiian Civic Club have given of their service and time to mālama this wahi kapu over the years; and

WHEREAS, the property was acquired by Hawaiian Memorial Park Cemetery in 1983 as a potential area for development of burial spaces; and

WHEREAS, the landowners have subsequently decided that, as part of the cemetery's proposed expansion, a cultural preserve should be established to incorporate Kawa'ewa'e heiau complex; and

WHEREAS, the landowner has begun meetings with the Hawaiian Islands Land Trust and the Ko'olaupoko Hawaiian Civic Club to plan for establishment of the cultural preserve, including the setting aside of 100 Native Hawaiian burial spaces; and

WHEREAS, the entirety of the expansion area would be placed into a conservation easement managed by the Hawaiian Islands Land Trust to preserve the cultural and natural resources; and

WHEREAS, the entirety of the cultural preserve would be placed under the management of the Ko'olaupoko Hawaiian Civic Club for cultural and educational purposes that would benefit the club and surrounding community; and

WHEREAS, this cultural preserve would be included as part of the cemetery's plan to expand burial spaces available to the general public in the surrounding area; and

WHEREAS, this project becomes a model whereby private companies and Hawaiian Civic Clubs can work cooperatively to develop ways to give the management of lands and cultural resources to kūpuna, Hawaiian practitioners, and Hawaiian communities.

NOW, THEREFORE, BE IT RESOLVED, by the Association of Hawaiian Civic Clubs at its 59th Annual Convention in Kalapaki, Kaua'i, in the malama of Welehu and the rising of 'Olepau, this 17th day of November 2018, supporting establishment of the Kawa'ewa'e Heiau cultural preserve as part of the Hawaiian Memorial Park Cemetary plan and the expansion of the cemetary to provide burials spaces for island familes; and

BE IT FINALLY RESOLVED, that a certified copy of this resolution is transmitted to the Governor of the State of Hawai'i, Mayor of the City and County of Honolulu, Honolulu City Council, the Ko'olaupoko Hawaiian Civic Club, and Hawaiian Memorial Park Cemetery, as well as the President of the State Senate, Speaker of the State House of Representatives, Chair of the State Senate Committee on Hawaiian Affairs, Chair of the State House Committee on Ocean, Marine Resources & Hawaiian Affairs, Chair of the Board of Trustees of the Office of Hawaiian Affairs, and all other County Mayors.

The undersigned hereby certifies that the foregoing Resolution was duly adopted in the malama of Welehu and the rising of 'Olepau on the 17th day of November 2018, at the 59th Annual Convention of the Association of Hawaiian Civic Clubs in Kalaheo, Kaua'i.

Annelle C. Amaral, President

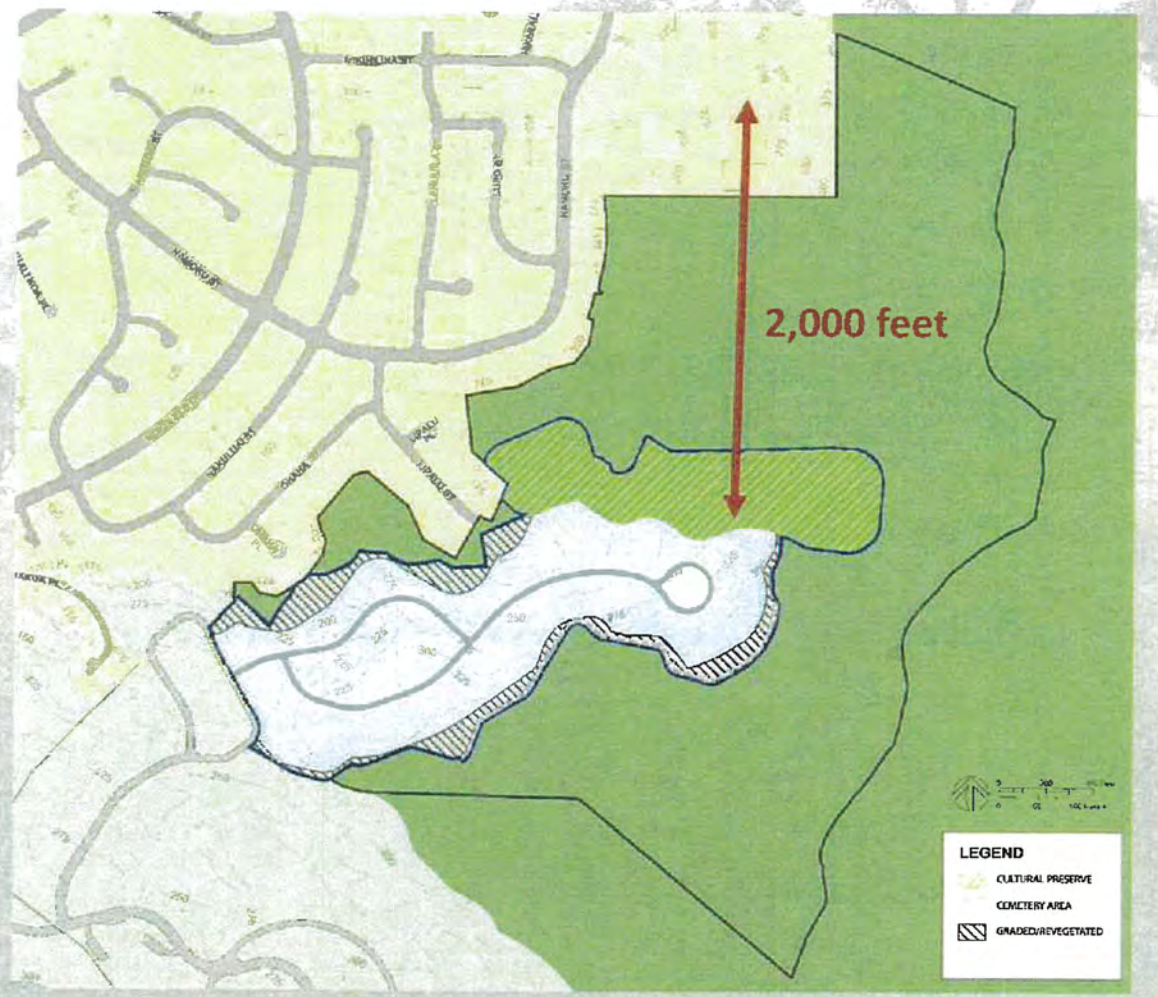
City Council Transportation and Planning Committee August 1, 2017

Hawaiian Memorial Park Briefing

HAWAIIAN MEMORIAL PARK
CEMETERY

New HMP Plan

1. Expanded Cultural Preserve from 9 to 14.5 acres
2. Preserve to be managed by Koolaupoko Hawaiian Civic Club
3. Increase residential buffer from 50 to 150 feet
4. Half of Project Site in Cultural Preserve/Other Open Space
5. 100 year 1 hour storm event for drainage
6. Approximate 2,000-foot buffer from Pohai Nani residential units



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

RETURN SERVICE REQUESTED

HONOLULU
HI 968
25 OCT '18
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Mr. Ronald A. Sato
AICP, Senior Associate
HHF Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

RECEIVED
OCT 29 2018
HHF PLANNERS

96813-401640

EXHIBIT "28"

DAVID Y. IGE
GOVERNOR

JADE T. BUTAY
DIRECTOR

Deputy Directors
ROY CATALANI
ROSS M. HIGASHI
EDWIN H. SNIFFEN
DARRELL T. YOUNG

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

IN REPLY REFER TO:
DIR 1029
STP 8.2544

October 23, 2018

TO: THE HONORABLE LUIS P. SALAVERIA, DIRECTOR
DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT
AND TOURISM

ATTN: SCOTT DERRICKSON
LAND USE COMMISSION

FROM: JADE T. BUTAY
DIRECTOR OF TRANSPORTATION

SUBJECT: HAWAIIAN MEMORIAL PARK (HMP) CEMETERY EXPANSION PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT
KANEOHE, OAHU, HAWAII
TMK: (1) 4-5-033:001 (POR.)

The applicant, Hawaiian Memorial Life Plan, Ltd., which owns and manages HMP, proposes an expansion to ensure that a sufficient supply of burial plots can be maintained. The applicant proposes reclassification of a 53.45 acres portion of Parcel 001 (164.4 acres) from Conservation District to Urban District. The reclassified area will consist of 28.2 acres for cemetery use, 14.5 acres for cultural preserve and the remainder for open space and internal roadways. The Department of Transportation (DOT) offer the following comments:

Highways Division

Kamehameha Highway in the project vicinity is a four-lane facility and HMP has two stop-controlled driveways across from Mahinui Road and from Halekou Road. The Traffic Impact Analysis Report (TIAR) noted that DOT was evaluating the Halekou Road intersection for possible signalization but, no decision had been made. The TIAR included two alternatives: one with a traffic signal, and one without a traffic signal.

1. Based on the TIAR, the proposed expansion is not anticipated to have a significant impact to our State highways; therefore, HMP has no transportation improvements to the State Highway System. HMP should implement the TIAR recommendation for restriping the HMP approaches to Kamehameha Highway to provide for better exiting traffic flow.

2. HMP should provide for appropriate traffic control plans in the event some activity within HMP and/or areas contained with its boundaries may cause traffic issues at access driveways.

3. If there should be unexpected traffic issues not provided for in the TIAR that can be attributed to HMP, the traffic issues should be mitigated to the satisfaction of the DOT.

If there are any questions, please contact Mr. Blayne Nikaido of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7979 or by email at blayne.h.nikaido@hawaii.gov.

c: Ronald A. Sato, HHF Planners

Testimony of
SCOTT EZER, PRINCIPAL
HHF PLANNERS
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 1,

My name is Scott Ezer and I am a Principal at Helber Hastert & Fee Planners, Inc. (dba HHF Planners) (HHF), a land use planning firm with expertise in a variety of land use planning subfields. I was the Principal-in-Charge of the preparation of the Final Environmental Impact Statement for the project which is the subject of this docket. A copy of my resume is attached.

My testimony today will focus on the planning issues related to this Petition. In this framework, I will be presenting information on the following subjects:

- Environmental Impact Statement
- Project Background and Description
- Standards for Determining Urban District Boundaries
- Community Outreach
- Ko`olau Poko Sustainable Communities

ENVIRONMENTAL IMPACT STATEMENT SCOPE OF EFFORT

HHF Planners was retained by Hawaiian Memorial Life Plan Limited (HMLP) to prepare the Environmental Impact Statement (EIS) required to support the Petition for this docket. As I stated previously, I served as the Principal-in-Charge for this this effort. HHF's major responsibilities included:

- Identifying specialty studies needed for the EIS
- Selecting qualified consultants to conduct the specialty studies
- Coordinating the field work for the qualified consultants
- Coordinating interactions with jurisdictional agencies during the course of EIS preparation
- Preparing and distributing the EIS Preparation Notice for the proposed action
- Preparing and distributing the Draft EIS for the proposed action
- Preparing and distributing the Final EIS for the proposed action

The EIS was a comprehensive review and analysis of the potential impacts that could occur as a result of the Proposed Action, and the various subject areas required for inclusion in the Petition. The following studies, prepared by expert investigators in their specific areas of expertise, are included in the Final EIS:

- Market Study and Economic Analysis
- Potential Rockfall and Slope Hazard Assessment
- Preliminary Engineering Report
- Botanical Resources Assessment
- Avian and Terrestrial Mammalian Survey
- Native Invertebrate Resources Survey
- Assessment of the Potential Impact on Groundwater

EXHIBIT "29"

- Water Quality Report on Impacts to Kawa Stream
- Archaeological Inventory Survey
- Cultural Impact Assessment
- Environmental Noise Assessment
- Traffic Impact Analysis Report
- Jurisdiction Waters Determination

The Final EIS for this project was accepted by the Land Use Commission on April 23, 2019.

PROJECT BACKGROUND

HMLP, the Petitioner, owns and manages Hawaiian Memorial Park (HMP), a full service cemetery that has been at its present location since 1958. HMP is the final resting place for over 41,000 people, representing families across Hawai'i. HMP has grown from an initial size of six acres to its existing size of 80 acres situated across three tax map parcels as sections of the cemetery have filled. In 1997, the Petitioner obtained approval from the City and County of Honolulu (City) to expand the then 72-acre HMP by another approximately eight acres (Ocean View Garden). The 122.5-acre Hawai'i State Veterans Cemetery site partially extends between the main HMP and Ocean View Garden section. A driveway easement through the Veterans Cemetery provides access connecting the HMP properties. The site of the Veterans Cemetery initially consisted of 89.5 acres that was used previously by the State as a baseyard and undeveloped property. An adjacent 33.0 acre property was donated to the State by HLMP so that the now combined 122.5-acre property could qualify for selection as a veterans cemetery and be developed as the Hawai'i State Veterans Cemetery in 1992.

The Proposed Action that comprises this Petition includes a plan that has evolved over the last several years, in the wake of a prior unsuccessful Petition to expand the existing Hawaiian Memorial Park (HMP) Cemetery in 2010. The Petitioner had developed expansion plans in 2007 that included completing a Final Environmental Impact Statement (FEIS) in September 2008. Since then, the Petitioner has had several meetings over the years with the Kāne'ohe Neighborhood Board, community members, and government agencies to address concerns associated with previous plans included in that FEIS. Present project plans have since been revised as reflected in this Petition. The proposed expansion of the HMP cemetery has also been incorporated in the City's updated *Ko'olau Poko Sustainable Community Plan* (DPP, 2017), which was revised by adoption of Ordinance 17-42 by the City Council in August 2017. I will have more on this issue later in my testimony.

The Petition Area is about 53.45 acres in size, and is a portion of a larger 164.4-acre parcel owned by HMLP. The 53.45-acre site includes a portion of a bluff that is presently undeveloped, but was previously used for agricultural and dairy farming activities. The HMP's existing Ocean View Garden, which was the location of the site visit for this docket, is located adjacent to the Petition Area on the northwest end of the larger 164-acre property. A general location map for the Petition Area can be found labeled as Figure 1.2 on page 1-8 of Petitioner's Exhibit 6 (The Final EIS).

Of the 53.45-acre Petition Area, 28.2 acres would be for cemetery use; 7.75 acres would consist of internal roadways; 3.0 acres for other open space, primarily buffer areas; and 14.50 acres for the establishment of a Cultural Preserve. Figure 2-2 on page 2-23 of Petitioner's Exhibit 6 (Final EIS) presents a conceptual plan for the future cemetery expansion. The remainder of Parcel 1 (103.07 acres) would be left undeveloped. The Petition Area is currently undeveloped, and previous land uses on the property within the last 50 to 100 years included ranching, dairy farming, and agriculture cultivation.

The conceptual plan for the proposed project is consistent with modern cemetery planning objectives. This includes considerations for views, maximizing use of easily walkable terrain, creating individual/exclusive burial areas, and addressing feng shui issues which are an important cultural consideration in Hawai'i.

There is a need to establish long-term stewardship responsibilities for the 156-acre property (not including HMP's 7.9-acre existing Ocean View Garden site). Areas of the property outside of the Petition Area would remain undeveloped, but some management and stewardship of this area is necessary for the future. Efforts are needed to prevent unauthorized use of the remaining areas because the area could be accessed from surrounding properties.

In support of these management objectives. a conservation easement is proposed for the remaining area of this parcel. A conservation easement is a legal agreement between a landowner and a third party that permanently limits uses of the land. The conservation easement would ensure no future urban development of the remaining 103 acres outside of the Petition Area, and that development of the Petition area would be limited to cemetery use and the Cultural Preserve. The conservation easement would establish a partnership between the Petitioner and the Hawaiian Islands Land Trust, allowing that organization to oversee the long-term management of remaining undeveloped areas. This conservation easement would also oversee the Cultural Preserve and ensure the long-term stewardship of this area as well.

The approximately 7.75 acres of the Petition Area would remain identified as other open space and undeveloped. The majority of this undeveloped open space area is located downslope from the cemetery expansion area and runs parallel to the Petition Area's northern boundary. This open space area provides a vegetated buffer between residences located downslope from the cemetery expansion. The area includes a small seep that would be preserved providing habitat for the endangered blackline Hawaiian damselfly.

Detention basins temporarily retaining stormwater runoff from the area and improving water quality are also proposed within this open space area. Smaller portions of this open space are located upslope from the Petition Area along the Oneawa hillside. An irrigation system would be provided to irrigate the landscape elements of the cemetery when necessary. The irrigation system for the existing HMP is served by the City's potable water system. A connection point is located at the entrance to HMP in the vicinity of Mahinui Road and Kamehameha Highway. A waterline under Kumakua Place irrigates the existing Ocean View Garden site.

Preliminary plans incorporate measures and BMPs from the City Department of Planning and Permitting's (DPP) new administrative rules on water quality under Title 20, Chapter 3 *Rules Relating to Water Quality*, amended August 16, 2017. The project's later design phase would include further analysis of site conditions and the appropriate design of drainage improvements. This would include inlet and outlet structures, junction-structures, slope of pipes, and open channel sections designed to enhance engineering efficiency and management of stormwater runoff. Drainage improvements would include post-construction stormwater design components that include:

- Appropriate low-impact development (LID) strategies and source control best management practices (BMPs).
- On-site detention of the water quality volume (WQV) or biofiltration measures, such as biofiltration swale or infiltration basin, for the remaining amount of the WQV not retained on-site.
- Vegetative buffers to support storm water infiltration.

The details of this conservation easement would be developed later between the Petitioner and HILT upon reclassification approval of this project. It is expected the easement would be a condition of approval by the Land Use Commission.

The project would be financed by the cash flow of HMLP's parent company. Debt or financing would not be required to implement the project. Development costs for the cemetery construction are estimated at $29.3 million (in 2018 dollars).

STANDARDS FOR DETERMINING URBAN DISTRICT BOUNDARIES

The State LUC follows eight standards for Urban District boundaries as set forth in §15-15-18, HAR in reviewing petitions for reclassification of existing district boundaries. These standards are presented below, followed by a discussion of the compatibility of Petition Area lands with these standards.

(1) It shall include lands characterized by "city-like" concentrations of people, structures, streets, urban level of services and other related land uses;

Discussion: The existing Petition Area is currently undeveloped. However, the Petition Area is surrounded by city-like urban land uses, services, activities, and infrastructure. Cemeteries can be considered "other related land uses" that are only allowable within the Urban District. The existing HMP and Hawai'i State Veterans Cemetery are situated adjacent to the Petition Area. The Pikoiloa residential subdivision is situated immediately north of the Petition Area. The heavy industrial Kapa'a Quarry is located east southeast of the property. There are existing roadways and highway facilities serving surrounding uses. Utilities (e.g. water lines, electricity, wastewater facilities), and several other urban services are found in the nearby Kāne'ohe area (e.g. schools, Pohai Nani retirement home, commercial and retail establishments). Therefore, the project reflects a reasonable extension of city-like urban related uses.

(2) It shall take into consideration the following specific factors:
(A) Proximity to centers of trading and employment except where the development would generate new centers of trading and employment;
(B) Availability of basic services such as schools, parks, wastewater systems, solid waste disposal, drainage, water, transportation systems, public utilities, and police and fire protection; and
(C) Sufficient reserve areas for foreseeable urban growth;

Discussion: The Petition Area is adjacent to established residential neighborhoods, commercial and industrial areas and other cemetery uses. Cemetery expansion improvements and the establishment of the proposed Cultural Preserve would not increase the population of the Kāne'ohe area, or lead to additional undesirable stress on centers of trading and employment or basic services. Employment opportunities are readily accessible in Kāne'ohe and public facilities, services, and utilities are already in existence in the area. The first of the three factors under this standard is intended to evaluate whether areas proposed for the Urban District are proximate to infrastructure, public facilities and services, and centers of trading and employment. As discussed under Standard No. 1, there are existing centers of trading, employment, and urban-related activities in the surrounding vicinity of the Petition Area.

There is significant existing infrastructure facilities and services provided in the immediate vicinity. Circulation networks already provide convenient and reasonable access and services to HMP and other surrounding land uses. Kamehameha Highway provides direct access to the cemetery, and the H-3 Freeway is approximately 0.25 miles to the east. There is already water service provided to HMP, and the City BWS indicated there is available capacity to serve the cemetery expansion. The cemetery

expansion and Cultural Preserve would not require additional wastewater infrastructure or contribute increased flows to the existing wastewater system in the area. Additional green waste would be generated by more acreage in turf management and the increased flowers used for gravesite visits. The processing of green waste is already managed by HMP on-site. The proposed project would have a beneficial effect by decreasing storm water runoff rates and volumes, detaining runoff, and improving water quality within Kāwā Stream.

The cemetery expansion would have minimal long-term effect on public facilities. The cemetery expansion would be designed to provide appropriate access to the area for fire protection and other emergency vehicles, although additional gravesite visits are expected to have minimal effect on their ability to provide protection services. Therefore, the expansion of the Urban District for this project is reasonable and beneficial given consideration of existing infrastructure facilities along with public facilities and services provided in the surrounding area.

Finally, the Petition Area is designated for urban expansion by the City's Koolaupoko Sustainable Communities Plan. No land is being removed from other urban uses to facilitate this project. As such, other urban lands would still be available for urban growth that might otherwise occur in the Kāne'ohe region.

(3) It shall include lands with satisfactory topography, drainage, and reasonably free from the danger of any flood, tsunami, unstable soil condition, and other adverse environmental effects;

Discussion: The project is consistent with this standard because the Petition Area includes lands with reasonably satisfactory topography, would improve existing drainage conditions, is free from natural hazards and unstable soil conditions, and would not have adverse environmental effects that cannot be minimized or mitigated as discussed in pertinent sections of the Final EIS. The overall Petition Area has reasonably satisfactory topography to implement the cemetery improvements proposed with some areas on the western mauka portion having steeper slopes that would be affected. This land is similar in character to other lands which comprise the existing HMP cemetery that have been graded in previous development phases, including Ocean View Garden.

Existing topographic conditions within the Petition Area would be graded to create conditions more appropriate for burial operations and activities. Areas would be designed to have slopes no greater than 20% to create topographic conditions suitable for pedestrian access. The project would improve Petition Area drainage conditions by decreasing area slopes, improving site permeability with proposed turf grass landscaping, and detain runoff and sediment through construction of retention/detention basins. The grading plan would improve site conditions by reducing storm water runoff volume and velocity, and also decreasing potential downstream flooding. The proposed project drainage system would improve stormwater management by designing site improvements for the 100-year 1-hour storm event.

The Petition Area is not in an identified flood hazard area or tsunami inundation zone. The project geotechnical study assessed rockfall and debris flow risk within the Petition Area. The study did not identify evidence of prior debris flow or landslide activity within the Petition Area characteristic of unstable soil conditions. While some areas of the Petition Area are subject to rockfall hazard, preliminary design measures were identified to mitigate this risk. Such measures (e.g. fencing, rockfall catchment ditch) should provide a high level of safety against rockfall hazards. Landscaped grass areas created for the cemetery would be a significant improvement removing existing vegetation litter debris and exposed soil and gravel/cobble talus from the site. The modified topography would reduce steeper upper slopes and create a gentler topography that would eliminate potential landslide hazards.

Therefore, the Petition Area is reasonably free from natural hazards, and proposed plans would improve site conditions further reducing possible effects.

(4) Land contiguous with existing urban areas shall be given more consideration than noncontiguous land, and particularly when indicated for future urban use on state or county general plans;

Discussion: The Petition Area is located contiguous to urban areas on its northern, western and southern boundaries. The Petition Area abuts the existing Ocean View Garden cemetery on its western boundary. Residential developments within the Pikoiloa subdivision are located adjacent to the Petition Area's northern boundary. Residential subdivisions are located across Kamehameha Highway to the south. Both the Ocean View Garden and Pikoiloa subdivision are within the Urban District. Furthermore, the City's *Ko'olau Poko Sustainable Communities Plan* designates the Petition Area for urban expansion intended for cemetery use within the Community Growth Boundary.

(5) It shall include lands in appropriate locations for new urban concentrations and shall give consideration to areas of urban growth as shown on state and county general plans;

Discussion: The Petition Area is not shown on any State or City and County of Honolulu land use policies as an area of urban growth. However, the Petition Area is an appropriate location for cemetery development given its proximity to existing cemetery and residential areas. The City and County *Ko'olau Poko Sustainable Communities Plan* provides a framework to implement the City and County *General Plan* objectives at a regional level. Planning guidelines discussed in the *Ko'olau Poko Sustainable Communities Plan* are applicable to the Petition Area. The "Community Growth Boundary" defines and contains the extent of urbanized or "built" portions of the SCP area, and is intended to ensure an adequate supply of land is provided to support Ko'olau Poko's established suburban and rural communities while protecting land outside the boundary for agricultural and open space preservation. The growth boundary was revised to include the area associated with the Petition Area in 2017. Therefore, the Urban District designation is reasonable and appropriate to the Petition Area as it is located within the designated growth boundary.

(6) It may include lands which do not conform to the standards in paragraphs (1) and (5):
(A) When surrounded by or adjacent to existing urban development
(B) Only when those lands represent a minor portion of this district;

Discussion: The Petition Area conforms to Urban District standards (1) and (5).

(7) It shall not include lands, the urbanization of which will continue toward scattered spot urban development, necessitating unreasonable investment in public infrastructure or support services; and

Discussion: The Petition Area is contiguous to existing Urban District areas, and designated for future urban expansion under the City's *Ko'olau Poko Sustainable Communities Plan's* Community Growth Boundary. Reclassification of the Petition Area to the Urban District will not lead to scattered urban development given its proximity to existing urban uses. As discussed in Chapters 4 and 5, the proposed project would not require additional investment in public infrastructure or services.

(8) It may include lands with a general slope of 20 per cent or more if the commission finds that those land area desirable and suitable for urban purposes and that the design and construction controls, as adopted by any federal, state, or county agency, are adequate to protect the public health, welfare and safety, and the public's interests in the aesthetic quality of the landscape.

Discussion: The Petition Area is desirable and suitable for urban purposes as discussed in Chapter 2 of the Final EIS due to its location and site conditions for cemetery expansion supporting HMP. Section 2.1 justified the need for such an expansion, and Section 2.2 identified other stewardship and management components supporting the wise and reasonable use of this area (e.g. Cultural Preserve and conservation easement). Furthermore, the City's *Ko'olau Poko Sustainable Communities Plan* designates this Petition Area for urban expansion intended for cemetery use.

Existing topographic conditions within the Petition Area vary and exceed 20% slopes in some areas. Slope conditions within the cemetery expansion area range from 25% to 30% in the eastern basin area to 90% at the hillside adjacent to Ocean View Garden. Project implementation would grade lands within the cemetery expansion area to slopes no greater than 20% to ensure the area is suitable for pedestrians.

The project would improve the Petition Area's current drainage conditions by decreasing area slopes, improving site permeability with turf grass landscaping, and detaining runoff and sediment with construction of retention/detention basins. The grading plan would improve site conditions by reducing storm water runoff volume and velocity, decreasing potential downstream flooding, and improving water quality within Kāwā Stream. The proposed project would improve stormwater management by designing site improvements for the 100-year storm, instead of the required 10-year storm event.

As discussed in Section 2.2, the project's design phase would develop construction plans that would be reviewed and approved by jurisdictional government agencies. These plans would include BMPs and other measures to minimize and mitigate short-term construction-related effects.

Topographic conditions would remain similar to existing conditions within the Cultural Preserve. Slopes within this portion of the Petition Area vary significantly as one travels from lower to higher elevations and exceed 20% in many areas. The Cultural Preserve would not be open to the general public. Measures to ensure the health, safety, and welfare of the individuals authorized to access the Cultural Preserve will be determined by the preparation of a preservation plan. The Ko'olaupoko Hawaiian Civic Club along with other organizations that may manage and steward the Cultural Preserve will implement the preservation plan.

COMMUNITY OUTREACH

Following is a list events that included discussion of the proposed project;

Department of Planning and Permitting Koolau Poko Sustainable Communities Plan Update Public Meeting
November 2009
September 2010
November 2014

Kaneohe Neighborhood Board

Agenda Planning Committee	May 2, 2017
Full board meeting:	May 17, 2017
Agenda Planning Committee	July 11, 2017
Full Board meeting	August 17, 2017
Full board meeting	September 21, 2017
Planning Committee	October 3, 2018

Full board meeting October 18, 2018

City and County of Honolulu Planning Commission
Public Hearing July 16, 2016

City and County of Honolulu City Council
Transportation and Planning Committee February 1, 2017
Full Council Public Hearing February 22, 2017
Transportation and Planning Committee August 1, 2017
Full Council 3rd Reading/Adoption August 9, 2017

Private meeting between Petitioner and three intervenors (G. Yoshimuri; J McCreedy; R. McCreedy)
July 19, 2017

KO`OLAU POKO SUSTAINABLE COMMUNITIES PLAN

The Project is consistent with the *Ko`olau Poko Sustainable Communities Plan* (KPCSP). With the adoption Ordinance 17-42 by the City Council on August 9, 2017, and signed by the Mayor on August 24, 2017, the proposed cemetery expansion achieved consistency with the KPSCP.

It should be noted that the Department of Planning and Permitting has consistently testified, both at the City and County of Honolulu City and before the State Land Use Commission, that the proposed project is consistent with the KPSCP. In fact, in their most recent Statement of Position regarding this docket, the Acting Director of DPP emphatically supported the position:

> *The DPP testified before the Land Use Commission ("LUC") on April 23, 2019, that the Project is consistent with City Ordinance No. 17-42, the Koolau Poko Sustainable Communities Plan ("KPSCP"), dated August 2017. The KPSCP,* ***which is not a regulatory document*** **(emphasis added)**, *sets forth regional land use policies and guidelines, and specifically indicates that the Petitioner's lands are proposed for cemetery expansion. The 28.2-acre expansion of the cemetery and 14.5 acres for the proposed Kawaewae Heiau cultural preserve are included within the KPSCP's Community Growth Boundary ("CGB"). In addition, pursuant to Section 3 .1.3, Elements of Open Space of the KP SCP,· guidelines for cemeteries emphasize very low lot coverage ratios; minimally visible above-grade structures; measures to mitigate, reduce, or rectify adverse impacts on sensitive species or the environment; and specific to any proposed expansion of Hawaiian Memorial Park, a 150-foot buffer from homes, a 2,000-foot buffer from Pohai Nani senior living ommunity, and a phased approach to cemetery interment so that the land adjacent to the residential homes on Lipalu Street are the last to be used in order to minimize potential impact to neighboring residents.*

In furtherance of the notion that the KPSCP is not regulatory, but policy driven, DPP further explains:

> *As stated in the adopting ordinance for the KPSCP in Section 24-6.2(c) of the ROH, "the provisions of this article and the Koolau Poko SCP are not regulatory (***emphasis added***). Rather they are established with the explicit intent of providing a coherent vision to guide all new public and private sector development within Koolau Poko."*

As HHF stated in a letter to DPP on March 29, 2019, the purpose of SCPs in general are discussed in the Honolulu City Charter. Under Section 6-1509 of the City Charter, development plans (including SCPs) consist of "conceptual schemes" for implementing and accomplishing the development objectives and policies of the City's general plan. Further, these plans are to describe the desired urban character and the significant natural, scenic and cultural resources for the several parts of the city to a degree which is sufficient to serve as a "policy guide" for more detailed zoning maps and regulations. Consistent with the City Charter, Ordinance 17-42 adopting the KPSCP states (Section 1) that the plan presents a "vision" for future development consisting of "policies, guidelines, and conceptual schemes that will serve as a policy guide" for public and private sector investment decisions. Section 24-6.2 (Applicability and intent) further explains that the provisions of the KPSCP are not regulatory. SCPs are established with the explicit intent of "providing a coherent vision to guide" all new public and private sector development, and are not deemed to be regulatory.

This is a key concept, as the intervenors intend to argue that the Petition is inconsistent with the KPSCP because it fails to adhere to language calling for a 2,000-foot buffer from the **Pohai Nani senior living community.**

2,000 FOOT BUFFER FROM THE POHAI NANI SENIOR LIVING FACILITY

Petitioner had submitted a June 9, 2017 memo to the Council Transportation and Planning Committee with a revised conceptual plan that: 1) proposed only 28.2 acres for cemetery expansion; 2) would establish a Cultural Preserve and create a conservation easement over the property; and 3) proposed an **approximate** 2,000-foot buffer from the Pohai Nani residential tower that would provide **visual mitigation** for its residents.

During the Transportation and Planning Committee meeting on August 1, 2017 (the final committee meeting before adoption of Ordinance 17-42), a PowerPoint presentation was given by HHF (Communication M-3552) and included a slide showing the buffer area from Pohai Nani (See Exhibit SE-1). As shown, the buffer distance extended from the **center of the Pohai Nani residential tower** up to the edge of the cemetery expansion. Further, bullet No. 6 of the slide clearly stated the 2,000-foot distance was an **approximate** distance from the residential units.

PURPOSE OF 2,000-FOOT BUFFER

The express purpose for the buffer was based on the testimony of several residents of Pohai Nani who did not want to look at the cemetery from their living units. It should be noted that private views are not protected by any County or State law. However, in the interest of being a good neighbor, HMP adjusted the proposed plan for the cemetery expansion to specifically address this issue by deleting the area of expansion previously proposed on the northeast side of the Cultural Preserve, thereby retaining the vegetated area of approximately 100 acres as a green space between Pohai Nani and the edge of the cemetery expansion.

In an effort to document the actual buffer distance between the Pohai Nani residential tower and the edge of the cemetery expansion area, HHF analyzed 32 measurements between the mid-point of the Pohai Nani residential tower and the edge of the cemetery expansion. The actual distance ranged from a low of 1,800 feet to a high of 3,068 feet (see Exhibit SE-2). The mean distance of all 32 data sets was 2,134 feet. Distances were measured using orthorectified aerial photography and ArcGIS software.

Another metric that can be used to determine whether the Proposed Action meets the intent of the KPSCP is to consider what actually can be seen from the Pohai Nani residential tower. First, it should be

noted that the direct line of sight from the Pohai Nani tower is oriented toward the west southwest, away from the cemetery expansion area, which is oriented toward the southeast. Meaning, the direct line-of-sight for Pohai Nani residents is not toward the cemetery expansion. Using the same 32 lines measured in Exhibit SE-2, a computer generated view was analyzed toward the cemetery expansion area to determine at what point the cemetery expansion would be viewable.

Each line was analyzed as if it were from the top floor of the Pohai Nani residential tower at 130 feet above existing grade. The view from this vantage point offers the greatest reach of viewing area. Due to angle of view, as you move down in height on the tower, the viewer is able to see less, until at some point you will no longer be able to see the cemetery expansion area. Using ArcGIS software, a terrain model was created based on future topography that would exist after the cemetery expansion is completed. A tree canopy height of 35 feet was used to allow for the interruption of views by existing vegetation. Exhibit SE-3 presents distances from the top floor of the Pohai Nan residential tower to the point at which the cemetery expansion would be visible. Only 15 of the 32 viewing lines offer a view of the cemetery expansion, and these distances range from 2,454 feet to 3,153 feet, with a mean distance of 2,712 feet, well beyond the recommended 2,000-foot buffer. Again, if we assume that the purpose of the buffer is for visual relief, the Proposed Action more than satisfies the intent of the KPSCP language.

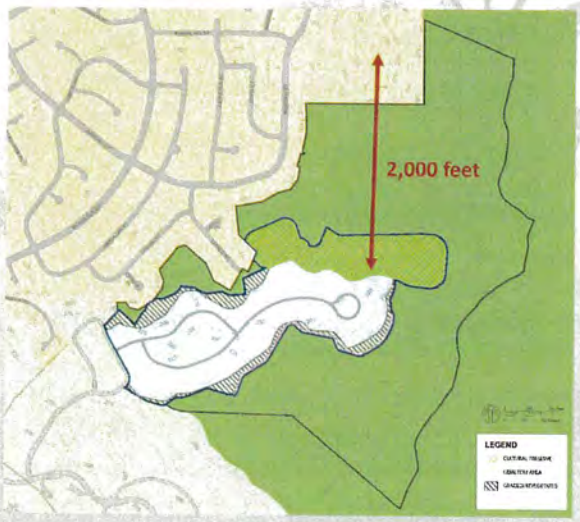
City Council Transportation and Planning Committee August 1, 2017

Hawaiian Memorial Park Briefing

HAWAIIAN MEMORIAL PARK
CEMETERY

New HMP Plan

1. Expanded Cultural Preserve from 9 to 14.5 acres
2. Preserve to be managed by Koolaupoko Hawaiian Civic Club
3. Increase residential buffer from 50 to 150 feet
4. Half of Project Site in Cultural Preserve/Other Open Space
5. 100 year 1 hour storm event for drainage
6. Approximate 2,000-foot buffer from Pohai Nani residential units



Source: City Council Communication M-3552

Hawaiian Memorial Park

Mean Distance Calculations from Pohai Nani to Cemetery Expansion

Exhibit SE-2
December 20, 2019

Kāne'ohe, O'ahu

0 400 Feet
0 100 Meters

HHF PLANNERS
places for people

Hawaiian Memorial Park

Mean Distance to Viewable Area of Cemetery Expansion From Pohai Nani

Kāne'ohe, O'ahu

Exhibit SE-3
December 20, 2019

0 400 Feet
0 100 Meters

HHF PLANNERS
places for people

Testimony of
Jay Morford
Hawaiian Memorial Life Plan, Ltd
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. to Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 1,

My name is Jay Morford and I am President with Hawaiian Memorial Life Plan, Ltd. ("HMLP"), the owner of Hawaiian Memorial Park ("HMP"). I have over 27 years of experience in the cemetery and funeral profession. I have worked for the company for 25 years as of January 1st 2020. I have been in my current role since 2006.

Scope of Testimony

I will be discussing 4 areas related to HMLP's request to amend the State Land Use District Boundary:

1. An overview of HMLP funeral and cemetery operations throughout Hawaii.
2. The History pf Hawaiian Memorial Park
3. Choice of disposition, i.e., traditional burial or cremation; and
4. Endowment Care Cemeteries.

Hawaiian Memorial Life Plan & Hawaiian Memorial Park's History

Hawaiian Memorial Life Plan, Ltd. currently serve over 3800 families annually.
Additional services we provide;

a) Statewide and National Funeral and Cemetery portability.
b) HMLP's "Public Servant Program" provides complimentary funeral and cemetery benefits for our Fire Fighters and Police Officers that are killed in the line of duty.
c) HMLP is the primary provider of funeral services for all military branches; and the repatriation of the fallen soldier's returning home from North Korea.
d) HMLP's "Homeless Veterans Program" providing full honor services.
e) HMLP handles many of the indigent cases for the State of Hawaii.

HMLP employs over 204 individuals, We offer 100% medical for fulltime associates, Dental, a 401K retirement plan with employer match, Life Insurance Benefits, Long and Short term disability and family funeral and cemetery benefits, plus a college tuition reimbursement program for those that wish to participate. Hawaiian Memorial Park serves approximately 1100 families annually that have experienced a loss of a loved one. HMLP (HMP) has many associates that have made a career with our company, we have been fortunate to have long term associates that have the tenure and experience to provide the professionalism and compassion needed in our profession. The company's cemetery operation is an important segment of our company. ("HMP") combined (funeral & cemetery) employs approximately 75 associates. The positions at the cemetery include administration, funeral directors, housekeeping, care center professionals, family service, pre-planning advisors and grounds maintenance. Our grounds maintenance department has 20 employees that are represented by the International

Longshore Workers Union ("ILWU"). The expansion will result in future security for all of these departmental employees with an increase in grounds maintenance staffing and other positions as the cemetery expands. This is notable because over the last few years HMP has experienced a downward trend in revenue in part due to the lack of available inventory. If our petition is denied and this trend were to continue, we will need to reduce expenses which could include a reduction of staff.

Hawaiian Memorial Park was established in 1958 by Maytor McKinley and Paul Trousdale and began offering funeral services in 1962. Since that time, HMP has offered prearranged and at-need funeral and cemetery services to the families of Hawaii. (Exhibit: JM-McKinley photo) HMP eventually had 72 developed acres used for burial and cremation memorialization with an additional 8 acre parcel developed in 2000 (Ocean View Garden) resulting in the 80 developed acres HMP operates today.

In 1983, HMP was approached by the Harold Castle Estate with an option of purchasing 203 acres to be used in the future for cemetery use which HMP did purchase.

In 1987, the State of Hawaii was looking for a location on the Island of Oahu for a State Veterans Cemetery as the National Cemetery of the Pacific (Punchbowl) was close to full capacity. There was a minimum acreage requirement for the State of Hawaii to receive Federal funding. In order to meet this requirement, HMP gifted 33 acres of the 203 acre parcel to the State of Hawaii. Subsequently this allowed the State to receive federal funding and move forward with the development of the Veterans Cemetery, which opened in 1992. HMP's entrance off of Kamehameha Highway is the only access to the Hawaii State Veterans Cemetery, which receives tens of thousands of visitors annually. As a side note, HMP incurs 100% of the expenses for road maintenance.

In 1992, Hawaiian Memorial Life Plan, Ltd was purchased by a subsidiary of Service Corporation International ("SCI"), the largest cemetery and funeral provider in the world. At the time of purchase, HMP and its local affiliates were having financial problems, so SCI's purchase provided the financial stability we needed to protect our local families and jobs. Over the past 27 years, SCI has invested millions of dollars into Hawaii by upgrading the businesses' facilities, cemetery development and capital improvements which improved the working environment for the employees and, most importantly, the experience for the families that we serve. SCI retained local management and staff, and allowed the Hawaiian businesses to operate independently from their mainland counterparts, deferring to local management's understanding of the Hawaii culture and the needs of our families. As the same time, the relationship has provided national portability so that our contracted families could now use their services at any SCI business nationwide.

In 2007, HMP began looking toward the future to plan how we would serve families into the next generations. Based upon the usage rates, it was clear that additional inventory would be crucial in order for HMP to continue to serve families of Hawaii. A plan to expand the cemetery

on the undeveloped parcel owned by HMP was designed. Unfortunately, the initial petition was denied by the State Land Use Commission in 2010 as HMP's plan was not consistent with the Ko'olau Poko Sustainable Communities Plan ("KPSCP").

HMP took that feedback seriously and has invested significant resources into presenting the petition currently before the Land Use Commission today. The new plan reduces the area of impact, increases the size of the cultural preserve, and adds a conservation easement which prohibits future development on approximately 128 acres of the HMP privately owned land. In 2017, 11 years after the City and County of Honolulu initiated efforts to update the KPSCP, HMP's new plan received a unanimous vote at City Council in favor of the amendment, which adds cemeteries as an acceptable use. The City also moved the community growth boundary line to include our future cemetery and the cultural preserve. HMP's plan is now consistent with the KPSCP. The Department of Planning & Permitting has concurred that HMP's proposed project is consistent with the City's plan as it is being presented today. HMP currently has approximately 1800 signatures of support for the expansion. (Exhibit JM-Support Letters)

Disposition vs. Memorialization

Our industry is like no other, and unless you have actually worked in the business, you would not understand the industry as a whole. For example, a common misperception is how memorialization relates to disposition "cremation vs traditional casket burial". One of the arguments you may hear over these hearings is that "People should cremate so we don't need to use land for cemeteries". You may also hear about the rising percentage of people cremating. Please don't be swayed by the cremation percentage. This is but one piece of the puzzle. If you have a 60% cremation rate and the annual number of deaths is 5,000, 2000 burial spaces are needed to serve those families. We have also heard about the baby boomer generation, which I think a few of us here today are part of. This is a large population bubble that is just starting to impact our funeral homes and cemeteries. Because of this generation, the industry will see an increase in the number of deaths and families that we serve. That is important because even if the cremation rate were to increase to 70%, if the number of deaths increases as well, the general demand for burial spaces will remain.

We anticipate that with the increasing number of deaths that the needed casket burial spaces will remain the same or increase, which is why referencing percentages alone can be misleading. Hawaii is unique when it comes to disposition. We are a melting pot and there are many different cultural and religious practices. The preferred method of disposition for some in Hawaii is cremation. However, there are other religious or cultural practices that do not cremate. An individual's choice for their disposition is a personal decision, one that should not be taken lightly and should never be directed by others.

We need inventory. As it currently stands, HMP's 80 acres is 93% - 94% sold-out on casket burial spaces (Exhibit JM-Remaining Interment Plots). Our Ocean View Garden has 25% of its burial space available, so without this expansion, we will be unable to provide options for

casket burial spaces in the near future. We will also be very limited and unable to provide the type of cremation garden options you saw due to our lack of available land. Families want to be together when they die. It is how they celebrate and reflect upon their heritage. Regardless of their choice of disposition, the memory of a loved one's life is what families reflect on, not if they were cremated or casketed. It is their heritage and where they are laid to rest.

In closing- If we want to continue to provide memorialization options to families in the future we need to allow the professionals in this industry the opportunity to serve this community. We have responsibility to be good stewards of the lands we own, we also need to be sensitive to cultural and community impacts. I believe we met and exceeded those obligations. We have the business infrastructure to support our company into the future and we provide a service that is necessary in society, and as evidenced by the 200,000 families we have served. Please don't take what we do lightly, this is important to the thousands of families we serve each year, the families of the over 41,000 people buried at HMP, the 204 people we employ in Hawaii and the overall community. Please reflect what someone goes through when they lose a mother, a father, a grandparent or even a child. We provide that place of healing for the family, not just at the time of a loss, but for all the years after. HMLP strives to be an outstanding steward to the community and respects its preservation goals. If the LUC Commission approves the proposed plan, we can ensure that together we continue to preserve this precious culture, while helping families honor their loved ones.

Jay Morford

The following is the testimony of Tom Holliday, CRE, FRICS, a Director of CBRE Valuation & Advisory Services Hawaii, regarding the *Market Study, Economic Impact Analysis and Public Fiscal Assessment of the Proposed Hawaiian Memorial Park Expansion Project* which he prepared and published July 25, 2018.

INTRODUCTION

Since 1958, Hawaiian Memorial Park (HMP), a privately-owned cemetery has served the resident population of Kaneohe and Oahu, expanding from its initial size of 6 acres to its present extent of 80 acres. It is currently the final resting place for over 41,000 persons, having a potential total of 79,000 burial spaces.

To service the coming generations of those interred at HMP, as well as meet the expanding need for additional burial opportunities on Oahu over the mid to long-term, ownership is pursuing an expansion plan on 53.45 acres (the "petition area") within a larger 164.42 acre mostly open space larger parcel. As currently envisioned, site work/infrastructure emplacement would be completed in 2020, with sales and interments commencing in 2021.

Cemetery uses will only utilize about 28.2 acres of the Petition Area, with the remainder used for a cultural preserve, open spaces and internal/connector roadways.

In addition to servicing the aspirations of family members and friends to be near those dear to them on an everlasting basis, the HMP expansion site is highly desirable from a market perspective, with:

- Exceptional panoramas stretching for miles along the Koolau Pali, encompassing the hills of Mokapu Peninsula and the waters of Kaneohe Bay.
- Feelings of serenity enhanced by a surrounding buffer of dense rain forest flora and open spaces and insulation from future intruding land uses.
- Gently flowing terrain creating discrete memorial gardens within the larger park.
- Excellent exposure and direct access from Kamehameha Highway, and immediately north of the H-3 Freeway, 1.5 miles north and south, respectively of the Pali and Likelike Highways.
- Proximity to Kaneohe and Kailua, the two largest windward towns, and only ten miles from Downtown Honolulu. It is the closest cemetery to Honolulu with significant numbers of burial spaces available.
- Favorable windward climate which keeps lawns green, forest vibrant, and the air fresh and cool.

The HMP Expansion site has been in the master planning process for a decade. The current design calls for the addition of some 28,000 to 30,000 burial spaces, increasing the capacity of the Park by a maximum of 38 percent.

Assuming sufficient market demand, the HMP Expansion project will transform a vacant acreage holding having no meaningful economic highest and best use potentials and offering no tangible benefits to the community into an asset providing needed future interment opportunities for the expanding, aging Oahu resident population, spurring capital investment and economic activity, sustaining regional employment, and generating new tax dollars at nominal costs.

The CBRE/Hallstrom Team assignment was to analyze the proposed HMP Expansion project from a real estate market perspective and to identify and quantify probable market and economic impacts associated with the development considering competitive, regional, prevailing and forecast trends to answer four basic study questions:

1. Is there sufficient demand to absorb the up to 30,000 burial spaces of the subject project during a reasonable exposure period given competing product and projected Oahu demographic and market sector trends?

2. Will the subject project be an appropriate use of the underlying site relative to market needs, desirability, standard land planning objectives, accepted design characteristics, and the area environs?

3. What will be the general/specific and direct/indirect economic impacts on Oahu resulting from the undertaking of the subject development via capital investment, employment, wages, business operations, and other economic activity related to the real property asset?

4. What will be the net, new effect on the state and county "public purse" from the project in in the form of increased tax/fee receipts versus additional costs?

These issues were addressed through a comprehensive research and inquiry process utilizing data from market investigation, governmental agencies, various Hawaii-based media, industry spokespersons/sources, on-line databases, published public and private documents, and our files.

The primary baseline information regarding the subject used in our study were:

- Maps, master plans, inventory counts, infrastructure cost estimates, and background materials provided by HHF Planners, HMP ownership, and other members of the planning team;

- "Hawaiian Memorial Park Expansion Environmental Impact Statement Preparation Notice" (November 2017);

- Oahu resident population, mortality rates, interment, and other pertinent trends from the State of Hawaii Department of Economic Development and Tourism, State Department of Health, United States Department of the Census and Veterans Affairs, and agencies of City and County of Honolulu;

- Oahu Cemetery locations, size, burial spaces, sales to date, expansion plans and other data from the State Department of Health, cemetery websites and spokespersons, Hawaii Information Service, published articles, and informed industry parties; and,

- Data from published and on-line sources and from our files.

The HMP site and environs have been viewed on several occasions and specifically for this assignment between January and March 2018.

The *Market Study* time-frame which serves as a basis for subject absorption projections extends approximately 23 years from early-2018 through 2040, as it is anticipated all the HMP Expansion inventory will be in-place and absorbed by then. The demand for burial plots on Oahu is quantified during this period, existing, planned competitive supply is identified, the appropriateness of the site for the proposed project is analyzed, and absorption is estimated using several market-based methods.

Our *Economic Impact Analysis* and *Public Fiscal Assessment* study forecast period extends over 21 years from ground-breaking in 2020, with product absorption (plot sales) through 2037, and continued burial activity through the end of the modeling period in 2040, with the remaining burials extending beyond 2040 captured in that "residual year" totals.

Focal Market and Economic/Fiscal conclusions are expressed in five cumulative periods. The first is three years (2018 through 2020), the remaining four are five year periods (2021-2025, 2026-2030, 2031-2035 and 2036-2040).

We have also tested our econometric model outcomes against the 2012 Hawaii Inter-County Input-Output Study (approved August 2016) multipliers and formulae.

It is noted, the model is not specifically time-sensitive as it is expressed in constant 2018 dollars and should the project timeline move several years in either direction from our estimate we would not anticipate major changes to our stated conclusions.

PRIMARY STUDY CONCLUSIONS

Based on our analysis of the subject property, its environs, and envisioned development we have reached the following conclusions as of the First Quarter of 2018 regarding the probable market standing and economic impacts of the proposed Hawaiian Memorial Expansion Project.

All the larger tables which have been excerpted into the text are presented full-size in the addenda for easier reading.

Market Study

- The resident population of Oahu (City and County of Honolulu) has grown by nearly 60 percent over the past five decades, reaching a total of some 995,583 persons in 2017, with a compounded annual growth rate of about one percent. The population has "aged" over the same period, with some 18 percent now being over age 65; up from 14 percent at the turn of the century.
- As a result, the mortality rate of the Oahu population has escalated, now standing at a death rate of 0.8 percent annually (some 8 deaths per 1,000 people), up from just 0.6 percent just two decades ago and showing a compounded annual growth rate of 1.6 percent. The number of deaths on island has commensurately increased from 5,467 in 1997 to 7,960 in 2017.
- Historical and forecasts for the three foundational demographic factors which contribute to projections of annual resident deaths on Oahu by 2020 are summarized below. Throughout the market study "Minimum" and "Maximum" scenarios are calculated and presented based on past trending, anticipated evolutions, and reasonable variance.

OAHU DEMOGRAPHIC TRENDS 2000 TO 2040			
Year	**2000**	**2017 (Current)**	**2040**
Resident Population	878,906	992,605	
Minimum Forecast			1,086,710
Maximum Forecast			1,142,434
Mortality Rate	0.65%	0.80%	
Minimum Forecast			1.08%
Maximum Forecast			1.19%
Percent of Population Over 65	14.00%	18.00%	
Minimum Forecast			24.00%
Maximum Forecast			26.00%
Annual Resident Deaths	5,721	7,960	
Minimum Forecast			11,694
Maximum Forecast			12,864
Compiled by CBRE/Hallstrom Team			

The estimated total number of deaths on Oahu from 2018 to 2040 will be between 225,711 and 245,130 persons.

- In converting the number of projected deaths into net interment space/burial plot demand in non-military cemeteries on Oahu during the 2018-2040 modeling period, numerous factors had to be identified, analyzed and their going-forward trending forecast, including:
    - Number of Burial Spaces on Oahu Previously Purchased but Currently Unused
    - Percentage of Deaths Disposed Via Cremations
    - Percentage of Cremations Interred versus Ashes Scattered or Other Disposal
    - Percentage of Deaths Disposed Via Burial
    - Percentage of Deaths Interred at Veterans Cemetery
    - Number of Oahu Persons Interred on Neighbor Islands
    - Number of Non-Oahu Residents Interred on Oahu

Based on these researched and forecast indicators we have estimated the net demand for additional burial spaces on Oahu through 2040 at between 145,025 and 165,795, broken down periodically as shown below.

ESTIMATED NET ADDITIONAL BURIAL SPACE DEMAND ON OAHU 2018 THROUGH 2040		
Period	**One: Minimum**	**Two: Maximum**
2018 to 2020	14,732	15,128
2021 to 2025	27,471	29,338
2026 to 2030	30,186	33,841
2030 to 2035	34,460	40,367
2036 to 2040	38,176	47,120
Total Burial Spaces	**145,025**	**165,795**

Compiled by CBRE/Hallstrom

- Other than HMP, there are currently six major cemeteries/memorial parks on Oahu offering burial spaces to the general public; some have no to limited numbers of burial plots, all have niches available, and some have crypt spaces:
    - Diamond Head Memorial Park
    - Oahu Cemetery
    - Nuuanu Memorial Park
    - Valley of the Temples Memorial Park
    - Mililani Memorial Park
    - Laie Cemetery

  Cumulatively, these facilities comprise some 436 gross acres of land, of which 194 acres are currently being used for interments, with some 217,000 total burial spaces sold to date and about 16,500 spaces of remaining inventory (plots, niches and crypts) in existing phases.

- Two of the existing cemeteries have meaningful expansion areas within which to provide significant additional burial spaces. In addition, there is one major proposed project (Hawaii Kai Cemetery) which has been delayed for many years. We estimate these facilities could potentially add a maximum of 89,000burial spaces by 2040.

- The maximum total supply of burial plots/interment spaces on Oahu, existing and proposed, through 2040 (excluding HMP) is estimated at 105,000 spaces, as summarized on the following table. This total does not include inventory within military/veterans, church, or private cemeteries.

MAXIMUM ESTIMATED TOTAL EXISTING AND PROPOSED SUPPLY OF MAJOR OAHU INTERMENT OPTIONS BY 2040

Cemetery	Combined Burial Plots, Crypts and Niche Spaces		
	Existing Available	Currently Proposed	Total Availalble and Proposed
Diamond Head Memorial Park	1,300	0	1,300
Nuuanau Memorial Park	700	0	700
Oahu Cemetery	700	0	700
Valley of the Temples Memorial Park	9,700	46,000	55,700
Mililani Memorial Park	3,800	19,000	22,800
Laie Cemeteries	300	0	300
Hawaii Kai Cemetery (Proposed) (1)	0	24,000	24,000
TOTALS	**16,500**	**89,000**	**105,500**

(1) Phase I will have 12,000 burial spaces of total build-out of 60,000. We have assumed two phases, or 24,000 spaces, will be made available in projection time-frame to 2040.

Complied by CBRE/Hallstrom Team

- The expansion area of HMP is an appropriate location for cemetery development. In addition to being an extension of a long-successful facility established 60-years ago, which accounts for about one-quarter of the interments in the islands, and providing needed burial opportunities for families of those already interred at HMP and the Oahu public, the Petition Area also offers:
    - Exceptional panoramas.
    - Open space/rain forest buffer.
    - Suitable terrain.
    - Excellent exposure and direct access
    - Proximity to windward towns and Honolulu.
    - Favorable climate.
- We have forecast the absorption of the HMP Expansion project burial space inventory using three methods assuming the new product would be available for sale and interment in 2021, and there would be approximately 30,000 plots in the expansion area in addition to the some 3,600 remaining in the existing facility (or 33,600 burial spaces total).
    - Gross Demand/Supply Comparison – The rounded net total demand for additional burial spaces on Oahu from 2018 through 2040 will be between 145,000 and 165,800 spaces. The total number of existing and proposed supply apart from HMP is 105,000 burial plots. There will be a shortfall of supply relative to demand sufficient to absorb the subject inventory within the projection period.
    - Residual Demand Analysis – When placed on a timeline, even if all the existing and proposed competitive burial space supply is absorbed in a timely manner before any demand flows to HMP, there will be ample excess residual demand in every projection period to absorb the subject inventory within 15 to 19 years.

- Market Shares Analysis – Based on the absorption history at HMP, the desirability of the Expansion project plots, and the characteristics of the competitive supply, we estimate HMP could readily capture a market share of from 30 percent to 33 percent of the total net Oahu burials space demand during the projection period, which result in full-absorption within 15 to 18 years.

We conclude the 33,600 burial spaces at HMP, including the estimated 3,600 remaining in the existing sections of the Park by 2021 and the 30,000 (maximum) in the expansion area, will achieve absorption within 17-years of initial offering (2021-2037).

Economic Impact Analysis

We have constructed a model depicting the economic impact of the HMP Expansion project on the Oahu and Statewide community during the course of its "lifespan" from anticipated ground-breaking in 2020, through its sell-out and use/absorption to 2035, and stabilized "operations" (management and maintenance) thereafter.

The model builds on the absorption estimates and data contained in our market study. All estimated amounts are in constant 2018 dollars. We note, that even if the timing of development or absorption moves substantially from our projections it does not change the resultant outcomes or indicators as the use of constant dollars removes time as a determinant variable. The purpose of the model is to illustrate how capital, jobs, wages, population and business activity will flow over time for planning and budgeting purposes apart from and present value considerations.

The HMP is a large, existing operation with 38 full-time-equivalent employees and millions of dollars in annual revenues and expenditures in the Oahu community.

The expansion project will not create significant new employment opportunities (beyond the extra workers needed to maintain the additional acreage) or new economic activity; it will allow the employment and activity to continue on at the currently high levels for another 16 plus years rather than winding-down as the remaining existing plots are sold and filled. It is this "extension period" we measure in our Economic Impact Analysis.

- The development of the HP Expansion project will bring in an estimated $29.3 million of new, direct capital investment with significant unquantified indirect expenditures into the island's real estate market and generate $141.7 million in total economic activity islandwide during its build-out and absorption over a sixteen-year period (forecast from circa 2020 to 2035. It will contribute some $5.9 million in annual economic activity on a stabilized basis thereafter.

- The construction of the HMP Expansion will directly create an estimated 73 "worker-years" of employment (the equivalent of 52 work weeks at 40 hours per week) in the trades and supply businesses during build-out, with an estimated $5.9 million in wages.

- The operation of the expansion area, through administration, sales/servicing, maintenance and landscaping will create 625 worker-years of employment from 2021 through 2035 and associated wages and benefits of $43.8 million. Once stabilized these project components will create demand for 45 FTE positions and annual wages of $3.2 million

- Associated secondary/off-site employment during the overall development and absorption time-frame will total 233 worker-years with wages of $13.1 million and a stabilized FTE job-count of 15 with total wages of $842,000 per year.

- The on-going management and maintenance economic activity resulting from the HMP Expansion between 2021 and 2035 will total $115.9 million during the projection period and average $8.5 million per year on a stabilized basis. The base impact to Oahu from 2020 through 2035 will be $141 million and average $9.3 million annually thereafter.

- Application of the State DBEDT Inter-County Input-Output Model macro multipliers depicting direct, indirect and induced economic impacts arising from the HMP Expansion project results in significantly higher economic out-flow indicators than those from our direct, subject-specific micro model.

Secondary Impacts

HMP will have nominal to minor impacts on the socio-economic aspects of the surrounding community that relate to real estate issues.

- There are no neighboring uses on three sides of the HMP Expansion acreage property. The existing park is to the west, open lands to the east, and hills, open space and old quarry lands to the south. To the north are built-out single family residential subdivisions which will be buffered from the plot gardens in the expansion project.

- The site is appropriately called a Memorial Park, a vast greensward having several small central structures and highly limited activity; with just a handful of internment services daily, graveside visitations and maintenance activities. There will be no additional structures on the expansion acreage and similarly limited, subdued activities.

- The HMP Expansion will not meaningfully impact the property values or real estate taxes of the northerly-abutting homes. Property values throughout Windward Oahu are largely driven by external, cyclical economic factors within an existing (and expanding) cumulative mass, not by the expansion of a cemetery which has been in-place for decades.

- There is not expected to be any in-migration to Oahu as a direct result of the project.

Public Fiscal Benefits

Public fiscal (or cost/benefit) impacts are typically estimated on a per capita basis founded on a conservative assumption that each new person added to the Oahu community is "responsible for" a similar tax cost/obligation as every other person on the island.

As there will be no new residents resulting from the HMP Expansion there will be no new per capita costs. We have therefore, as discussed later in the report, focused on any additional costs the State and County will incur beyond current levels as a result of the expansion project.

Our analytical focus is on "new" or additional fiscal impacts (incoming tax dollars and outgoing government expenditures) to the State and County arising from the development of HOAH not those monies/costs which are merely flowing from elsewhere on the island.

- The City and County of Honolulu currently receives some $530 per year of real property taxes on the 164-acre subject site (split between "Preservation" and "Residential" use designations.). This total is not anticipated to meaningfully change, if at all, as a result of the HMP expansion. The County will receive an estimated $500,000 in one-time permit, license and other fees at the commencement of the project; otherwise there will be no enhancement in benefits from the project.

- The State of Hawaii will receive Gross Excise and Income taxes, secondary revenues, and impact fees of $8.7 million during the 2020-2035 modeling period, and $402,376 per year thereafter.

- There will be no "new" or additional per capita or actual costs beyond the nominal amounts already incurred to either the State or County resulting from the expansion of HMP, making their added revenues all marginal profits.

- The major economic impacts and public fiscal conclusions (above current levels) are summarized on the following table. The column on the left summarizes the cumulative impacts during the initial 16-year build-out and absorption period (2020-2035) covering infrastructure emplacement and plot sell-out, and the right hand column the annual impacts after full-absorption/stabilization.

  Even after all of the plots are fully absorbed (sold) and eventually filled, the HMP expansion area will require continued maintenance and servicing in perpetuity with similar operating costs, though revenues/economic activity will lessen.

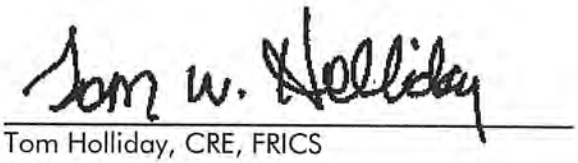
SUMMARY COMPARISON OF MAJOR ECONOMIC IMPACTS
AND PUBLIC FISCAL COSTS/BENEFITS
All Amounts Expressed in Constant, Uninflated 2018 Dollars

Analysis Item	Cumulative During Build-Out Period	Stabilized Annually Thereafter
Direct Capital Investment	$29,304,000	
Local Contractor's Profits	$2,930,400	
Local Supplier's Profits	$1,172,160	
Worker Years of Jobs	931	60
Employee Wages	$62,854,492	$3,998,895
Total Oahu "Base" Economic Impact	$141,024,067	$5,842,400
Accounting for "New" Impacts Only		
Honolulu County Gross Tax Receipts	$500,000	$0
State of Hawaii Gross Tax Receipts	$8,721,678	$402,376
Added Honolulu County Costs of Services	$0	$0
Added State of Hawaii Costs of Services	$0	$0
Honolulu County Net Benefits or (Loss)	$500,000	$0
State of Hawaii Net Benefits or (Loss)	$8,721,678	$402,376

Source: CBRE/Hallstrom Team

Respectfully submitted,

CBRE - VALUATION & ADVISORY SERVICES



Tom Holliday, CRE, FRICS
Director

Phone: (808) 541-5120
Fax: (808) 541-5155
Email: Tom.Holliday@cbre.com

PROFESSIONAL QUALIFICATIONS OF THOMAS W. HOLLIDAY, CRE, FRICS

Business Affiliation

Director	The Hallstrom Team | CBRE, Inc. Valuation & Advisory Services Honolulu, Hawaii (2015 - Present)
Senior Analyst/ Supervisor	The Hallstrom Group, Inc. Honolulu, Hawaii (1980 - 2014)
Former Staff Appraiser	Davis-Baker Appraisal Co. Avalon, Santa Catalina Island, California (1977 -1979)

International Designation and Membership

- CRE Designation (2015) - The Counselors of Real Estate
- FRICS Designation (2016)–Fellow of the Royal Institution of Chartered Surveyors

Education/Qualifications

- California State University, Fullerton (Communications/Journalism)
- More than 600 Hawaii Hotel/Hospitality Valuation and Consulting Assignments
- More than 150 Market Studies, Economic Impact Analyses and Public Fiscal Assessments for Proposed Projects and Entitlement Purposes
- Qualified expert witness testimony before State of Hawaii Land Use Commission, County Planning Commissions, County Councils and various state and county boards and agencies since 1983.
- Only certified real estate economist by County of Kauai for workforce housing assessments.
- Numerous SREA, Appraisal Institute and RICS Courses
- Numerous professional seminars and clinics.
- Contributing author to Hawaii Real Estate Investor, Honolulu Star Bulletin, Pacific Business News, Other Publications

On January 1, 1991, the American Institute of Real Estate Appraisers (AIREA) and the Society of Real Estate Appraisers (SREA) consolidated, forming the Appraisal Institute (AI).

Recent Assignments

- Market Study, Economic Impact Analyses and Public Costs/ Benefits (Fiscal Impact) Assessments

<u>Oahu</u>

-- OHA Kakaako Makai (Mixed-Use Project)
-- Howard Hughes/Ward Kewalo Basin (Retail Project)
-- Marriott Waikiki Parking Lot (Hotel/Timeshare Project)
-- Residence Inn Kapolei (Hotel)
-- Turtle Bay Resort (Destination Resort Community)
-- Waikapu Country Town (Mixed-Use Community)
-- Oahu Community Correctional Center Relocation
-- Oahu Tourism Spending/Tax Impact Analysis
-- Waikapu Country Town (Mixed-Use Community)

Maui County
- Waikapu Country Town (Mixed-Use Community)
- Lanai City Expansion (Mixed-Use/201H Community)
- Polanui Garden (201H Residential Community)
- Molokai Ranch Holdings (Mixed-Use)
- Makila Rural Subdivision (201H Residential Community)
- Makila Kai (201H Residential Community)
- Maui Research & Tech Park (Mixed-Use Community)
- Maui Lani (Mixed-Use Community)
- Honuaula (Mixed-Use Community)
- Makena Beach Resort
- Maui Business Park, Phase II (Industrial/Commercial)
- Kapalua Mauka (Master Planned Community)
- Hailiimaile (Mixed-Use Master Planned Community)
- Pulelehua (Master Planned Community)
- Westin Kaanapali Ocean Villas Expansion (Resort/Timeshare)

Big Island
- Parker Ranch Waimea Town Center (Mixed-Use)
- West Hawaii/Gold Coast Tourism & Hotel Analysis
- Puako Farms/Kamakoa (Residential Subdivision)
- Kau Tea Farm (Agricultural/Mixed-Use Project)
- Kamakana Villages (Mixed-Use Residential Development)
- W.H. Shipman Ltd, Master Plan (Various Urban Uses)
- Nani Kahuku Aina (Mixed-Use Resort Community
- Kona Kai Ola (Mixed-Use Resort Community)
- Waikoloa Highlands (Residential)
- Waikoloa Heights (Mixed-Use Residential Development)

Kauai
- Princeville Lodge (Hotel)
- Princeville Phase II (Destination Resort Community)
- Hanalei Plantation Workforce Housing (Resort)
- Lima Ola (Residential Community)
- Coco Palms (Hotel)
- Sheraton Kauai Workforce Housing (Resort)
- Coconut Coast Tourism and Hotel Analysis
- Hanalei Plantation Resort (Resort/Residential)
- Kukuiula (Resort/Residential)
- Waipono/Puhi (Mixed-Use Planned Development)
- Eleele Commercial Expansion (Commercial)
- Village at Poipu (Resort/Residential)
- Ocean Bay Plantation (Resort/Residential)

- Major Neighbor Island Valuation Assignments

  -- Mauna Lani Bay Hotel
  -- Courtyard Kahului Airport Hotel
  -- Maui Oceanfront Days Inn
  -- Holiday Inn Express - Kona Hotel (proposed)
  -- Keauhou Beach Hotel
  -- Courtyard King Kamehameha Kona Beach Hotel
  -- Aloha Beach Resort
  -- Coco Palms Resort
  -- Grand Hyatt Kauai
  -- Islander on the Beach
  -- Waimea Plantation Cottages
  -- Coconut Beach Resort
  -- Sheraton Maui Hotel
  -- Outrigger Wailea Resort Hotel
  -- Maui Lu Hotel
  -- Coconut Grove Condominiums
  -- Palauea Bay Holdings
  -- Wailea Ranch
  -- Maui Coast Hotel
  -- Westin Maui Hotel
  -- Maui Marriott Hotel
  -- Waihee Beach
  -- Kapalua Bay Hotel and The Shops at Kapalua

Email Address Tom.Holliday@cbre.com

Testimony of
JAMI HIROTA, PE, LSIT, LEED BD+C
COFFMAN ENGINEERS
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 1,

My name is Jami Hirota and I am the manager of the civil engineering department at Coffman Engineers, an engineering consulting firm with expertise in related subfields including civil engineering. I prepared the Preliminary Engineering Report (PER) for the Hawaiian Memorial Park Cemetery Expansion Project (included as Appendix D in the Final Environmental Impact Statement) while working as a project manager with Sam O. Hirota Inc. In August 2018 I transitioned to the position I currently hold with Coffman Engineers and continue to provide support on this project. I have over 23 years of experience in the field of civil engineering and land surveying, and possess expertise in civil engineering design as well as associated permitting requirements including National Pollution Discharge Elimination System and Section 401/404 permits. A copy of my resume is attached.

Scope of Study

Sam O. Hirota, Inc. (SOH) was retained by HHF Planners (HHF) to prepare a preliminary engineering report for the cemetery expansion. The scope of our work included developing preliminary grading plans, addressing drainage requirements and effects, and identifying potable water demands on the available aquifer system (irrigation requirements). Coffman Engineers was later retained by HHF to provide continued civil engineering services for the project. As an employee of Coffman Engineers, I revised the preliminary drainage design supporting additional study of the Petition Area's site conditions. I will summarize the information contained in the preliminary engineering report that focuses mainly on preliminary grading plans and drainage improvements.

I. PRELIMINARY GRADING PLAN

Overview of Grading Plan

The proposed cemetery expansion area is contained within a broad drainage basin bounded by the slopes of Oneawa Hills and summit ridgeline that consist of undeveloped and forested land along the lower elevation slopes. The terrain along the lower flank slopes of the Oneawa Hills generally rise and steepen toward the east and south (mauka) within the cemetery expansion site, and generally decrease toward the north and west within the site.

The project proposes to achieve 28 acres of usable cemetery burial land and will be designed to have slopes no greater than 20%. The slopes less than 5:1 allow for access and maintenances of the burial spaces and pedestrian access. Along the fringes of the cemetery expansion site, retaining walls and cut/fill slopes will be used to tie into existing grades. Cut and fill slopes will not exceed two horizontal to one vertical slope ratio. Fill slopes will have benches at a maximum of 30 feet height intervals, and will be "keyed" in design to provide additional stability. At the recommendation of the geotechnical and hydrogeological engineers, subdrains will be installed at the base of fill slopes to assure seepage water does not accumulate at the toe of the slope, which may cause instability.

In order to achieve the desired finish grades, the lower flank slopes of the Oneawa hillside on the western end of the site will need to be cut. Exhibit JH-A (Exhibit 1) includes a preliminary grading plan showing general areas of proposed cut and fill activities that have been developed using topographic contour data generated by the U.S. Geological Survey. Refinements to this grading plan will be determined during the project's design phase when data from a detailed topographic survey is obtained.

The majority of the hillside on the western end of the expansion site will be excavated to achieve a height reduction up to 40 feet; however, the areas near the top of the hillside will be reduced up to 100 feet in height. A smaller ridge line below this hillside in the area generally between Līpalu Street and Ōhāhā Place will also be excavated. Excavations will extend up to 60 feet for this smaller ridge.

The excess soil from excavation activities will be used to fill the lower portions of the basin areas within the cemetery expansion site. As shown in Exhibit JH-A, proposed fill generally includes areas below the current hillside, and the majority of the eastern half of the cemetery expansion site. The majority of fill activities will increase the existing height of the basin less than 20 feet; however, a section will be filled up to 40 feet in height. A site section portraying the large cut section within the hillside and the lower fill areas are shown in Exhibit JH-B (Exhibit 2).

The estimated area of disturbance for earth moving activities is approximately 33.6 acres. The estimated quantities of excavation and embankment are shown below. Excavated material that is not used as fill within the cemetery expansion will be removed from the site and used at other construction sites as suitable or disposed at the privately-owned PVT Nānākuli-Construction and Demolition Material Landfill site. It is anticipated the quantities will be revised as more accurate topographic survey data is available.

Estimated Excavation	470,960	cubic yards
Estimated Embankment	413,673	cubic yards
Net Change	[57,287]	cubic yards (cut)

Exhibit JH-A Preliminary Grading Plan

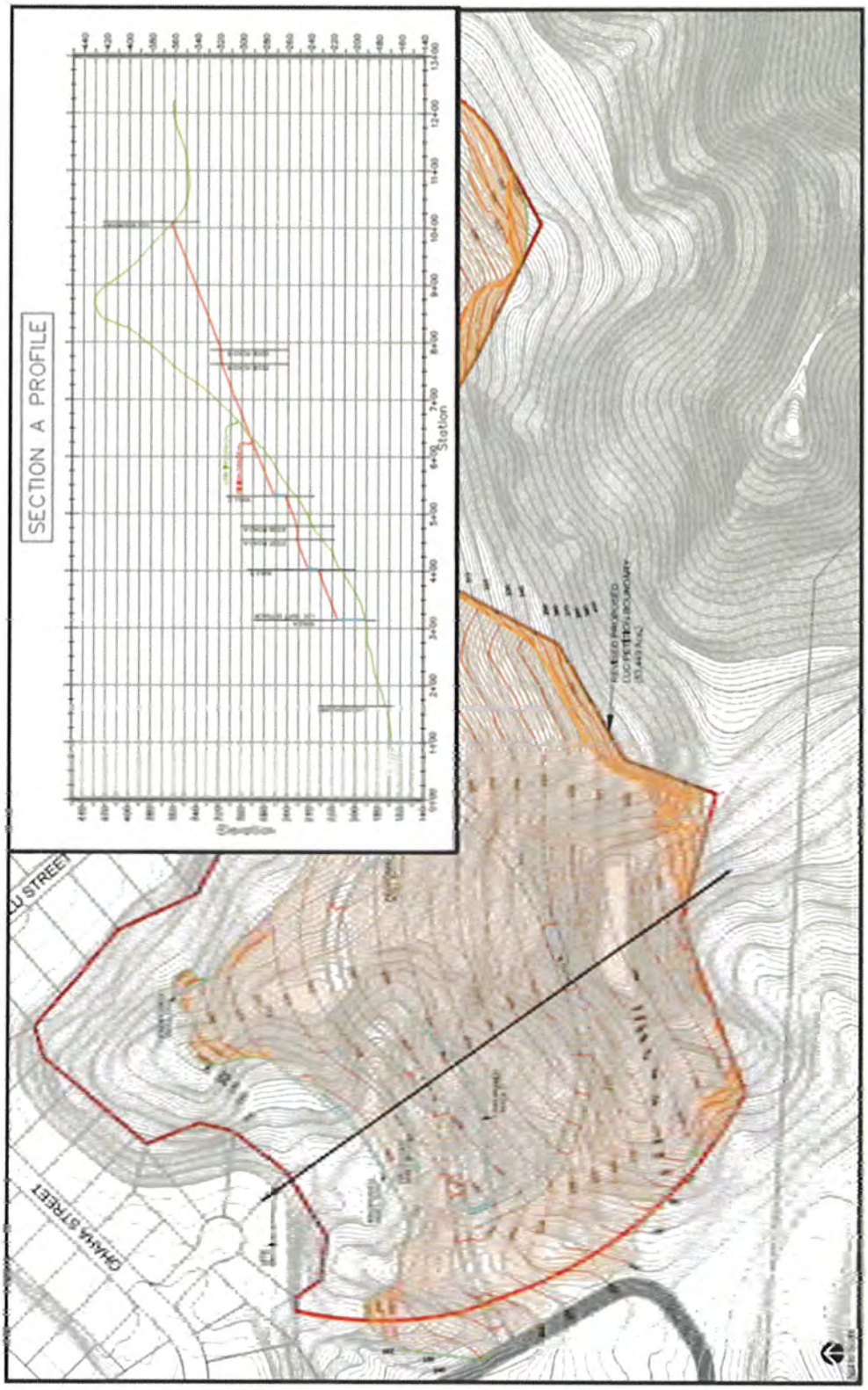


Exhibit JH-B Section View of Cut/Fill

Retaining Walls

In order to achieve 28 acres of developable land, the desired roadway alignments and a balanced earthwork condition, constructing retaining walls at various locations within the cemetery site is necessary. A total of seven retaining walls of keystone design (labelled Walls A to G) are planned and were previously shown on Exhibit JH-A. These retaining walls will be utilized within the central and western areas of the Petition Area, and most are associated with the excavation of the hillside.

The keystone designed retaining walls will average about 10 feet in height, with some sections having a maximum height of 25 feet due to terrain. The use of walls taller than 10 feet tall is planned to be kept to a minimum. However, where taller wall sections are required, the keystone will be terraced to provide for a more aesthetic view complete with landscaping.

Exhibit 3 shows a typical section view of a keystone wall. The retaining wall will have a subdrain installed at the base to assure seepage water does not impact the wall structure. The footing of the wall will be constructed on a concrete or crushed stone pad minimizing further subsurface disruptions.

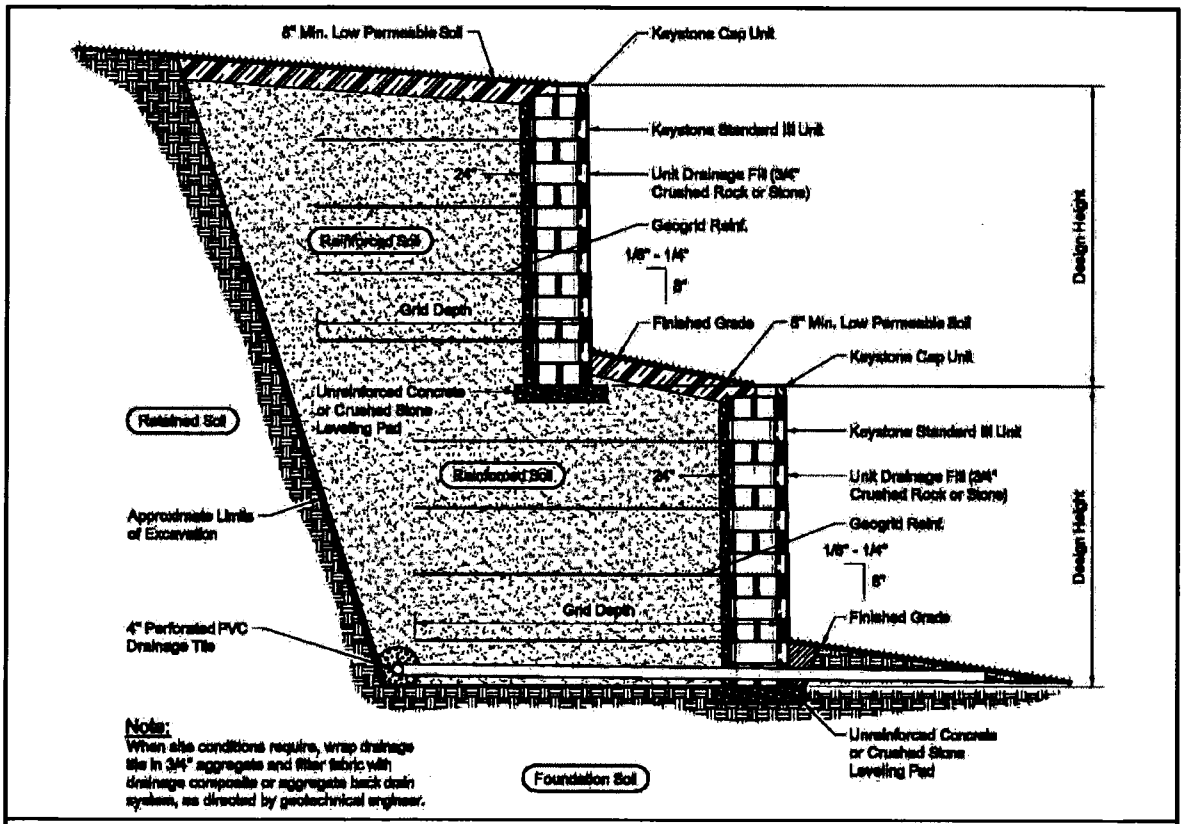


Exhibit 3 Typical Section View of Keystone Retaining Wall

Roadways within Expansion Area

The project will include the construction of a new roadway network, consisting of 24' wide roads with rolled curbs. The roadway network will provide access to the future burial sites connecting from the existing roadway serving the Ocean View Garden. The roads, as shown in the Conceptual Site Plan, will meander through the site with a cul-de-sac at the end, and will be designed to be similar to existing roadways throughout. HMP Roadway slopes will vary throughout the site, but are not intended to exceed a longitudinal grade of 18%.

Site Grading Design and Construction Methods

At the start of construction, erosion and sediment controls will be installed prior to the clearing and grubbing of the site. Vegetation, debris and other unsuitable materials will be removed and disposed of properly off-site or in a designated area. Clearing and grubbing work will be performed incrementally in phases (5 acres at a time) developed during the project's design phase. The resulting excavation will be backfilled with well-compacted fill. Excavated soft soils will not be re-used as fill materials and will be properly disposed of. Where shrinkage cracks are observed after the subgrade compaction, the subgrade soil will be prepared again.

Fill and Backfill Material

Earthwork will likely involve four main types of materials: 1) wet onsite soils; 2) excavated basalt rock materials; 3) boulder fills; and 4) imported fill materials. On-site soils may be re-used as a source of general fill material, provided they are free of vegetation, deleterious materials, and rock fragments greater than 12 inches in maximum dimension. Fill materials within the upper 6 feet of finished grades shall contain rock fragments no greater than 6 inches in dimension. Drying or aerating the excavated materials may be necessary prior to their use as general fill due to wet conditions in this environment.

Excavated rock materials less than 12 inches in size may be used as general fill material, and can be processed and crushed to a relatively well-graded granular material. Excavated rock materials and boulders less than 2 feet in size may also be used as fill material provided that their usage does not complicate trenching operations. Imported fill materials shall consist of non-expansive, select granular materials such as crushed basalt or coral. Select granular fill will be well-graded from coarse to fine with particles no larger than 3 inches in dimension.

Excavations and Cut/Fill Slopes

Based on the initial soils investigations by Geolabs, it is anticipated excavation work may encounter stiff to hard residual and saprolitic soils along with the underlying basalt rock formation. In addition, some of the excavations may encounter boulders, clusters of cobbles, and hard basalt rock formation. It is anticipated that most of the materials may be excavated

using normal heavy excavation equipment. However, deep excavations, boulder excavations, and excavations into the underlying basalt rock formation may require the use of hoe rams.

Cut slopes will generally expose stiff to hard residual and saprolitic soils based upon sample borings and the anticipated basalt rock formation underlying the area. Cut slopes of on-site soils may be designed with a slope inclination of a 2 to 1 ratio (horizontal to vertical) or flatter, and cut slopes into the basalt formation may be cut at an inclination of 1.5 to 1 ratio or flatter (Exhibit 4).

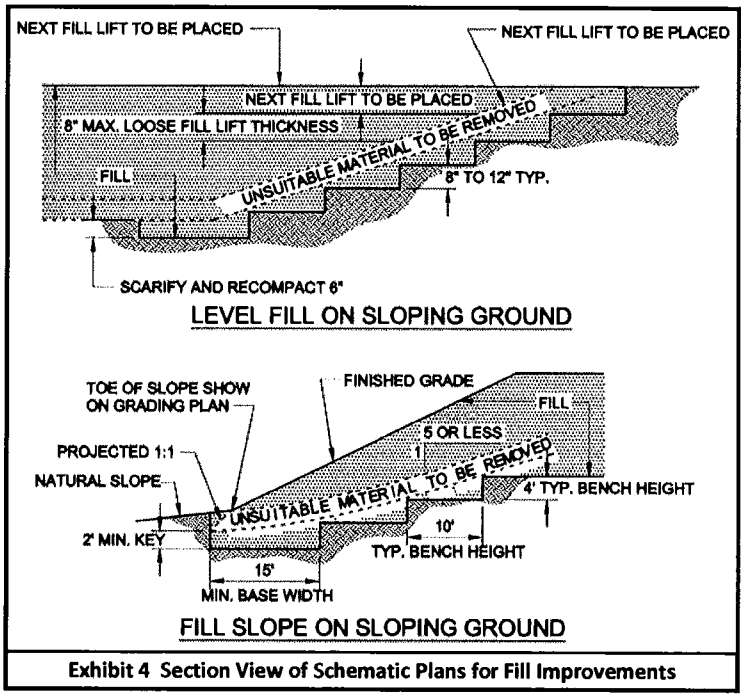


Exhibit 4 Section View of Schematic Plans for Fill Improvements

Fill slopes will be designed with a slope inclination of 2 to 1 ratio or flatter. Slope benches will be up to a maximum 30-foot vertical height intervals. Fills placed on slopes steeper than 5 to 1 ratio should be keyed and benched into the existing slope to provide stability of the new fill embankment against sliding.

Subdrains

Subdrains will be installed in the base of the fills to drain accumulation of water that may occur at the toe. In general, the subdrains will follow the existing drainage paths on the site. Subdrains will generally consist of 4-inch or larger diameter perforated pipes with perforations facing down as shown on Exhibit 5.

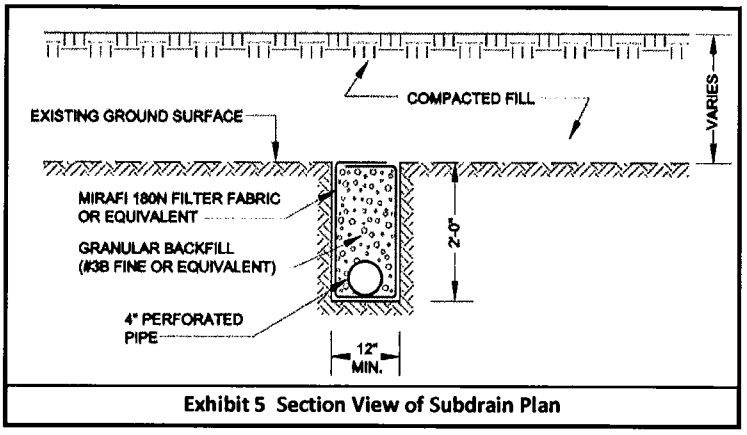


Exhibit 5 Section View of Subdrain Plan

In the area of the seep, a subsurface drainage system designed with a herringbone pattern is proposed to ensure that the natural movement of subsurface water through the poorly permeable residual soils in this area continues, thereby supporting the long-term health of the seep. Three subsurface drainage mainlines with smaller lateral subdrains will be constructed under the fill material,

aligned approximately perpendicular to proposed retaining walls, and installed at depths to intercept and convey the flow of subsurface water to the existing shallow well and seep. The exact locations, alignments, and depths will be determined during the project's design phase.

Construction Best Management Practices

The cemetery expansion is defined as a Category 5 project under the City Department of Planning and Permitting's (DPP) new rules related to water quality. Category 5 projects involve more than 1 acre of disturbance triggering grading, grubbing, stockpiling, and National Pollutant Discharge Elimination System (NPDES) permits. Projects also require the preparation of an Erosion and Sediment Control Plan (ESCP), which require the following information: 1) project site information detailing existing and finish grading and drainage conditions; 2) BMPs addressing erosion and sediment control during construction; 3) BMP monitoring; and 4) inspection reporting until the project site is stabilized.

It is anticipated the mass grading work for the Proposed Project will be done under one grading permit, in maximum 5-acre increments, and will take between 12 to 16 months to complete. This timeframe anticipates a moderate settlement waiting period (4 to 8 months) will need to be implemented. General BMPs will typically include the following, however, more detailed and site specific BMPs will be developed during the project's design phase.

1. Measures before construction:
    a. Existing ground cover will not be destroyed, removed or disturbed more than 20 calendar days prior to start of construction.
    b. Erosion and sediment control measures will be in place and functional before earthwork may begin, and will be maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but shall be replaced at the end of the work day.
2. Measures during construction:
    a. Clearing shall be held to the minimum necessary for grading, equipment operation, and site work.
    b. Construction shall be sequenced to minimize the exposure time of cleared surface areas.
    c. Areas of one phase, maximum of 5 acres in size, shall be stabilized before another phase can be initiated.
    d. Slope management and protection is required for slopes exceeding 15 percent.
    e. Stabilization shall be accomplished by protecting areas of disturbed soils from rainfall and runoff by use of structural controls such as PVC sheets, geotextile filter fabric, berms or sediment basins, or vegetative controls such as grassing or hydromulch. In addition, buffer strips 10 feet wide, at the toe of all slopes, and upstream diversion of storm water are required.
    f. All control measures shall be checked and repaired as necessary, e.g., weekly in dry periods and within 24 hours after any heavy rainfall event. During periods of prolonged rainfall, daily checking shall be conducted.

3. Measures during adverse weather conditions:
   a. The contractor shall monitor weather reports daily while conducting work.
   b. If an emergency weather warning is issued, work shall cease. All equipment and materials shall be secured against wind, rainfall and flooding, and the work area cleared of construction debris to the extent practicable. Work shall not resume until conditions improve and weather warnings are rescinded.
   c. Prior to recommencement of work activities following an event, the Contractor shall inspect all BMPs, including silt fence, sandbag barriers, and stabilized construction entrance, to ensure that they are not damaged, and that all BMP's are properly installed and functioning.
   d. Construction materials and debris that is dispersed due to wind or rainfall shall be collected by the Contractor and reused or disposed of in compliance with State and County regulations.

Sediment basins, in the form of depressions or excavated basins, will be used during construction to collect and detain runoff, allowing suspended soil particles to settle. Basins will generally be between 3 to 8 feet deep, and have controlled outlets and overflow spillways, so water is not permanently contained. These basins will be sized to handle the volume of runoff from a 2-year, 24-hour storm event, or 3,600 cubic feet per acre area that will be drained.

II. DRAINAGE FACILITIES

Existing municipal drainage facilities are available within the residential subdivisions surrounding HMP and within the subdivisions below the Petition Area. These facilities were developed as part of existing residential subdivisions. The municipal system consists of various storm drains within roadways, inlets, and catch basins that collect runoff from the street.

Existing Topography and Hydrology

The Petition Area ranges in elevation from 172 feet to 412 feet mean sea level (MSL). The existing slopes vary from 0% to 100% as shown in Exhibit 6 (Topographic Map). The western portion of the site, adjacent to Ocean View Garden, contains a large hillside that serves as a ridgeline directing stormwater runoff both towards and away from the project site. The slopes of the hillside are up to 90% in some areas. Moving east across the site, the slopes decrease significantly, having an average of 25% to 30%. Various smaller ridgelines and valleys exist throughout the site.

The watershed area encompasses the 54-acre Petition Area and a contributing off-site drainage area above this site for a total of about 93 acres, as shown in Exhibit JH-C (Exhibit 7). The mauka land comprising this watershed extends up to an elevation of 670 feet MSL.

Existing Drainage System Serving Petition Area

Within the Petition Area, stormwater runoff sheet flows downslope in a north-northwesterly (mauka-makai) direction following natural ephemeral drainageways and lower lying areas based upon topography. Stormwater sheet flows toward the Pikoiloa subdivision, eventually discharging into existing catchment structures located on Līpalu and Ōhāhā Streets.

Stormwater from the Petition Area is first collected by concrete drainage swales running along the mauka boundary of residences. This system of swales was designed to collect and convey stormwater to the existing City catch basin structures. The swales are within private property and the responsibility of individual property owners (residents) to maintain. Site inspections throughout the years have shown these swales have been poorly maintained. Neighbors have complained about flooding when these swales become overwhelmed.

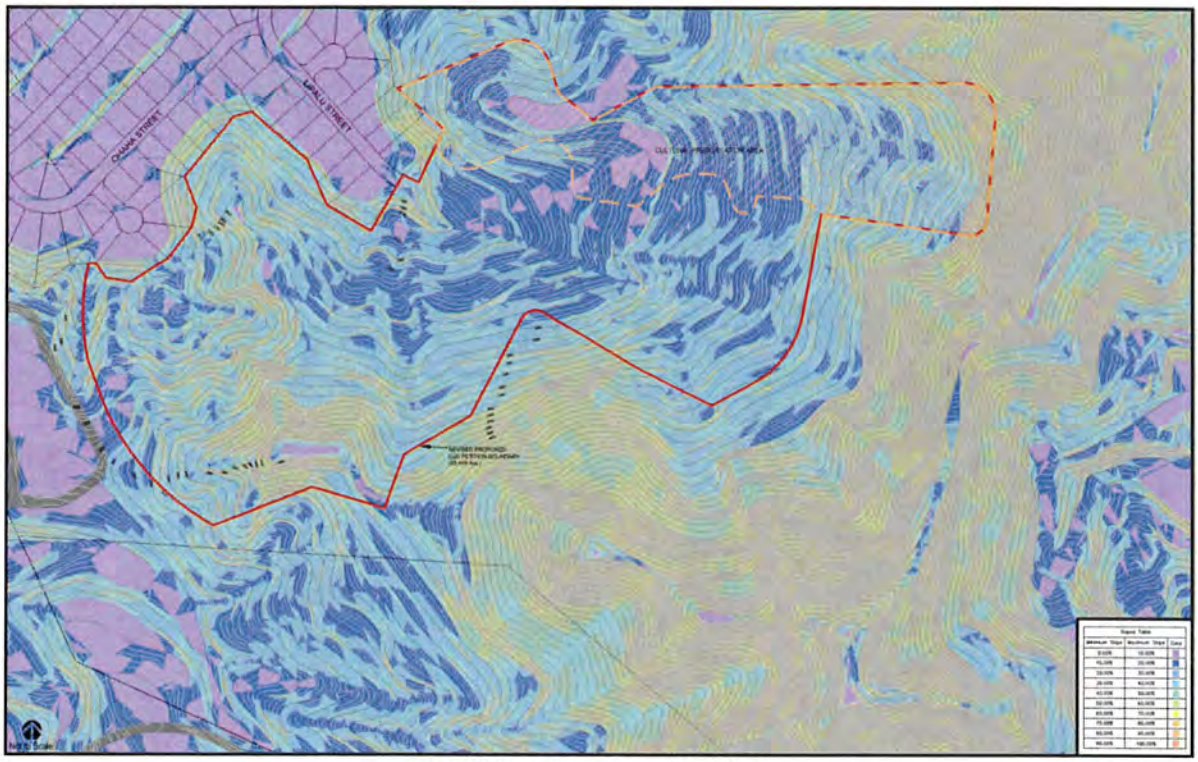


Exhibit 6 Topographic Map

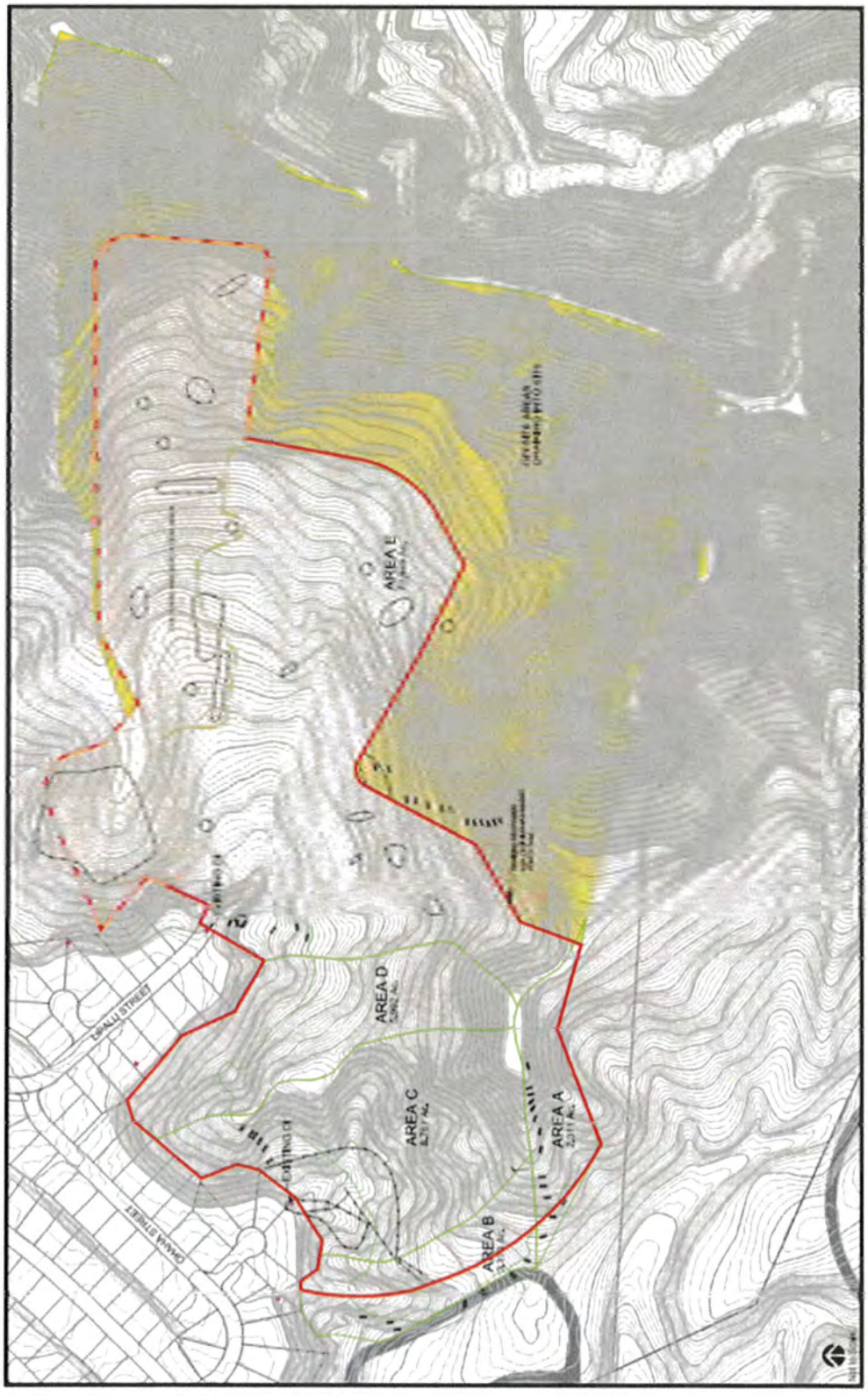


Exhibit JH-C Existing Drainage Area Map

Six catch basins were identified along the Petition Area border the residential properties, with two larger structures situated at the end of Līpalu Street and Ōhāhā Place. Exhibit 8 includes photos of the catch basin at the end of Ōhāhā Place as well as the general area where the catch basin at the end of Līpalu Street is situated. Runoff collected by the municipal system is eventually channeled into Kāwā Stream, and later discharges into Kāne'ohe Bay.

View of Catch Basin at End of Ōhāhā Place | View of Catch Basin Area at End of Līpalu Street

Exhibit 8 Photos of Existing Catch Basins

Stormflow that cannot be accommodated by the municipal system sheet flows further downslope to a privately owned drainage system. This system is located along the mauka property line of Pikoiloa subdivision properties bordering the Petition Area boundary. This drainage system consists of a series of swales. Each property owner is responsible for maintaining the portion of the drainage system within their property.

A preliminary engineering report prepared in 2008 for a previous version of this project obtained hydrology studies from the City and County that were completed as part of the Drainage Master Plans for the Pikoiloa subdivisions. Approved Drainage Master Plans were required to address all stormwater requirements prior to the development of any subdivision. Based on these documents, it appeared that the collection of the existing stormwater runoff quantities from the Petition Area were addressed as part of the development of Pikoiloa 9, Pikoiloa 10, and Parkway Subdivisions via various collection points in the residential areas.

A hydraulic analysis of the drainage system was conducted as part of the 2008 study after further evaluation of the existing storm drain infrastructure based upon construction documents recorded with the City. This downstream system was designed to meet current, undeveloped conditions within the Petition Area for the 10-year, 1-hour storm. This system analysis, based on the existing stormwater runoff quantities referenced from Drainage Master Plans and full system hydraulic flow calculations, showed that the existing drainage system was adequate for the current, undeveloped conditions within the Petition Area. However, it may have little excess capacity to accommodate additional peak runoff (>10 year, 1 hour storm).

Current Evaluation of Petition Area

The undeveloped Petition Area is densely vegetated with large canopy trees in the western portions of the area. Field investigations noted the canopy prevented sunlight from filtering through, primarily from invasive albizia trees. This is prevalent on the western portion of the site, where minimal ground cover is evident and some erosion is occurring. The eastern portion of the site has smaller canopy trees, more ground cover, and heavy vines over boulders due to more sun exposure.

Drainage calculations were prepared in accordance with the City DPP's Storm Drainage Standards for the 10-year and 100-year, 1-hour storm events, dated August 2017. The drainage area studied encompasses both the 53.45 acre Petition Area and the surrounding upslope watershed area for a total of 93.2 acres as previously shown on Exhibit JH-C.

There are a total of five sub drainage areas (Areas A to E) within the Petition Area. Area E is the largest and includes the central and eastern portions of the cemetery expansion along with the Cultural Preserve. This area corresponds to what is referred to as the Līpalu watershed that drains into the catchment basin at the end of Līpalu Street. The other four drainage areas serve the smaller western watershed area that discharge into the catchment basin at the end of Ōhāhā Place. A standard runoff coefficient of 0.35 is assumed for storm events, representing a conservative value for timber lands of moderate to steep slopes. Flows for the 10- and 100-year storms are estimated to be approximately 110 cubic feet per second (cfs) and 174 cfs, respectively.

Project Effects on Drainage Conditions

The project will change ephemeral drainageways and drainage patterns within the cemetery expansion area as a result of grading activities. Stormwater will continue to travel in a north-northwesterly direction downslope through the Petition Area for eventual discharge into the City's existing drainage facilities. However, this change in drainage patterns will not have an adverse effect on overall drainage conditions. The rate of stormwater runoff and the volume of runoff being discharged from the Petition Area will improve with the project. Overall, grading improvements will benefit existing drainage conditions by reducing the volume of stormwater runoff and improving the quality of water being discharged.

Project improvements proposed will change existing site conditions from undeveloped forest to a predominantly landscaped grass area. Topographic conditions will change to create a more level site with sloped grades of less than 20%. Therefore, runoff rates are expected to decrease with the reduction in slope and landscaped groundcover increasing permeability. Reduction of stormwater runoff rates will result in a corresponding reduction of runoff volumes. Landscaped groundcover will enhance stormwater infiltration and create a vegetated buffer strip serving as a low impact development (LID) improvement.

The project results in a 2% total increase in impervious area within the 92.3 acre drainage area. This is due to 2 acres of impervious surface being added as new roadways within the cemetery expansion. The Cultural Preserve will remain unchanged; the remainder of the Petition Area will consist of grassed cemetery lands, and undeveloped mountainous terrain mauka of the Petition Area.

Exhibit JH-D (Exhibit 9) shows the new drainage areas based upon proposed grading plans. The five main drainage areas have been divided into subareas, appropriately named, to graphically show the changes occurring to the site's drainage pattern. Detention basins are also shown and discussed in more detail below. Projected stormwater runoff rates associated with the project were calculated for the 10-year and 100-year, 1 hour storm events. Results of these calculations are shown in Table 1.

Table 1
Proposed Runoff Rates

	Rainfall Intensity 10yr-1hr (inches)	Rainfall Intensity 100yr-1hr (inches)	Runoff Coefficient	Flow Q_{10} (cfs)	Flow Q_{100} (cfs)
Existing Conditions	2.96	4.63	0.35	110.3	173.9
Proposed Conditions	2.96	4.63	0.25 – 0.35	106.1	166.0
Differential				**-4.2 (-4%)**	**-7.9 (-4%)**
Source: SOH, 2018					

The project will result in the reduction of the runoff flow rate due to: 1) a decrease in the slope of the large open portion of the site; 2) improved site permeability with proposed turf grass landscaping; 3) lower runoff coefficient; 4) lower runoff velocities; and 5) increased time of runoff concentration within the Petition Area. These factors result in a reduction of the 10-year and 100-year storm water flows by 4.2 cfs and 7.9 cfs, respectively.

The resulting decrease in runoff rate will also produce a decrease in runoff volume. Providing a well landscaped, stable surface for stormwater infiltration will contribute to the reduction in the overall volume of water leaving the site. Projected runoff volumes are outlined in Table 2. As shown, the proposed project will reduce the volume of stormwater runoff by 18,665 cubic feet (cf) and 29,180 cf for the 10-year and 100-year storms, respectively. This amounts to a beneficial 5.5% decrease in runoff volumes.

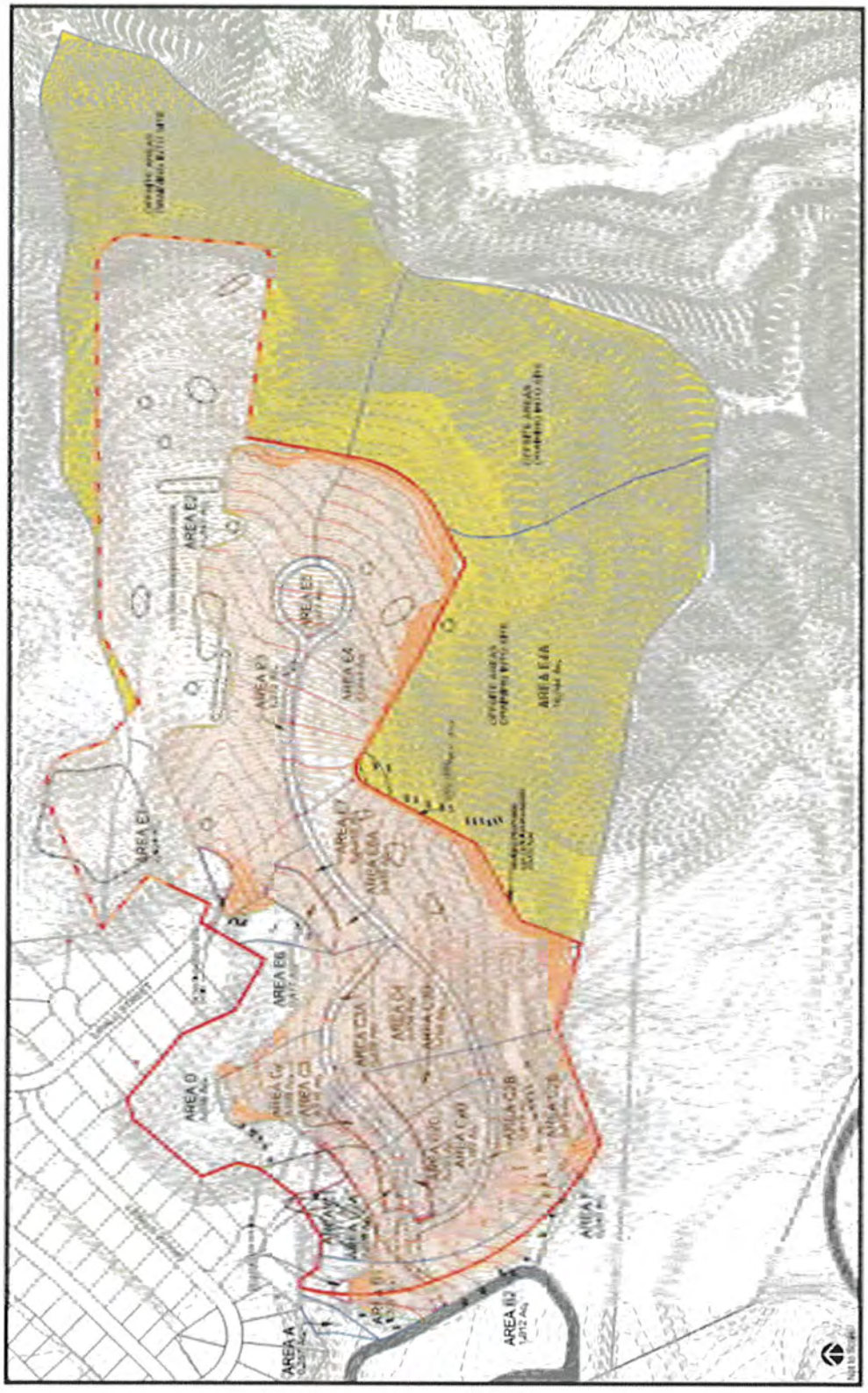


Exhibit JH-D Proposed Drainage Areas

Table 2 Proposed Runoff Volumes					
	Rainfall Intensity 10yr-1hr (inches)	**Rainfall Intensity 100yr-1hr (inches)**	**Runoff Coefficient**	**Volume V_{10} (cf)**	**Volume V_{100} (cf)**
Existing Conditions	2.96	4.63	0.35	350,465	548,194
Proposed Conditions	2.96	4.63	0.25 – 0.35	331,810	519.014
Differential				**-18,665 (-5.5%)**	**-29,180 (-5.5%)**
Source: SOH, 2018					

Proposed Drainage Improvements

The City adopted new "Rules Relating to Water Quality" under their Administrative Rules, Title 20, Department of Planning and Permitting in August 2017. Under these rules, the cemetery expansion is defined as a "Priority A" project, which involves land disturbance of one or more acres. Post-construction stormwater requirements include: incorporation of appropriate LID strategies and source control BMPs, including on-site retention of the water quality volume (WQV) or biofiltration BMPs for the remaining portion of the WQV not retained on-site.

The design storm runoff depth is one inch for basins and the water quality volume is about 12,700 cf for the 33.6-acre of disturbed area within the Petition Area. Therefore, planned drainage improvements include the use of two LID strategies and source control BMPs in order to meet the new requirements: 1) retention/detention basins, and 2) vegetative buffers.

Cemetery access roads will be graded to direct runoff to drain inlets located adjacent to these roads as shown on Exhibit JH-D. Runoff from drain inlets shall be piped through drain lines conveying stormwater to lower portions of the site where three permanent retention/detention basins are proposed. These and other basins shall initially be constructed to handle sediment laden runoff resulting from grading activities during construction. Three of these basins proposed for the lower portion of the site will then remain as permanent post-construction LID improvements. The basins function as a detention system and retain stormwater for water quality purposes.

It is projected that an additional 12,700 cubic feet (cf) of storage and infiltration will be accommodated by the modifications planned for the project site. Stormwater from the cemetery expansion will be detained and allowed to infiltrate within permanent retention/detention basins. These basins retain a temporary pool of water that is designed to drain between storm events, while the remainder of the water is drained through a controlled outlet. These outlets will be designed to be no smaller than 4 inches in diameter allowing a basin to drain completely within 48 hours when full, and 24 to 36 hours when half full. An

emergency spillway will also be designed to allow the basin to safely overtop when experiencing a larger storm event.

A summary description of the retention/detention basins is provided:

1. Detention Basin A. A smaller detention basin of about 1,500 square feet in size is located on the western end of the Petition Area. This basin is intended to detain stormwater runoff for the area along the edge of the Ocean View Garden site and the western edge of the cemetery expansion.
2. Detention Basin B. This detention basin is about 4,500 square feet in size, and is located in the northwest area of the cemetery expansion. This basin is intended to collect stormwater runoff from this western area where the hillside will be excavated, and will drain into the existing drainage culvert behind residences at Ōhāhā Place.
3. Detention Basin C. This detention basin is about 5,000 square feet in size, and is located in the central area of the cemetery expansion site near the end of Līpalu Street. This basin is intended to generally collect stormwater runoff from the central portion of the Petition Area. This basin will have a drain connecting to the existing drainage culvert at the end of Līpalu Street.

The project will also have a vegetated buffer strip between the cemetery and lower lying areas. A vegetated buffer strip is a grassy slope vegetated with turf grass that is designed to accommodate sheet flow and removes pollutants by vegetative filtration.

Stormwater will eventually drain from all detention basins through outlet structures that direct flow to pipes outletting adjacent to existing catchment structures on Līpalu Street and Ōhāhā Place. No impacts are expected to these catchment structures because of the projected reduction in runoff volume and flow rates.

In summary, proposed improvements will reduce runoff volume by about 5.5% for the 10 and 100-year, 1-hour storm events relative to existing conditions. Given that existing drainage structures presently appear to lack capacity beyond the 10-year storm event they were designed for, proposed improvements will beneficially impact the structures and reduce potential flooding for downstream residences. Based upon proposed drainage improvements, no further mitigative measures are necessary.

Water Facilities

The Petition Area is an undeveloped site that is not currently serviced by on-site potable water infrastructure. The City Board of Water Supply (BWS) provides potable water service to existing sections of HMP, the Hawai'i State Veterans Cemetery, and surrounding uses via a network of water transmission mains.

Water provided to HMP is by the City's potable water system from two separate connections. The main connection point is located at the entrance to HMP in the vicinity of Mahinui Road and Kamehameha Highway. A 6-inch meter on Kamehameha Highway services HMP and has a capacity of 1,000 gallons per minute (gpm). Ocean View Garden's irrigation system is serviced via a separate 1-inch lateral coming off a 5/8-inch meter from Kumakua Place.

The majority of existing water demand is primarily related to irrigation of the cemetery's landscape, with a smaller portion of water used for cemetery water features and visitor needs (i.e. filling individual containers to water flowers placed on burials). An average of 10,000 gallons of water a day is used by HMP for irrigation of their existing 80 acre cemetery. This average daily water use was estimated based on an average water demand of 125 gallons per acre per day. Irrigation demand was calculated based upon available 2017-18 water use billings for the Ocean View Garden cemetery. Irrigation water use varies depending upon weather conditions, and HMP's irrigation demand has generally been fairly low to moderate due to the wetter climate conditions in Windward O'ahu. In comparison, BWS planning standards allocate average daily demands of 4,000 gallons per acre for agricultural use, schools, and parks, and 2,500 gallons per acre for single-family use.

Effect on Potable Water System

Site improvements propose to connect the cemetery expansion area's irrigation system to the City's existing waterline at the end of Kumakua Place. There is already an existing waterline being used to irrigate the Ocean View Garden site. The existing 5/8-inch meter serving Ocean View Garden will need to be upgraded to a 2-inch water meter to accommodate the additional water flow needed.

When the project connects to the City's existing potable water system, this additional demand will not have a significant impact on the City's water system. Given Kāne'ohe's wet climate, with annual rainfall averaging about 53.8 inches per year, the need for irrigating grounds will be greatly decreased. Irrigation will only be needed during drier periods, such as during summer months, or during periods of low rainfall. It has been estimated that an average of about 3,500 gpd of water will be needed for irrigation of the expanded cemetery. This estimate is based upon an average use of 125 gallons per acre per day for the Ocean View Garden. With this increased demand, the total average daily water use for irrigation with the project will be 13,500 gpd.

Consultation with the City BWS for this project indicated their existing water system is adequate to accommodate the proposed expansion of the cemetery. BWS's review of the Draft EIS further confirmed the water system being adequate to accommodate the project based upon their October 11, 2018 comment letter.

Further, the existing water system is adequate to support the proposed project and provides a reliable water source. The Petitioner will pay the water system facilities charges for resource development, transmission, and daily storage when water is made available. Construction drawings and the project construction schedule will be coordinated with BWS for review during the project design phase to minimize impacts to the City's water system.

Years of Experience
With this Firm: <1
With Other Firms: 23

Education
B.S., Purdue University; Civil Engineering, 1995

License
Hawaii; Licensed Civil Engineer No. 9776, 1999
LEED – BD&C Accredited Professional, Hawaii, 2009

Professional/Community Activities
American Council of Engineering Companies of Hawaii
American Society of Civil Engineers
American Society of Military Engineers
Society of Women Engineers
Young Business Roundtable
Young Business Council, Honolulu
Japanese Junior Chamber of Commerce
Hawaii Kai United Church of Christ

JAMISEN S. HIROTA, PE, LSIT, LEED BD&C

Project Manager, Senior Discipline Manager, Civil Engineering

Ms. Hirota is a leader in the civil engineering and land surveying industry in Hawaii. She joined Sam O. Hirota, a firm at the forefront of the design-build industry in Hawaii, in 1997 after serving as a project planner for the City of Indianapolis. Jami immediately excelled at the intricacies of managing projects through the process of preparing a winning bid, project design, and construction.

After the completion of several design build projects, in 2003 she became principal-in-charge of the site design for the Residential Community Initiative for inventory of Army housing on Oahu. The project entailed design and construction of 5,000+ new houses within 7 Army installations, community centers, recreational facilities, and refurbishment of historic neighborhoods over a 16-year period. Jami was part of the Actus Lend Lease team that prepared the winning proposal and continues to manage design of site components for the $1.5+ billion project.

Overall, Ms. Hirota has a large portfolio of DoD, commercial, state, county and subdivision projects that spans over twenty years. Her job responsibilities include management of projects from the initial proposal stage through to their completion. She excels at maintaining high levels of client satisfaction, while keeping projects within budget and on schedule.

Project Experience:

Kahokuwelowelo Heiau Site and Implementation Plan *Waialua, Hawaii*
Project manager and civil engineer for a site and implementation plan to guide site repairs and restoration to support stewardship and educational activities taking place at Kuhokuwelowelo. The project area is approximately 6.5 acres and the heiau itself consists primarily of retaining walls and terraced areas incorporated with natural bedrock outcrops.

Diamond Head Theatre Redevelopment *Kaimuki, Hawaii*
Project Manager and Civil Engineer for the new 500-seat Diamond Head Theatre (DHT) at the site of the historic theatre along the base of Diamond Head Crater. The existing theatre building was originally built in the 1930s as an Army movie house, and served as a performing arts center for more than 60 years.

Dillingham Ranch Agricultural Subdivision Improvements *Honolulu, Hawaii*
Project Manager and Civil Engineer for a 70-lot agricultural subdivision to occupy 1,150 acres of the historic Dillingham Ranch on the North Shore of Oahu. Responsible for preparation of the construction documents for the subdivision improvements, including roadway design, the private potable water system and low-pressure sewer system.▲

Testimony of
TOM NANCE, P.E.
TOM NANCE WATER RESOURCE ENGINEERING, INC.
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 1

My name is Tom Nance, P.E. and I am the president of Tom Nance Water Resource Engineering, Inc. (TNWRE), an engineering consulting firm which specializes in well development, water system design, and other aspects of surface and groundwater hydrology. I am a licensed professional engineer with more than 45 years of experience. As an expert witness, I have offered professional testimony in court proceedings and in other legal venues. A copy of my resume is attached.

Scope of Study

TNWRE was retained by HHF Planners to assess groundwater conditions at the Hawaiian Memorial Park (HMP) project site and the likely impact of project's development. Particular emphasis was placed on evaluating the shallow dug well and perennial seep located in the western portion of the project site. Assessment of the project's potential impact on the well and seep involved field investigation, review of the results of four boreholes drilled upslope of these features, and a siphon and pump test of the well to determine its relation to subsurface flow maintaining the flow in the seep. TNWRE prepared a groundwater assessment report that was included as Appendix H in the Final Environmental Impact Statement (Final EIS) for the project.

Geologic Setting

The existing HMP cemetery and project area are located within the former caldera of the Koolau Mountain. The caldera filling lavas beneath the project site are part of the Kailua Member of the Koolau volcanics. These caldera filling lavas are relatively impermeable due to almost complete filling of interstices with secondary minerals from hydrothermal alteration. Clinker beds, where they occur, have been cemented into hard and essentially impermeable breccia. Joints of intruded dikes are also filled with secondary minerals.

As a result, development of even a moderate capacity well anywhere in the volcanics beneath the project site or elsewhere on the HMP property would not be possible. Given the virtual impermeability of Kailua volcanics, none of the proposed actions within the project site have the potential to impact ongoing or possible future uses of groundwater drawn from the permeable Koolau volcanics of the Ko'olaupoko Aquifer System.

Shallow Well and Perennial Seep

A shallow dug well and perennial seep is located in the northwest corner of the project site (see Exhibit 1 attached to this testimony). Flow form the perennial seep has created a habitat for the endangered Blackline Hawaiian Damselfly. Preservation of this habitat is considered to be a necessity. The dug well is located directly upslope of the seep. It is 11.5 feet deep below the top of its square-shaped concrete rim. The opening of the concrete top is 2.65 by 2.9 feet in dimension. The dug borehole below the concrete is substantially larger than this opening. Exhibit 2 attached to this testimony is a schematic cross section of the well and indicates its approximate dimensions.

As measured a number of times during the field investigation, the water level in the well was consistently above ground level on the downstream side of the well. The well is not registered with the State Commission on Water Resource Management (CWRM) and no information about its installation or past use could be found. Based on the old pipe laying nearby, it may at one time have been a modest source of supply for some prior use.

The small perennial seep emerges about four feet downslope from the well. Further down the waterway, the flowrate in the waterway continuously increases along the route to its ultimate discharge into a City drain inlet at the end of Ohaha Place. Given the additions to the flowrate enroute downslope, it is more accurate to describe the seep as a linear area of discharge rather than a discharge from a single point.

Testing of the Dug Well

Two types of field investigation were conducted to assess the well and seep: 1) drilling four boreholes directly upslope the well and seep; and 2) conducting a siphon and pump test of the well. Drilling of the boreholes was done by Geolabs, Inc.

Borehole Drilling Results

Exhibit 1 identifies the approximate locations of the four boreholes drilled above the well and seep. Although an obvious perching member was not encountered, the water level response in all four boreholes was informative. Water was not encountered in the boreholes until each borehole had been drilled down to between 15 to 20 feet below ground. At that depth, the water level in each borehole rose up very slowly. These results establish that the groundwater in the well and emerging in the seep is semi-confined. The tabulation of approximate water levels in the boreholes and the well showed that the semi-confined groundwater residing in the poorly permeable residual soil has a relatively steep downslope gradient.

Siphon and Pump Testing Results

Well testing was conducted for two basic objectives: 1) to confirm that the semi-confined groundwater occurrence found at the four boreholes directly upslope also exists at the well; and 2) to determine if the seep emerging four feet downslope of the well is a result of subsurface leakage from the well. Both aspects of the groundwater occurrence were confirmed by the test. Test results can be summarized as follows:

1. When well water level was drawn about halfway down the concrete well head, the seep emerging about four feet downslope stopped flowing. Clearly, flow from the upper end of the seep is maintained by subsurface well leakage.
2. Over the period of intermittent siphoning and then pumping, a total of 1,615 gallons was removed from the well. About 950 gallons was estimated to be removed from well storage itself, and the remaining 665 gallons flowed into the well during the test. That inflow was at an average of about 4.3 gallons per minute (gpm).
3. Based on measurements of the recovering water level at the end of pumping, inflow to the well averaged approximately 3.1 gpm.
4. The water level in the well was checked the following day. The water level had fully recovered (actually to a level 0.1-foot higher than at the start of the test the day before). Flow in the seep below the well was fully restored at that time.

In summary, field investigations demonstrated that the seep is maintained by the natural discharge of groundwater moving downslope through the poorly permeable residual soils overlying the unweathered Kailua volcanics. In the vicinity of the well and the four test boreholes upslope from the well, the groundwater is actually semi-confined. The groundwater movement is through underlying soils at depths of 10 feet or more rather than through the surface soils. The upper end of the seep begins about four feet downslope of the well, and water flow in the upper one third to one half of the linear seep is maintained by subsurface leakage from the well. Further downslope, flow in the seep increases continuously to its ultimate discharge into the Ohaha Place drainage system.

Potential Project Effects on Shallow Dug Well and Seep

Grading plans for the cemetery expansion include placement of fill and construction of retaining walls upslope of the well and seep. These improvements could potentially intercept, impede, or reroute the flow of groundwater that ultimately feeds into the well and seep.

Based on groundwater occurrence established by the test borings and testing of the dug well, the footings of the proposed retaining walls would be too shallow to directly intercept groundwater moving downslope. However, the weight of fill material behind retaining walls has the potential to compress existing soils, potentially impending or redirecting groundwater moving downslope.

To minimize this potential impact, a subsurface drainage system consisting of three subsurface drains in the area planned for fill activities above the seep is recommended. This would ensure the quantity and direction of groundwater flow is maintained. The drain system would be designed in a herringbone configuration. Three subsurface drainage mainlines would have smaller subdrains branching laterally from them. This drainage system should generally be aligned perpendicular to the retaining walls and installed at depths to intercept and convey the flow of groundwater to the well and seep. The possible alignment of this system is shown in Exhibit 3 attached to this testimony. Subsurface drains would likely be installed between 10 to 15 feet below the existing surface. The exact location, alignment, and depth of this drainage system would be determined after the drilling of additional boreholes as part of project design to develop project grading plans.

It is also recommended to install a water level recording device in the dug well above the seep prior to construction. Its monitored levels during and following construction would be a good indicator of the effectiveness of the subsurface drainage system. If the subsurface groundwater flow is not sufficiently maintained by this system, the flow could be augmented by a water line extended from the project area to the well.

TOM NANCE **Hydrologist / Water Resource Engineer**

EDUCATION

1977-1978 Graduate Work in Hydrology, University of California at Berkeley
1970-1972 Graduate Work in Physical Oceanography, University of Hawaii
1970 M. S., Civil Engineering, Stanford University
1966 B. S., Mechanical Engineering, Stanford University
1966 B. S., Economics, Claremont Men's College

REGISTRATION

)75-Present Professional / Civil Engineer - Hawaii #3878
Certified Diver - Hawaii

AFFILIATIONS

American Society of Civil Engineers
American Water Works Association

EXPERTISE

Groundwater and Surface Water Development
Hydraulics and Water System Design
Flood Control and Drainage
Coastal Engineering

EXPERIENCE

93-Present **TNWRE Inc. dba Tom Nance Water Resource Engineering - Honolulu, Hawaii**
President

1989-1993 **Tom Nance Water Resource Engineering** (a subsidiary of **Belt Collins & Associates) - Honolulu, Hawaii**
President

1972-1989 **Belt Collins & Associates - Honolulu, Hawaii**
Senior Water Resources Engineer (1979-1989)
Specializes in hydrologic and engineering studies and designs for water resource development, flood control projects, and unusual drainage applications such as injection wells.
Project Engineer (1975-1979)
Responsible for hydrologic investigations, engineering feasibility, and design studies and environmental impact statements.
Civil Engineer (1972-1975)
Engineering feasibility studies; environmental impact assessments and statements.

1970-1972 **Donald Wolbrink & Associates - Honolulu, Hawaii**
Participated in engineering and planning studies

1968-1969 **U.S. Peace Corps** (Served as a volunteer in Micronesia)
Civil Engineer / Teacher

1964-1965 **Hawaiian Electric Company - Honolulu, Hawaii**
Student Engineer

1962-1963 **Honolulu Board of Water Supply - Honolulu, Hawaii**
Student Engineer

SELECTED PROJECTS

Year	Location	Project
2019	Oahu	Disposal Wells for the Yacht Harbor Towers
2019	Hawaii	UIC Disposal Wells for the Hu Honua Power Plant
2018	Guam	Andersen AFB Wells
2018	Maui	Sustainable Groundwater Supply of HC&S Wells
2018	Oahu	Supply and Disposal Wells for the Atlantis Project
2017	Maui	Pumped Water Storage Project

SELECTED PROJECTS

Year	Location	Project
2017	Hawaii	Ouli Well field
2017	Oahu	Waiahole Wells 1 and 2
2017	Hawaii	Hualalai Groundwater Sustainable Yield
2017	Hawaii	Waialua Well B
2017	Maui	Wailea Well 2A
2017	Maui	Ulupalakua Pumped Storage Project
2017	Oahu	Groundwater Assessment for the Blaisdell Center
2017	Hawaii	Hualalai Sustainable Yield Assessment
2017	Maui	Wailea 2A Well
2017	Maui	LIC Well 1
2017	Maui	Polena Disposal Well
2016-2017	Hawaii	HOVE-2 Well at Ocean View Estates, Kona
2016-2017	Maui	Pookela Well B, Makawao
2015-2016	Kauai	Princeville Wastewater Treatment Plant Disposal Wells, Princeville
2015-2016	Guam	Andersen AFB Wells
2015-2016	Maui	Launiupoko Well, Lahaina
2015-2016	Maui	Kihei High School Irrigation Wells
2015-2016	Hawaii	Keopu Deep Monitor Well, Kona
2015-2016	Maui	Polena Wells 1 and 2, Makena
2015	Maui	BRE-1 Well, Haliimaile
2015	Maui	HT-1 Well, Haiku
2015	Maui	Kamalani Irrigation Well, Kihei
2015	Guam	Anderson AFB New Well Development
2015	Oahu	Evaluation of the Navy's Barbers Point Water System
2014-2017	Kauai	Hawaii Dairy Farms Hydrologic Assessment, Mahaulepu
2014-2016	Kauai	Hawaii Dairy Farms Groundwater Evaluation
2014-2016	Hawaii	Monitor of High Level Groundwater in the Keauhou Aquifer, Kona
2014-2016	Oahu	Kahana Artesian Well Rehabilitation
2014-2015	Hawaii	Palani Well and Pump Assessment, Kona
2014	Maui	Reservoir Sizing for Maui DWS Treatment Plant at Kamaole Weir
2013-2014	Lanai	Saltwater Supply and Concentrate Disposal Wells for Lanai Desalinization
2013-2014	Oahu	Saltwater Supply and Disposal Wells for Hoakalei Cove
2013-2014	Maui	Supply and Disposal Wells for Puunene Heavy Industrial Subdivision
2013-2014	Maui	Wailuku Well 2
2013-2014	Maui	Nalu Ola Well
2013-2014	Maui	MECO Maalaea Disposal Wells 3 and 4
2013-2014	Hawaii	Rehabilitation of Keauhou Well 2
2013	Kauai	Hydrologic Analysis of Kalihiwai Reservoir
2013	Oahu	Makaha West Irrigation Well
2012	Kauai	Brydeswood Well 1
2011	Oahu	Disney Aulani Resort Saltwater Supply and Disposal Wells
2011	Oahu	Covanta (HPOWER) Disposal Wells
2011	Oahu	New Well at St. Stephens Diocesan Center
2011	Oahu	New Well at Fort Shafter
2011	Lanai	Lanai Well 15
2011	Hawaii	DWS Halaula Well
2010	Hawaii	DWS Kapulena Well
2010	Oahu	Robinson Well No. 1
2009-2010	Hawaii	Kamakana Villages Deep Exploratory Well
2009-2010	Oahu	NOAA Ford Island Deep Saltwater Well
2009-2010	Oahu	Alii Turf Helemano Well
2009	Maui	Central Maui Baseyards Well
2009	Maui	New Wells at Kealia NWR
2009	Maui	Kaanapali P-5A Well
2009	Maui	Villages of Lealii Potable Water Master Plan
2008-2009	Hawaii	Waikoloa Drinking Well No. 8
2008	Maui	Kaanapali P-3 Well
2008	Hawaii	Kaupulehu Well 11

SELECTED PROJECTS

Year	Location	Project
2008	Kauai	Princeville Well No. 5
2008	Lanai	Lanai Well 3
2008	Kauai	Potable Water Master Plan for Kikiaola
2007-2008	Maui	A&B's Waiale Well Nos. 1 and 2
2007-2008	Maui	Kula 1800 Well Nos. 1 and 2
2007	Maui	Maui Lani Irrigation Well No. 3
2007	Maui	Kamaole Well Nos. 1 and 2
2007	Hawaii	Waikoloa Drinking Water Well No. 7
2007	Hawaii	DWS' Waiohinu Well
2006	Hawaii	DWS' Ahualoa Well
2006	Hawaii	Hapuna Irrigation Well No. 4
2006	Kauai	Kapalawai Resort Potable Wells
2006	Kauai	Poipu Wastewater Treatment Plant Disposal Wells
2006	Oahu	Ko Olina Resort Deep Saltwater Supply Well
2006	Hawaii	Kealahewa Potable Wells 1 and 2
2006	Kauai	Falko Potable Wells 3 and 4
2005-2006	Hawaii	Kaupulehu Potable Well No. 6
2005-2006	Hawaii	Kaupulehu Irrigation Well No. 6
2005-2006	Maui	Maui Lani Potable Wells 5, 6, and 7
2005	Pohnpei	Groundwater Exploration Program, Pohnpei Island of FSM
2004	Hawaii	Waikoloa Drinking Water Well No. 6
2004	Hawaii	Honomu Potable Well
2004	Oahu	Saltwater Wells for the Hilton Hawaiian Village Lagoon
2004	Oahu	Groundwater Modeling of Saltwater Disposal at the Oceanic Institute
2004	Kauai	Stormwater Modeling for the Pacific Missile Range Facility
2004	Hawaii	Waikoloa Effluent Disposal Well
2004	Kauai	Kiahuna Mauka Water Master Plan
2004	Kauai	Village at Poipu Water Master Plan
2004	Kauai	Kukui'Ula Offsite Water Master Plan
2003-2004	Hawaii	Kaupulehu Potable Well No. 5
2002-2004	Guam	Anderson AFB Drinking Water Wells
2003-2004	Oahu	Four Saltwater Disposal Wells at the Oceanic Institute
2001-2003	Kauai	Piwai Well Nos. 2 and 3
2003	Hawaii	Hapuna Irrigation Well No. 4
2002	Maui	Kauaula Well No. 3
2002	Molokai	Kaluakoi Resort Brackish Irrigation System
2002	Molokai	Kaluakoi Potable Water System
2001	Maui	East Maui Irrigation Ditch / Stream Study
2001	Kauai	Mana Plain Drainage Study
2001	Kauai	Hanamaulu Bay Oceanfront Wells
2001	Kauai	Evaluation of Koloa Well F
2001	Kauai	Trex Disposal Well
2001	Lanai	Koele Golf Course Irrigation Supply
2001	Kauai	Poeleele Well
2001	Oahu	Pump Testing of the DLNR Oahu (Kaimuki) Exploratory Wells
2001	Maui	Kealia Pond for Maui National Wildlife Refuge
2001	Yap Islands	Falalop Island Water System - Ulithi Atoll
2001	Oahu	Kii Well Rehab at Kahuku Wildlife Refuge
2001	Oahu	Waiau Pipeline for HECO
2001	Oahu	Ameron Quarry
2001	Hawaii	Department of Water Supply Waiaha Well and Tank
2000	Hawaii	South Kohala Groundwater Assessment
2000	Kauai	Lihue Energy Services Center Water System Design
2000	Hawaii	1.5 MG Reservoir at Mauna Lani WWTP
2000	Yap Islands	Yyin to Gargey Pipeline
2000	Oahu	HASEKO Ocean Pointe Water Master Plan
2000	Hawaii	Irrigation Wells for Hualalai Resort
2000	Kauai	CEATECH Plantations Wells 3 and 4

SELECTED PROJECTS

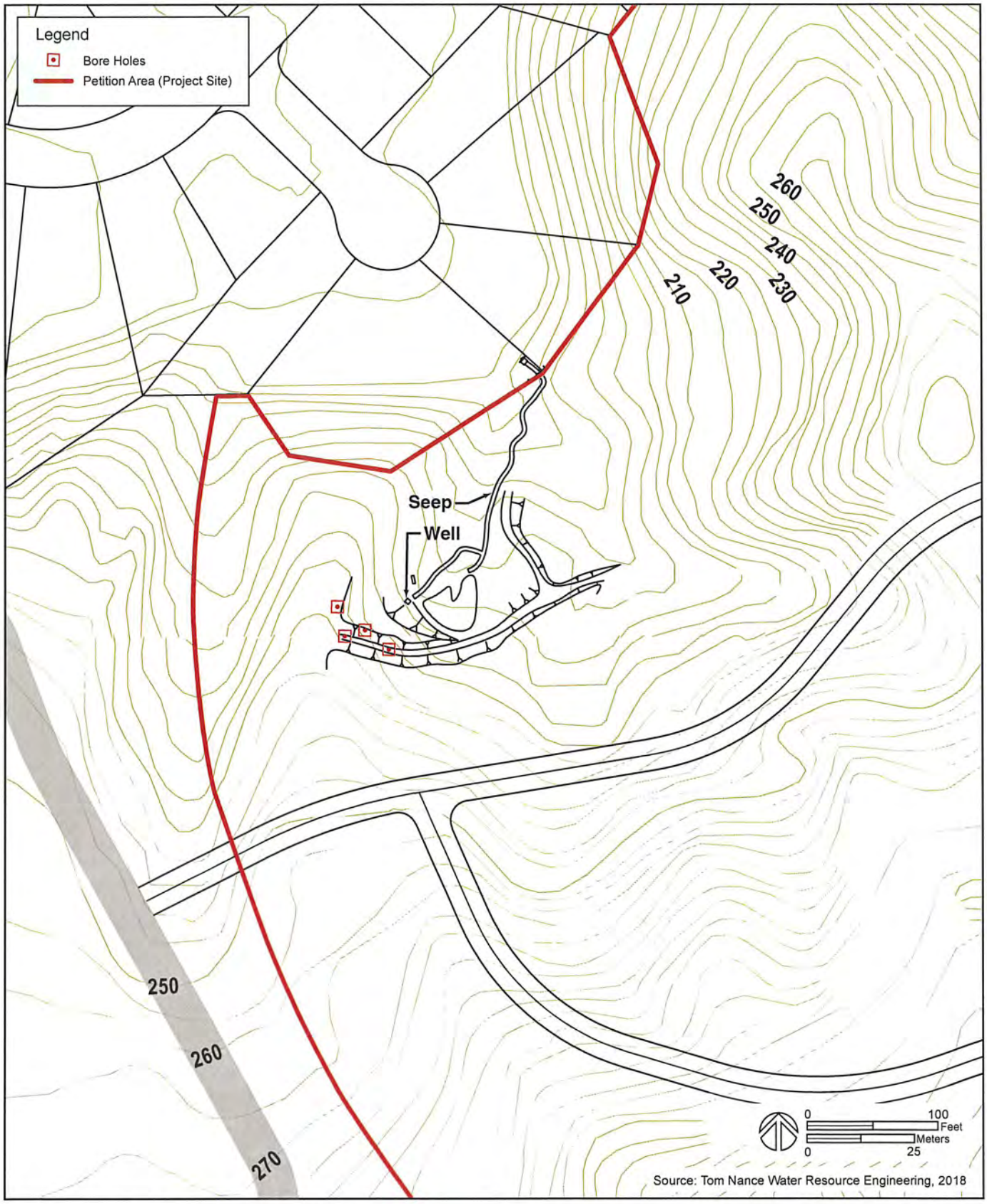
Year	Location	Project
2000	Oahu	Dillingham Airfield Water Supply Evaluation
2000	Molokai	Hanalilolilo Intake and Pipeline
2000	Hawaii	Hapuna Well No. 3
2000	Maui	Launiupoko Well
2000	Hawaii	Department of Water Supply Waiaha Well
2000	Yap Islands	Design of the Maa-Rumung Pipeline Extension
2000	Yap Islands	Gagil-Tomil System Extension
2000	Hawaii	Kaupulehu Potable Well No. 4
1999	Kauai	Kapalawai Resort Water Systems
1999	Yap Islands	Kadday to Yyin Pipeline
1999	Kauai	Kekaha Sugar Plantation Infrastructure Study
1999	Maui	Maui Land & Pineapple Well in Haliimaile
1999	Hawaii	Mauna Lani Resort Irrigation Well Nos. 8 and 9
1998	Oahu	Coral Creek Golf Course Well Development
1998	Hawaii	Uplands Water System Design
1998	Molokai	Puu O Hoku Ranch Well Development
1998-1999	Maui	Kailua Well Development for East Maui Irrigation
1998	Oahu	Waikele Stream Evaluation
1998-1999	Yap Islands	Groundwater Development in Eyeb Valley
1998-1999	Oahu	Drainage Assessment for Hawaii Reserves, Inc.
1998-1999	Kauai	Well Development at Papaa Bay Ranch
1996-1997	Oahu	Bay View Golf Course Irrigation Wells
1996-1997	Molokai	Molokai Ranch Replacement Pipelines
1996-1997	Molokai	Molokai Ranch 15 MG Storage Reservoirs
1996-1997	Molokai	Waiola Well
1996-1997	Hawaii	Parker Wells Outfitting
1996	Oahu	Royal Kunia Golf Course Irrigation Well
1996	Oahu	Hawaii Reserves, Inc. Contested Case
1996	Oahu	Puuloa Caprock Users Group Master Plan
1997	Kauai	Kauai Electric-Chevron Groundwater Evaluation
1994-1997	Oahu	Ewa Caprock Aquifer Monitoring
1995	Hawaii	Kaupulehu Potable Wells Evaluation
1995	Indonesia	Pecatu Graha Project - Bali
1995	Indonesia	Taman Dayu Well Drilling - Surabaya
1995	Kauai	Princeville Water Master Plan
1995	Hawaii	Kaupulehu Brackish Pond Turnover
1995	Oahu	Honolulu Resource Recovery Venture Disposal Wells Report
1995	Hawaii	Outfit Mauna Lani Resort's Parker Wells
1995	Kauai	Princeville PUC 1995 Rate Case
1995	Oahu	EPWDC Non-Potable Source Plan
1995	Hawaii	Kaupulehu Disposal Wells
1995	Maui	DWS Piihonua Well Pump Test
1995	Hawaii	Kaupulehu Potable Well Nos. 1 and 2
1995	Hawaii	Ookala Well (DWS)
1995	Oahu	Waiahole Irrigation Company
1995	Oahu	Gentry Area 26 Well
1995	Oahu	Second Honouliuli 228 Tank
1995	Lanai	Lanai Well No. 14 Outfitting
1995	Hawaii	Big Island Country Club Estates Potable Wells Certification
1995	Hawaii	Mauna Kea Hotel Drainage Improvements
1995	Oahu	Gentry Area 26 Irrigation Station
1994	Oahu	Waialua Sugar Company Pump 3 DOH Certification
1994	Hawaii	Islands Saltwater Well Permits, Mauna Lani Resort
1994	Hawaii	Kehena Ditch Evaluation for Kohala Ranch
1994	Oahu	Chiyoda Makakilo Golf Course
1994	Oahu	Gentry Waiawa Recharge Study
1994	Hawaii	Kawaihae Cogeneration Supply and Disposal Wells
1994	Oahu	Kapolei Irrigation Pump Station

SELECTED PROJECTS

Year	Location	Project
1994	Oahu	Campbell Agricultural Lands Water System
1994	Oahu	AES Federal UIC Permit
1994	Oahu	Campbell Estate's Malaekahana Water System
1994	Oahu	Hauula Well Evaluation
1994	Maui	Kapalua's Well No. 3
1994	Hawaii	Waikoloa's Tank 1200S-2
1994	Oahu	Gentry Golf Course Irrigation Pump Station
1994	Oahu	HRT's Makaha Site Groundwater Evaluation
1994	Oahu	Kalaeloa Partner's New Monitoring Wells
1994	Oahu	Castle & Cooke Central Oahu Master Plan
1994	Hawaii	Kaupulehu Makai Irrigation Well Outfitting
1994	Philipinne Islands	Villa Escudero
1994	Oahu	HPOWER Disposal Wells DOH Report
1994	Guam	Lost River Water Supply Evaluation
1994	Oahu	Makakilo Golf Course
1993	Lanai	Lanai Water System Development
1993	Oahu	Kapolei City Irrigation System
1992-1993	Oahu	Laie Water Master Plan
1992-1993	Hawaii	Kohala Ranch Well Nos. 3 and 4
1992-1993	Hawaii	Mauna Lani Resort's Parker Wells
1992-1993	Rota Island	SNM Rota Island Resort
1993	Oahu	ABB Cogeneration Plant Saltwater Supply Wells
1991-1993	Hawaii	Keauhou High Level Well Development
1992-1993	Oahu	Waiawa by Gentry Water System Development
1990-1993	Hawaii	Kaupulehu Resort Water System Development
1991-1992	Hawaii	Kona Country Club Irrigation Well
1992	Oahu	Lihilani Groundwater Development
1992	Oahu	Honouliuli Wastewater Reclamation and Reuse Study
1992	Hawaii	Big Island Country Club Irrigation Well
1991-1992	Hawaii	Hapuna Golf Course Irrigation Wells
1991-1992	Oahu	Ewa Caprock Aquifer Computer Model
1991-1992	Hawaii	South Kohala Water Master Plan
1992	Kauai	Princeville Well Development
1990-1992	Hawaii	Waikoloa Well Nos. 1, 2, and 3
1991	Hawaii	Waikoloa Water System Master Plan
1991	Hawaii	Lalamilo Water System Expansion
1991	Hawaii	Saltwater Wells for the Islands at Mauna Lani Resort
1990-1991	Indonesia	Bali Golf & Country Club Irrigation Wells - Bali
1990-1991	Oahu	Honouliuli Well Nos. 1 to 6
1990-1992	Oahu	Ewa by Gentry Irrigation System Development
1990	Oahu	Saltwater Supply and Disposal Wells for the AES Cogeneration Plant
1990	Oahu	Makakilo Golf Course Supply Wells and Desalination Plant Design
1990-1991	Maui	Kapalua Resort Well Nos. 1 and 2
1989	Hawaii	Lalamilo Water System, Mauna Lani Resort
1989-1990	Hawaii	Waikoloa Water System Expansion
1988-1990	Philipinne Islands	Clark AFB Well Development
1988-1990	Guam	Mangilao Golf Course Irrigation Well Development
1990	Hawaii	Waikoloa Stream Flood Study
1986-1988	Oahu	Ewa Water System Development
1986-1888	Singapore	Reclamation & Beach Construction - Sentosa
1988	Hawaii	Waikoloa Beach Resort Irrigation Well Development
1988-1992	Hawaii	Mauna Lani Resort Irrigation Well Development
1987-1988	Kauai	Westin Kauai Irrigation Well Development
1986	Hawaii	Makaiwa Bay Beach Development, Mauna Lani Resort
1984	Kosrae Island	Kosrae Groundwater Development - Trust Territory of the Pacific Islands
1984-1988	Palau Island	Palau Islands Grouridwater Development
1983-1984	Hawaii	Keauhou Resort Golf Course Irrigation Well Development
1983-1984	Maui	Kula Up-Country Water Study

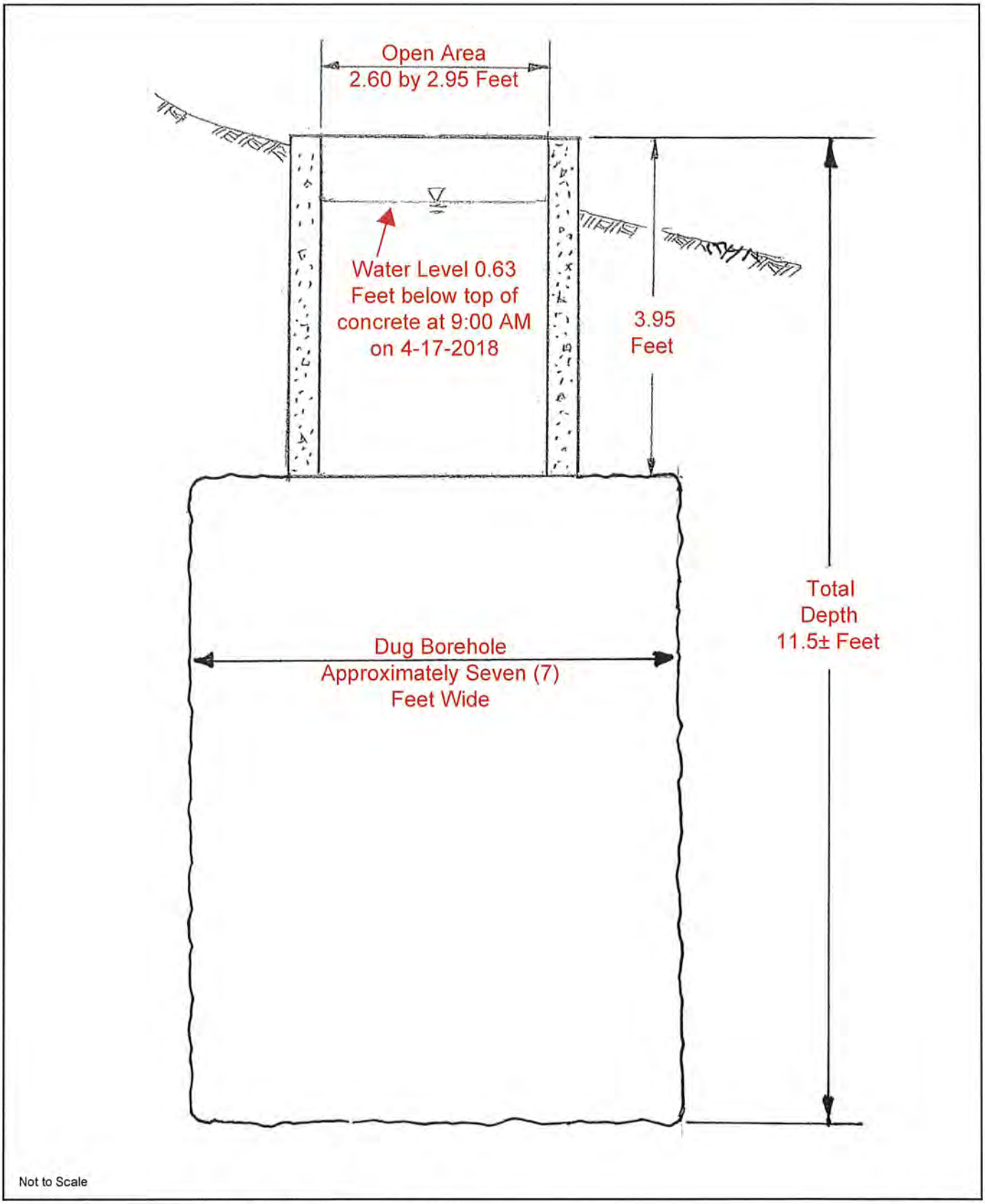
SELECTED PROJECTS

Year	Location	Project
1983-1984	Oahu	Ewa Water Master Plan
1984 & 1988	Hawaii	Lalamilo Water System
1983	Hawaii	Beach Construction, Mauna Lani Bay Hotel
1983	Yap Islands	Southern Water System
1983	Saipan	Water Development
1982	Molokai	Molokai Water Master Plan
1982	Yap Islands	Yap Island Groundwater Exploration & Development
1983 & 1988	Molokai	Molokai Ranch Mountain Water System
1981	Kauai	Princeville Golf Course Irrigation System
1978-1980	Maui	Prototype High Capacity Injection Well Field Testing
1979	Hawaii	Irrigation Well, Liliuokalani Trust
1980	Yap Islands	Yap Island Sewage Treatment Plant Ocean Outfall
1981	Yap Islands	Design of the Gagi-Tomil Water System
1979	Oahu	Tripler Hospital Traffic Study
1980 & 1982	Lanai	Kaumalapau Harbor Breakwater Repair
1979	Hawaii	Beach Development Study for Mauna Loa Land Resort
1980	Maui	Drainage Master Plan, Waiale Development
1980	Yap Islands	Conceptual Water Development Plans for Colonia, Gagil-Tomil, and Southern Yap areas of Yap State - Trust Territory of the Pacific Islands
1980	Hawaii	Appeal of FIA Flood Hazard Designations for the Mauna Loa Land, Inc. Resorts
1979	Kauai	Irrigation Wells for Kiahuna Golf Village
1979	Yap Islands	Yap Islands Groundwater Investigation
1978	Yap Islands	Yap Wastewater Facility Plan
1976-1977	Kauai	Wailua Basin Water Resources Development Study (Dam Feasibility Study, Hydropower, Flood Control, Irrigation)
1977	Kauai	Irrigation Study, Kilauea Agricultural Subdivision
1977	Hawaii	Waimea to Kawaihae Water Transmission Line Study
1976	Indian Ocean	Sewerage Master Plan, U.S. Naval Facility - Diego Garcia
1975	Hawaii	South Kohala Groundwater and Deep Well Evaluation Study
1975	Oahu	Fort Shafter Sewage Pump Station
1974	American Samoa	Tafuna Industrial Park - Tutuila Island
1974	Maui	Kapalua Master Plan



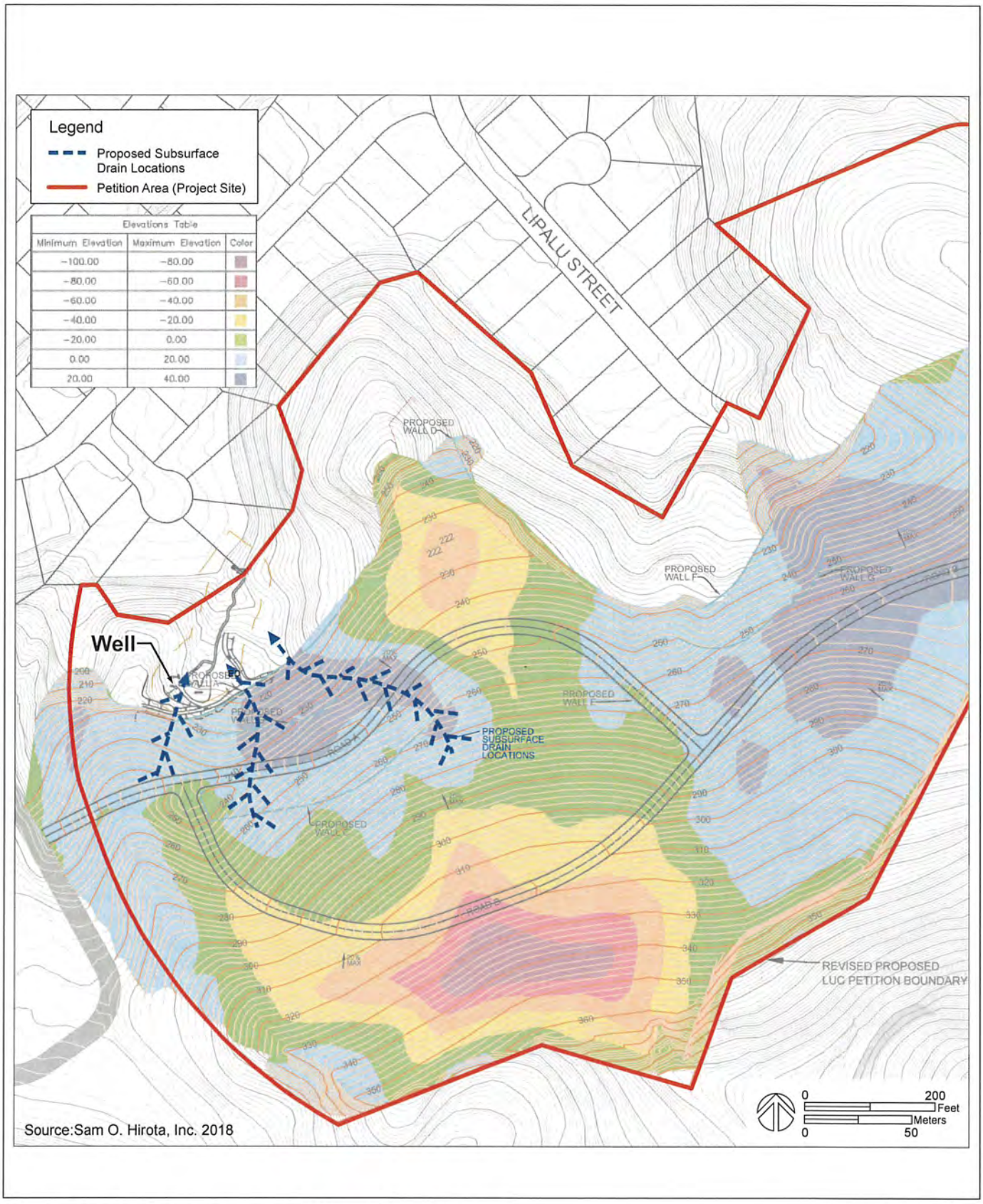
Location of Well, Seep and Borings **Exhibit 1**

Hawaiian Memorial Park Cemetery Expansion Project
Kāneʻohe, Oʻahu, Hawaiʻi



Schematic Cross Section of Shallow Well **Exhibit 2**

Hawaiian Memorial Park Cemetery Expansion Project
Kāne'ohe, O'ahu, Hawai'i



Conceptual Alignments of Subsurface Drains

Exhibit 3

Hawaiian Memorial Park Cemetery Expansion Project
Kāneʻohe, Oʻahu, Hawaiʻi

Testimony of
ROBIN M. LIM, P.E.
GEOLABS, INC.
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne`ohe, O`ahu, Hawai`i
TMK: (1) 4-5-033: Portion 1,

My name is Robin Lim, and I am the President of Geolabs, Inc., a consulting firm specializing in geotechnical engineering services. As a licensed professional engineer with more than 30 years of experience in this field, my project experiences includes design and construction of slopes and embankments for highways, foundation design for major bridges, high-rise and low-rise buildings, landslide and rockfall evaluations and mitigations, and design of conventional and specialty retaining walls, among other things. My expertise includes engineering a variety of geotechnical solutions involving shallow and deep foundation systems, conventional and specialty retaining wall systems, landslide and rockfall mitigation systems, and site soil improvement. A copy of my resume is attached.

Scope of Study

Geolabs, Inc. was retained by HHF Planners to evaluate the potential for rockfall and slope stability hazards within the Petition Area. My analysis involved ground reconnaissance above and subsurface test borings within the Petition Area allowing the assessment of rockfall hazards and slope stability in the area and to support the project team in evaluating general subsurface conditions. We prepared the Phase 1 Potential Rockfall and Slope Hazard Assessment for the Hawaiian Memorial Park Cemetery Expansion Project included as Appendix C in the Final Environmental Impact Statement (Final EIS). Discussion of the work is divided into three sections: 1) rockfall hazard analysis; 2) slope stability analysis; and 3) test borings above the seepage area.

Rockfall Hazard Analysis

Based on our evaluation of the existing site conditions with respect to potential natural hazards such as rockfall, slope stability, and debris flow, it was determined that the site is suitable for cemetery development and is feasible from a geotechnical point-of-view. Preliminary design recommendations were provided and discussed in Chapter 2 of the Final EIS. Once the final grading plans for the project are available, a qualified geotechnical engineer should address the stability of slopes in the post-development condition.

<u>Rockfall Hazard Areas</u>

Site reconnaissance indicates that portions of the area upland from the cemetery expansion area may be exposed to potential rockfall hazard from the adjacent steep mountain slopes. Areas presenting potential rockfall risk are shown in Exhibit 1. These areas are identified as Potential Rockfall Source Areas 1 (PRSA-1) and 2 (PRSA-2).

The greater risk for potential rockfall encroachment involves the sub-valley at the far northeastern portion of the Petition Area upslope from the proposed Cultural Preserve. This portion of the Petition Area may pose moderate risk for potential rockfall activity. Greater risk is anticipated due to the large quantity and size of existing boulder deposits encountered on lower elevation slopes within the Cultural Preserve. The presence of these deposits and their depositional characteristics suggest evidence of significant older rockfall events that deposited the rocks within this area.

There also appears to be a more frequent occurrence of widely scattered large-block, high relief, massive rock outcroppings that could represent a potential rockfall source material on slopes above the proposed Cultural Preserve. This source of rockfall risk is identified as PRSA-1 in Exhibit 1 attached to my testimony. Additionally, the alignment of the proposed Cultural Preserve area boundaries with respect to topographic conditions aids the natural containment of rockfall within the area boundaries.

Analysis indicates the center portion of the cemetery expansion area is exposed to generally low to moderate potential for rockfall encroachment. Lower rockfall encroachment risk is anticipated due to the reduced number and size of existing rock outcroppings encountered within PRSA-2 located upslope. The identified potential rockfall source area also appears to have a lower density of rock outcroppings and less extensive reach in terms of elevation span on the hillside. As shown on Exhibit 1, there was no area of potential rockfall encroachment identified for the western end of the Petition Area.

Rockfall Hazard Analysis Results

The Colorado Rockfall Simulation Program (CRSP) Version 4 was used to evaluate potential rockfall activity in the Petition Area. This program estimates rockfall potential through simulations based on site specific input parameters. Identification of existing rockfall sources, deposition areas, and probable falling rock trajectories through site reconnaissance supported the CRSP simulations.

Five idealized slope profile models of the Petition Area were developed for the CRSP analysis. These slope profiles are identified as Slope Profiles "A" through "E" on Exhibit 1. Profile locations were selected to ideally represent existing slope conditions where rockfall encroachment is suspected with the program evaluating the statistical probability of potential encroachment from upslope areas for the profiles. If the statistical probability of rockfall encroachment is 10% or less, a hazardous rockfall conditions is considered a remote risk and protective measures may not be warranted. Rockfall protection is recommended for locations where the probability of encroachment exceeds 10% of total simulated rockfall.

A moderate risk of potential rockfall encroachment is estimated for a portion of the Cultural Preserve's mid to upper elevation basin and adjacent steep mountain slopes. Slope Profile E indicates that under existing natural site conditions, approximately 86% of simulated rockfall

involving boulders of 3 and 5 feet in dimension could pass below the Preserve's upslope area. No simulated rockfall should pass the area's mid-elevation analysis point.

The Preserve is intended for cultural landscape restoration, maintenance of historic sites, and accommodation of some burials following traditional native Hawaiian protocols within the lower portion. Therefore, site disturbance and topographic changes potentially contributing to increased rockfall hazards would not be significant and would not occur in the upper most portion of the area where the rockfall source is located.

Model results indicate the center portion of the cemetery expansion area would have low to moderate risk for potential rockfall encroachment. Rockfall simulation conducted for Slope Profile A indicates that under existing condition, approximately 64% to 66% of simulated rockfall involving boulders 3 and 5 feet in dimension could enter the upslope boundary of the area.

Within the eastern portion of the cemetery expansion area, limited potential for rockfall encroachment is estimated. Simulation results for Slope Profiles B, C, and D indicate a probability of 10% or less of simulated rockfall entering into the cemetery expansion area. Slope Profiles B and C indicate no simulated rockfall would enter the upslope cemetery boundary. Slope Profile D indicates that about 8% to 9% of simulated rockfall could enter the cemetery expansion area.

Rockfall Mitigation Measures

For the area above the Cultural Preserve, mitigation in the form of rockfall hazard warning signage is recommended. Signage would be posted at appropriate Preserve entry locations to alert permitted visitors to the potential for falling rock hazard in the mauka portion of the area. Additional protection measures are not needed since rockfall encroachment into the lower half of the site is not expected, and the Preserve would not be open to the general public, further reducing potential injury.

For the center of the cemetery expansion area, construction of an approximately 1,000-linear foot concrete lined rockfall catchment ditch along the Petition Area boundary upslope of the cemetery expansion area is recommended to mitigate rockfall hazard. The proposed location of this catchment ditch is shown in Exhibit 1. A 5-foot deep "V" shaped catchment ditch was determined to effectively contain simulated falling rock, reducing rockfall encroachment potential to an acceptable level. A conceptual schematic of this catchment ditch is shown in Exhibit 2. Construction of the catchment ditch should provide a high level of safety against rockfall hazard in these conditions based on past application of similar mitigation methods.

Slope Stability Analysis

No record or documentation of previous debris flow or landslide activity within the Petition Area is known, and no overt visible evidence of significant debris flow deposits or evidence of

recent ground scour was observed. However, the potential for debris transmission via stormwater runoff should be considered due to the large area of steep forested slopes possessing appreciable forest litter debris on the ground surfaces. Converging ephemeral drainageways that emanate from adjacent upland slopes could transmit appreciable stormwater runoff.

A rapid increase in discharge during storm conditions should be anticipated in the normally dry drainage channels. Areas of exposed soil and gravel/cobble talus were encountered in the steep upland drainageways above the Petition Area and have some potential to be scoured and entrained in heavy stormwater runoff from upper mountain slopes. However, it appears that the existing natural flatter ground topography at the foot of steeper terrain combined with the existing dense vegetation growth could provide some natural buffering and reduced risk for debris laden runoff.

Project Effects on Debris Flow and Mitigation

Grading activities would result in removal of existing landslide and debris flow hazards in the cemetery expansion area. Landscaped grass areas created for burial spaces would be a significant improvement, removing existing vegetation litter debris and exposed soil and gravel/cobble talus. The modified topography would reduce steeper upper slopes and create gentler topographic conditions that would eliminate potential landslide hazards. Therefore, the remaining potential for impacts on the cemetery from debris flow would be from upslope areas.

To mitigate the remaining debris flow risk, a surface drainage interception system is recommended. This system would consist of an interceptor ditch network with appropriate debris barriers and discharge outlets to reduce the potential for runoff encroachment along the upper boundary of the site. The catchment ditch recommended for rockfall hazards, also could function as this drainage interception structure.

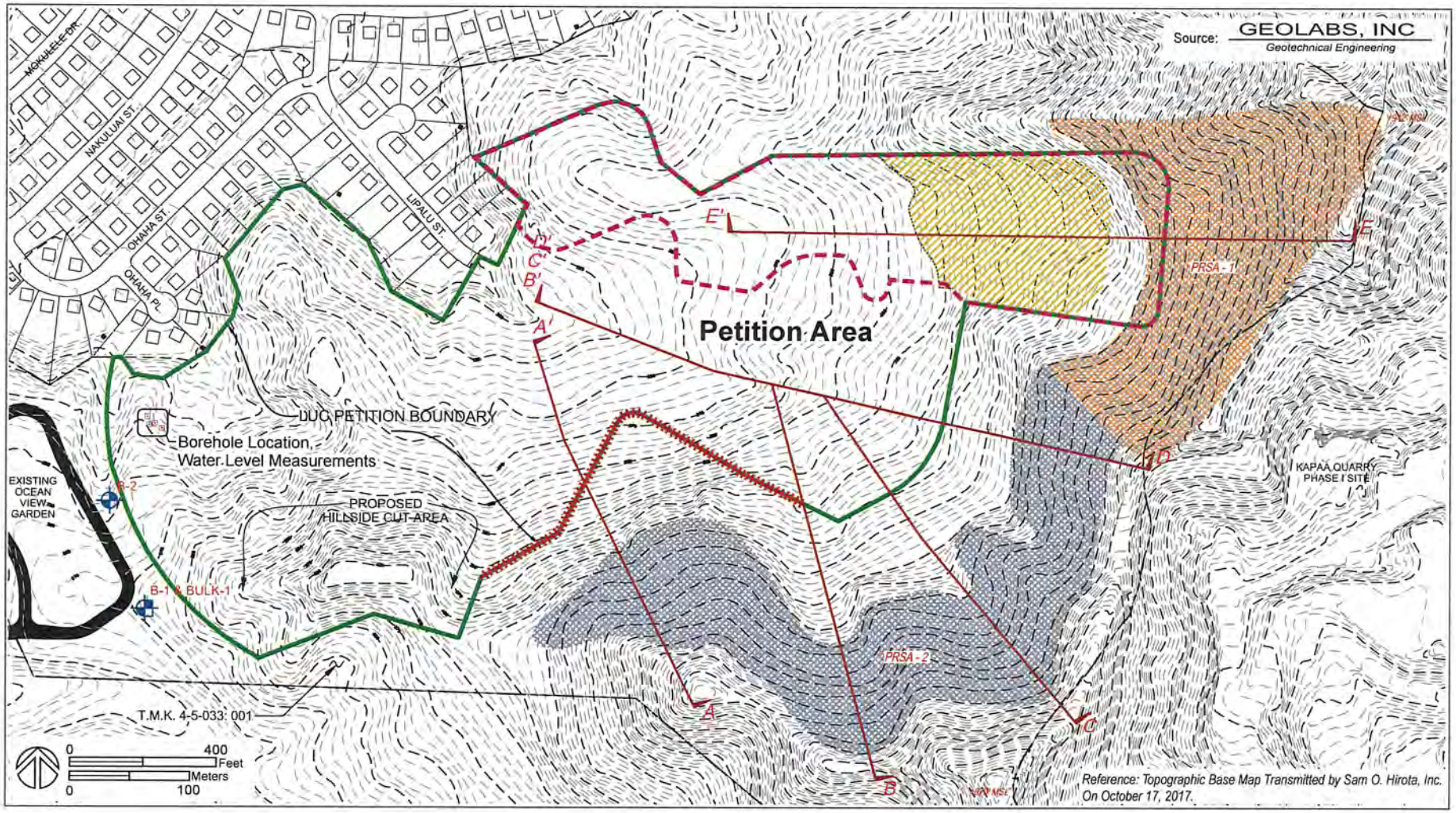
To reduce the potential for introduction of large quantities of organic debris from the adjacent forest area, installation of a chain link fence along and upslope of the catchment ditch is recommended to reduce the amount of debris that could accumulate in the ditch and potentially reduce rock catchment capacity. If possible, creation of a vegetation free clear zone of about 10 feet in width upslope from the ditch and encompassing the chain link fence "debris barrier" is recommended. The need for periodic ditch inspection and debris clearing may be needed to maintain rock catchment capacity.

Test Borings Above Seepage Area

Exhibit 1 identifies the approximate locations of four boreholes drilled above the well and seepage area to provide the design team with information on existing geotechnical subsurface conditions in this area. Although an obvious perching member was not evident in the borings, the water level response in all four boreholes was informative. Water was not encountered in

the boreholes until each borehole had been drilled down to between 15 to 20 feet below ground level.

After reaching that depth, the water level in each borehole rose up very slowly. The geotechnical boring results and boring logs included in a groundwater study (Final EIS, Appendix H) document this slow filling in each of the boreholes. As the tabulation of approximate water levels in the boreholes show, the semi-confined subsurface water residing in the poorly permeable residual soil has a relatively steep downslope gradient. Through coordination with the project team regarding grading plans, we further believe the weight of the fill material proposed above the well would not significantly impact the subsurface water flow in the area.



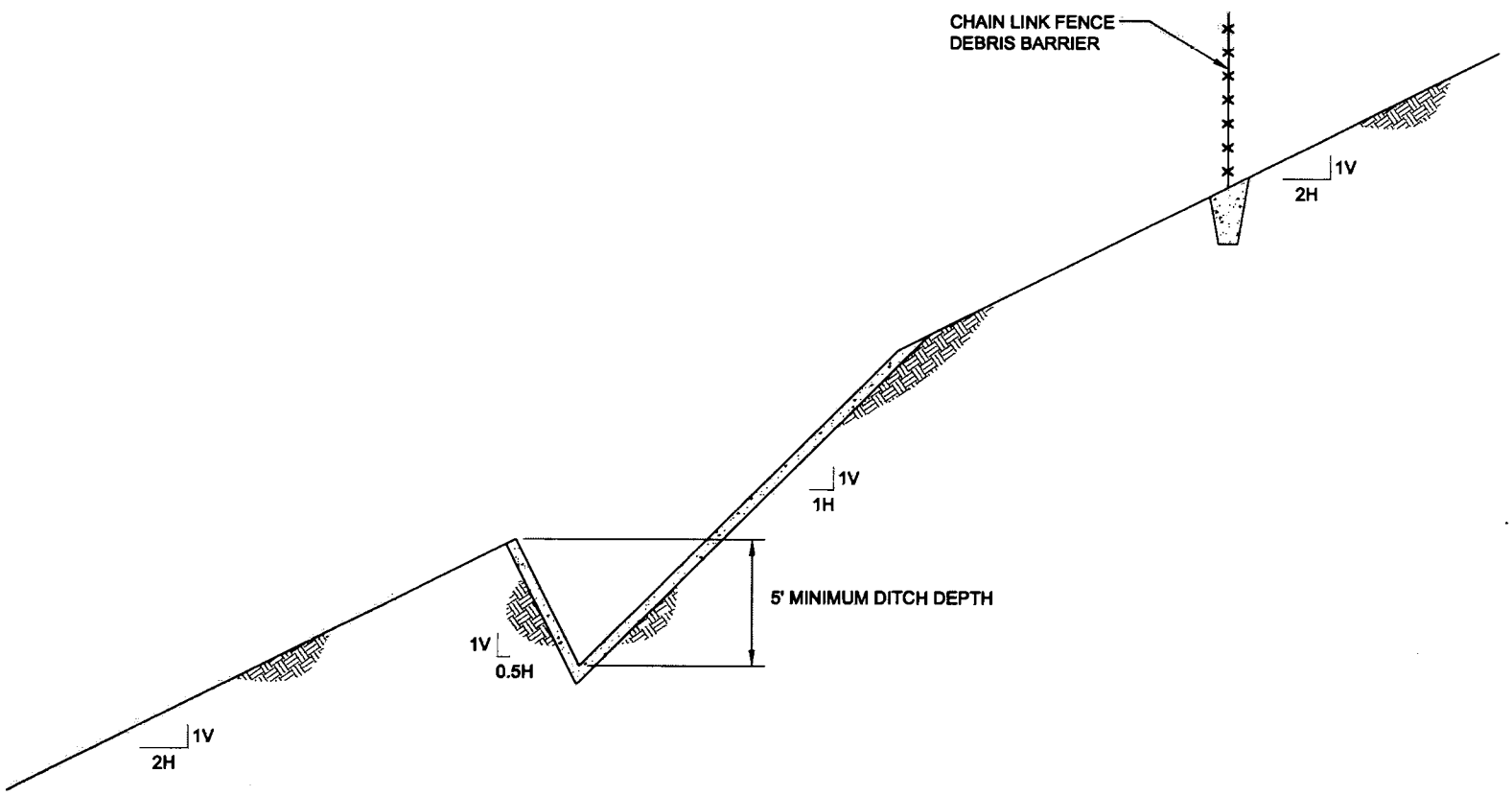
LEGEND

- Approximate Boring Location
- Approximate Bulk Sample Location
- Idealized Slope Profile for Rockfall Simulation
- Boulder Deposition Area (Basin Area Slopes Containing Scattered Large Boulder Blocks and Some Cobble/Boulder Talus)
- Approximate Location of Proposed Rock Catchment Ditch
- Cultural Preserve Area (14.5 Acres)
- Approximate Potential Rockfall Source Area with Greater Hazard Potential
- Approximate Potential Rockfall Source Area with Lesser Hazard Potential
- Borehole Location, Water Level Measurements

Potential Rockfall Source Areas

Exhibit 1

Hawaiian Memorial Park Cemetery Expansion Project
Kāne'ohe, O'ahu, Hawai'i



CONCEPTUAL CONCRETE LINED
ROCK CATCHMENT DITCH
PHASE I POTENTIAL ROCKFALL AND
SLOPE HAZARD ASSESSMENT
HAWAIIAN MEMORIAL PARK CEMETERY EXPANSION
TMK: 4-5-033: 001
KANEOHE, OAHU, HAWAII

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
DECEMBER 2017	HYC	4
SCALE	W.O.	
NO SCALE	7604-00	

Conceptual Concrete Lined Rock Catchment Ditch

Exhibit 2

Hawaiian Memorial Park Cemetery Expansion Project
Kāne'ohe, O'ahu, Hawai'i

ROBIN M. LIM, P.E. • Principal Engineer / President

ROBIN@GEOLABS.NET

(808) 841-5064

EDUCATION

MS, GEOTECHNICAL ENGINEERING, 1989
UNIVERSITY OF CALIFORNIA AT BERKELEY

BS, MINING ENGINEERING, 1987
UNIVERSITY OF CALIFORNIA AT BERKELEY

ACTIVE REGISTRATION

CIVIL ENGINEERING, GU • 2018
CIVIL ENGINEERING, HI • 1995
CIVIL ENGINEERING, CA • 1991

AFFILIATIONS

American Society of Civil Engineers

Deep Foundation Institute

American Council of Engineering Companies of Hawaii

PROFESSIONAL EXPERIENCE

Mr. Lim has a diverse background with geotechnical engineering experience working on numerous projects including highways, airport pavements, waterfront structures, piers and wharves, foundation design for major bridges, high-rise and low-rise building structures, residential developments, landslide evaluations, and conventional and specialty retaining walls. Mr. Lim's professional experience includes Hawaii, California, Eastern United States, Guam, Palau, American Samoa, Mali (West Africa), Indonesia, Korea and the Pacific Basin. Mr. Lim has worked on numerous highway and bridge projects and is experienced in a variety of geotechnical engineering exploration methods and feasibility studies, construction observation of shallow and deep foundation systems, conventional and specialty retaining structures, landslide studies, and site soil improvement.

PROJECT EXPERIENCE

Rockfall Mitigation at MP11, Route 360, Hana Highway, Hana, Maui, Hawaii – Principal Engineer responsible for the technical direction of the geotechnical exploration for design of mitigation measures for rockfall hazards at MP 11.05 to 11.31. A restraining anchored wire mesh system was used for the mitigation measures. A previous rock fall hazard assessment study identified this stretch as having the second highest potential for rockfalls along Hana Highway. Hana Highway is a narrow roadway (one and two lane road) with a steep hillside, following winding contours of the mountain range. Portions of the highway have high rockfall hazards due to the steep hillsides, abundant rainfall, and narrow winding road. The challenge for this project was to protect the road and commuters from rockfall while maintaining the natural beauty of the site. Geolabs utilized a slope mitigation system never before used in Hawaii, an anchored wire mesh. The system retained the natural beauty, reduced construction costs by 35%, improved the hillside stability from shallow landslides, and required less than one shift of road closure during construction. Use of the anchored wire mesh system eliminated the need for slope cutting, including hundreds of loads of excavated material that would require hauling off site. Besides the cost savings from the eliminated grading, this greatly reduced the impact to traffic. Geolabs was awarded the 2005 ACECH Engineering Excellence award for its innovative design for this project.

Kalanianaole Highway Improvements, Makapuu, Oahu, Hawaii – Project Manager – The project extends approximately 1,900 linear feet from the upper scenic lookout toward the lower scenic lookout overlooking Makapuu Beach Park. The project generally consisted of rehabilitation of portions of the existing CRM retaining walls, stabilization of the makai slope movements, and providing rockfall protection of the highway from the mauka slopes. Portions of the CRM barrier wall exhibited signs of distress and deterioration. Mr. Lim was responsible for the geotechnical exploration, engineering analyses, and design recommendations for retaining walls, makai slope stabilization, mauka slope stabilization and rockfall protection, and pavements.

Kuhio Highway Emergency Slope Repair, Vicinity of Lumahai, District of Hanalei, Kauai, Hawaii
Kuhio Highway is the sole vehicular access to the north shore of the Island of Kauai. From Princeville to Wainiha, the narrow, winding two-lane road follows the ridges and valleys along the coast. When several heavy rain storms initiated slope instability and threatened road closure, quick action was needed to maintain this vital link to the northern Kauai communities. Geolabs conducted an exploration for the design and construction of remedial measures to restore the safety to this road. The remedial work consisted of moving the road away from the landslide and into the stable hillside. To limit the excavation quantities and disturbance to the hillside, a steep cut slope reinforced with soil nails was used to strengthen the wet natural soils. The shotcrete facing normally used to cover the reinforced slope face was replaced with an anchored wire mesh system to allow vegetation growth and eliminated an unpleasant concrete facing. The construction was completed ahead of schedule and under budget. Geolabs was awarded the 2013 ACECH Grand Conceptor award for its innovative design.

Kuahea Street Area Movement, Project No. 97504, Palolo, Oahu, Hawaii – Principal Engineer - The Kuahea Street Area Movement study encompasses the Waiomao Landslide and surrounding area located in a residential subdivision in Palolo Valley on the Island of Oahu, Hawaii. The signs of potential earth movements include the observation of ground surface deformation, the seepage of water at the ground surface, and reports of damaged or leaking underground utility lines in the vicinity. Geolabs performed a subsurface exploration program consisting of the drilling and installation of groundwater and ground movement instrumentation at selected locations. The instrumentation and monitoring program generally consists of the installation of over 30 inclinometers and nested piezometers in borings. The instruments were monitored to collect data, which were used to evaluate the subsurface conditions with respect to the potential earth movements.

Rock Slide Potential Inspections, Project No. 01154, Rock Slope Inventory and Preliminary Rating, Various Locations, Oahu, Hawaii – Project Manager responsible for study encompassing public streets under jurisdiction of the City & County of Honolulu. Many of the City owned/maintained streets traverse steep hillslope areas located in and around the ridge and valley regions. Erosional forces altered the slope faces. The hillslopes were observed to be in a slow by constant state of geologic evolution that had the potential to generate such hazards as falling rock, landslide activity and slope erosion. The program was conducted in order to address the potential rockfall hazards adjacent to City streets on the Island of Oahu and was conducted in six stages.

Comprehensive Roadway Corridor Plan, Kuhio Highway (Route 560), Island of Kauai, Hawaii – The project involved a study providing a comprehensive roadway corridor plan for a 10-mile length of State highway located in a highly traveled though rural setting. The purpose of the study was to provide conceptual remedial improvements to upgrade the highway safety and correct existing deficiencies. Mr. Lim served as Project Manager, responsible for overview of site reconnaissance, which included geological and geotechnical engineering evaluation, consisting of considerations pertaining to rockfall and landslide hazards from adjacent slopes, protection of the road shoulder from shoreline erosion, and documentation of other potential slope instability.

Oak Tree Farm Project, Pleasanton, California - Technical Reviewer for the City of Pleasanton for development of a subdivision on a major ancient landslide measuring about 4,500 feet wide, 3,500 feet long, and 100 feet deep. As the geotechnical reviewer for the City, the methods of identifying, evaluating, and mitigating the ancient landslide by the developer were reviewed and critique. Provided consultation to the City of Pleasanton staff for evaluating risk of development.

Testimony of
STEVEN L. MONTGOMERY, PH.D.
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 1,

I am Dr. Steven Lee Montgomery, an entomologist and beekeeper specializing in Hawaiian and Pacific Island ecosystems and have contributed to numerous EIS reports. I have provided my expertise as a biological consultant to private landowners and government agencies since 1978, and conducted many invertebrate surveys, with field experience since 1964. Focused on insects and science since childhood, I sought many special educational opportunities including a 2 month field study in Oklahoma assisting a St. Mary's/ Notre Dame Professor studying Damselfly territorial behaviors. I have been active in field biology in Hawaii since 1968, earning a University of Hawai'i 1973 Master's degree in entomology (Drosophila Pomace Fly Ecology) and a 1984 Ph. D. on my discovery of Carnivorous Caterpillars, their Identification and behavior. I have had adventures finding a dozen new species and recognizing in 1972 that the little known Happy Face Spider deserved a portrait, and shared its rediscovery with Eddie & Myrna Kamae in their film, "Listen to the Forest". I have been a member of Hawaiian Entomological Society and Hawaiian Botanical Society since 1970. Also, I am a 35 year member of the Xerces Society for Invertebrate Conservation based in Portland, Oregon. It serves as the voice for the "little things that run the world." From the caddisflies that live solely in one stream, to declining bumble bees, Xerces Society is dedicated to protecting invertebrates and the ecosystems that depend on them, and also promotes invertebrate protections under the Endangered Species Act and other laws.

As an avid conservationist, I have performed community service: 5 years as a Land Use Commissioner, 2002-2007; State Natural Area Reserves Commissioner under 3 Governors; as a Board member for National Wildlife Federation; Ahahui Mālama I Ka Lōkahi / Hawaiians for the Conservation of Native Ecosystems, and other community groups.

I place great importance in communicating to the public about science and conservation and in 2001 was tasked to guide photographers for two National Geographic Society books, *Hawaii's Hidden Treasures* and *Remains of a Rainbow*, when they turned their cameras to these islands, home to over a quarter of the U.S. Endangered Species List. Their almost jewel-like photographs are stunning portraits of aboriginal inhabitants of this archipelago. [Exhibit SM-A]

As a biological consultant with specific expertise in the terrestrial and aquatic invertebrates of Hawai'i and the Pacific, I was retained by HHF Planners to conduct a survey of the Hawaiian Memorial Park Cemetery Expansion Petition Area in order to identify invertebrates inhabiting this site (included as Appendix G in the Final Environmental Impact Statement).

Survey results provide knowledge of whether endemic or indigenous terrestrial invertebrates, especially any listed under federal or state threatened and endangered species statutes, were present. I will summarize the findings of this survey and any of project's likely impacts to invertebrate resources identified in the Petition Area.

Survey Methodology

Field surveys were conducted on 12 separate days over a period of several months from July to December 2017 to include dry and wet conditions and to ensure observation and collections during the day and night. The survey focused on finding endemic and indigenous Hawaiian species. Prior to the initiation of fieldwork, a general assessment of site terrain and habitats was conducted through review of maps and prior reports.

The property was traversed to survey all habitat types, and pathways were followed to search for any hidden springs or native host plants for native invertebrates. Survey methods included visual observation, searches of native host plants found in association with the botanist, usage of sweep nets, and MV light sampling.

Invertebrate Survey Results

Plant and invertebrate populations are interdependent, with the presence and condition of host plants and habitats serving as a means of measuring invertebrate health. The Petition Area has historically been used by humans for agriculture and ranching. Feral pigs are present and continue to degrade vegetation and understory plants by rooting, resulting in soil disturbance. These factors likely contribute to the limited number of native plants identified on site. The scarcity of native plants capable of serving as arthropod host sites explains why so few Hawaiian arthropods were found.

As soon as I heard 3rd hand reports of an endangered Damselfly being seen on the HMP property, I agreed to the landowner's request to confirm the location with the advice of other biologists and began planning to conserve this Damselfly home.

The only federally listed endangered species observed was the Blackline Hawaiian Damselfly *(Megalagrion nigrohamatum nigrolineatum)*. The remaining native and endemic Hawaiian invertebrates sighted are very widespread in distribution. Invertebrates endemic to Hawai'i identified in this survey, along with the 2008 survey, are outlined in Table 1.

Table 1 Endemic Invertebrate Species Detected Within the Petition Area					
Species	**Common Name**	**Status**	**Comments**	**2008**	**2017**
INSECTA					
DIPTERA	Flies and Mosquitoes				
Chironomidae	Midges				
Chironomus hawaiiensis		End	Prey of damselfly		X
Ceratopogonidae	Biting Midges				
Dasyhelea hawaiiensis					
Forcipomyia howarthi		End	Prey of damselfly		X
Ephydridae	Shore flies				
Brachydeutera hebes	Shore fly	End	Feeds on algae, fresh water		X
HEMIPTERA: HETEROPTERA	True Bugs				
Lygaeidae					
Nysius terrestris	Seed bug	End	On Portulaca		X
LEPIDOPTERA					
Cosmopterigidae	Case Bearers				
Hyposmocoma		End	At light	X	X
Crambidae	Micro-Moths				
Eudonia	Moss Moth	End		X	X
ODONATA	Dragonflies Damselflies				
Coenagrionidae					
Megalagrion nigrohamatum nigrolineatum	Blackline Hawaiian Damselfly, Rainbow-eye Damselfly, or pinao ānuenue	End	Endangered		X
Status: End: Endemic to Hawaiian Islands Source: Montgomery, 2017					

Blackline Hawaiian Damselfly (*Megalagrion nigrohamatum nigrolineatum*)

Native Hawaiian damselflies are a cluster of 25 species that have diversified long ago from a single waif landing in Hawai'i, and now occupy many aquatic niches and rain forests. The Blackline or Rainbow-eye Damselfly on O'ahu is a species that has been historically noted as common from sea level up to 2,400 feet in elevation. However, by 1996 this species appeared to be extirpated from the Waianae streams. It is now present in the Ko'olau Range only as scattered colonies, as documented in Bishop Museum's 1996 Damselfly Field Guide. In the Petition Area they are seen along a seep located in the northwestern corner that is fed from a human-developed well, which was likely created a century ago during the area's use as a dairy farm.

The brown, inch-long damselfly nymphs have a concealed existence clinging under stones or hiding in algae masses, both in moving and quiet waters. The Hawaiian Damselfly's diet includes bloodworms, which are the larvae of midges and other fly immatures plus sowbugs, and oribatid mites (data from F. X. Williams' 1996 report). Kalo is one of the few emergent water plants available as a host site in the native damselfly habitat. Some of these were seen with broken, pig chewed petioles.

On sunny days, up to eight males were sighted spaced out along the seep's waters. With thick cloud cover and much decreased sunlight, two to zero were present at mid-day, likely because damselflies had dispersed from the breeding waters and risen into nearby trees and shrubs to rest and sleep.

It is also present in widely dispersed streams on both the windward and leeward sides of the Koolau mountains in the headwater and mid-reach sections, and the seeps that border them in 17 streams: Koloa, Kaluanui, Helemano, Poamoho, Kahana, Waikane, Waiahole, Waianu, Waiawa, Kaalaea, Waihee, Kahaluu, north Halawa, Heeia, Kalihi, Moole, and Maunawili. The critical habitat for this species is mapped in 6 sections of Koolau mountain streams and seeps totaling 25,203 acres. The 17 stream colonies are estimated to total 800 to 1,000 individuals, with approximately 50 individuals per stream. Some of these remaining populations may be considered robust (Federal Register 2007).

Key invertebrates in the Hawaiian Damselfly habitat.

1. Mosquitoes: The Southern House Mosquito (*Culex quinquefasciatus*) are breeding in small numbers in the small flowing water of the seep and cement encased well feeding it. The Cannibal Mosquito (*Toxorhynchites amboinensis*) also lives in the cement water receptacle, and feed as predators on larvae of all other mosquitoes, and each other. Larvae of the Southern House Mosquito were found only in a few 1- to 2-inch deep pools associated with this seep, and serve as one food source for damselfly young. The Forest Day Mosquito (*Aedes albopictus*) breeds mostly in tree holes, shells of coconuts and artificial water receptacles.

2. Ants: Alien ants are known to prey on other insects and are documented as a factor in the limited presence of native arthropods. Ants are noted as a primary threat factor for the Blackline Hawaiian Damselfly in the 2011 Listing of Endangered Species. Alien ants observed in the Petition Area include the Long-legged ant (*Anoplolepis gracilipes*), Big-headed ant (*Pheidole megacephala*), and the Glaber ant (*Ochetellus glaber*). The Long-legged ant was not observed in the 2017 survey, likely due to the presence of the Big-headed ant, since these species maintain separate territories and seldom overlap in distribution. The Big-headed ant is a general predator on most native arthropods and is a threat to emerging damselflies.

The color and narrow shape of the Damselflies make them difficult to see, creating risk that they could be stepped on by humans. Persons trespassing can be a threat to damselfly presence, since traveling in or near the seep could inadvertently disturb damselfly molting, breeding and resting sites. Trespassers also risk disturbing and harming Damselflies directly while they are resting and molting on foliage or small sticks in water margins or muddy areas. [Exhibit SM-A]

To answer the question "What acreage of forest is needed for flying and foraging adults of this species?" I find no data on this Hawaiian damselfly adults' needs, but found a report for similar, small endangered damselfly *Coenagrion mercuriale*, in the same family. It reported a mark–release–recapture project carried out in 2007 by James Rouquette, and other biologists at The Open University in Itchen river valley of southern England to determine the extent of flight movements. After 8700 individuals were marked, the species was found to be extremely sedentary, with dispersal limited to an area of contiguous habitat. The median, net lifetime movement was 32 meters and 75% moved less than 50 meters in their lifetime.

The major threat to this species is predation on immature damselflies by alien fish, especially the Western Mosquitofish, Sailfin molly, and the Guppy. The placement of nonnative fish species into new aquatic habitats poses the major threat to this relatively accessible, relictual population, and may continue into the future by uninformed persons without increased public awareness.

Feral pigs are another threat because their destructive wallowing and rooting for worms cause major disruptions of damselfly breeding and resting places.

<u>Damselfly Habitat Boundaries and Characteristics</u>

The boundaries of the damselfly habitat area along the seep were determined based upon this study and many site visits, one in which HMP and the writer invited USFWS Biologist Dr. Dan Polhemus to inspect the terrain and suggest optimum boundaries. Damselfly young, or naiads, do not extend from the water's edge, but the foraging and roosting home ranges of adults does extend well into the surrounding vegetation. Undisturbed emergent wetland plants (like sedges) can serve as ant-free perches for immatures molting into damselflies in their few hours of tender, flightless vulnerability to predators. However, the present seep habitat lacks much foliage and ground cover, primarily due to the repeated rooting of feral pigs for worms and wallowing in mud.

Topographic and sunlight conditions influence the movement patterns of the adult damselfly in the surrounding area along the course of the seep. Based upon site visits and available topographic data, the boundaries will respond to these needs, with the high points along and surrounding the ravine and above the seep channel establishing the habitat boundary. The boundary does not include an erosion incised, ephemeral drainageway located east of the seep. This drainage feature is normally dry except for brief flows after heavy rainfall events, and does not serve as a habitat for damselfly young. Even after these freshets, this drainageway lacks

residual plunge pools where a damselfly could breed. Forested belt remaining as a buffer between residential plots and burial plots and the cultural reserve set aside will all together provide 100+ acres within which adult damselflies can continue to forage and rest in shelter.

Project Effects

Improvements implemented under the Proposed Action would not adversely impact native invertebrate species populations, which are widespread in distribution, except for a single listed endangered species.

Usage of native vegetation in site landscaping of the cemetery expansion area and select portions of the proposed Cultural Preserve would increase the presence of native vegetation on site. Overall, these plants would provide additional habitat for native invertebrates. Landscaping improvements using native plants would provide beneficial habitat and refuge for native arthropods along with supporting cultural values.

Effects on Endangered Damselfly

A groundwater study shows the seep is maintained by the natural discharge of subsurface water moving downslope through poorly permeable residual soils overlying the unweathered Kailua volcanics. Subsurface water feeding the well flows downslope through subsurface soil at depths of 10 feet or more rather than through surface soil. According to recommendations from the project hydrologist and geotechnical engineer, subdrains would be installed within the cemetery expansion area above the well and seep to maintain the natural discharge of subsurface water from under the overlying soils.

The subsurface drainage system would be designed using a herringbone pattern that would increase and improve the amount of subsurface water collected to ensure continued flow to the well and seep. The herringbone system would be comprised of subsurface drainage main lines with smaller subdrains branching out laterally from the main lines. This drainage system would generally be aligned perpendicular to the retaining walls and installed at depths about 10 to 15 feet. The system would be designed to intercept and convey the flow of subsurface water to the well and seep. This design would minimize potential impedance of subsurface water flows due to potential compaction of soils from fill activities planned mauka of the well.

To further ensure continued water flow to the seep, a monitoring gauge or other appropriate device would be installed inside the well to monitor water levels. A permanent irrigation line extending from the proposed cemetery expansion area's irrigation system to the well would also be installed. This irrigation line would serve as a long-term means of ensuring continued water flows to the seep. If the gauge indicates water levels have declined to levels potentially affecting the seep, water from the irrigation line to the well could be provided to stabilize water levels.

Design measures would be incorporated into grading plans to minimize fill effects on the well and seep serving this aquatic and terrestrial damselfly habitat. Grading improvements would not impact or alter the Damselfly seep habitat located in the northwest corner due to avoidance and proposed minimization measures. Since this damselfly habitat would be avoided, it would not be impacted by grading activities.

Damselfly populations and human developments can co-exist. For example, a population of the Orange-black Hawaiian Damselfly (*M. xanthomelas*) at a stream course at Tripler Army Hospital has been sustained by managing piped water for 20 years. (*Bishop Museum Technical Report 8,* 1995). On Lāna'i, this endangered species (*M. xanthomelas)* was found breeding in a large, ornamental pond behind the Lodge at Kō'ele. Its natural breeding waters on Lāna'i were unknown before this writer found it abundant at the prehistoric Lopa Fish Pond and relict Keōmuku wells along the east coast.

The placement of large branches, coconut fronds and other organic materials into and covering seep waters in which the blackline Hawaiian damselflies breed has occurred in recent years, and this writer removed an unauthorized pile of dead branches and yard trimmings to restore this 15 foot reach of the water course.

Although impacts to the seep habitat from project implementation are not anticipated, measures are proposed to minimize existing and future impacts occurring from predators and trespassers as well as to ensure the seep remains as a functional damselfly habitat. An Incidental Take Permit under Section 10 of the Endangered Species Act would not be required because the cemetery expansion would avoid the damselfly and its habitat, and proposed minimization measures would ensure continued water flow along the seep and would not alter this habitat. A July 9, 2019 letter from the State Department of Land and Natural Resources, Division of Forestry and Wildlife attached confirms this.

A portion of the fenced habitat for the damselfly may potentially extend into the cemetery expansion area based upon preliminary grading plans. Thus, the final project design would include an accurate topographic survey that may result in the fence boundaries being refined. The boundary shown utilizes available topographic data to identify higher points. It is possible the boundary on the west side may not need to extend as far west based upon actual site conditions, since a site visit indicated the top of the western embankment was only about 30 feet away from the seep. The mauka boundary above the well and seep may also not need to extend as far based upon site visits and using GIS data. Refinement of preliminary habitat boundaries based upon more detailed and accurate topographic conditions would occur during project design to ensure cemetery expansion grading plans would avoid encroaching within the damselfly habitat boundary.

Proposed Avoidance and Minimization Measures

To minimize potential effects on the endangered damselfly, the following measures are proposed:

1. Schedule a regular inspection of the seep to ensure the present low trickle flow of water is continued through a monitoring plan during the project design phase. Inspection of the seep should be conducted before the start of construction to establish baseline water flow conditions. Monitoring would occur during construction with the seep area inspected on a weekly basis to evaluate water flow in coordination with BMP measures. Once construction concludes, monitoring would continue for an additional six months to ensure continued seep water flow. Inspections would occur weekly for the first three months and every two weeks thereafter if conditions are satisfactory. After the six month period elapses, HMP staff would conduct monthly water flow inspections.
2. A well monitoring gauge or other appropriate device would be installed inside the well located upslope from the seep to monitor water levels prior to, during, and after project construction. Once project earthmoving activities conclude, a permanent water line extending from the proposed cemetery expansion area's irrigation system to the well would be installed to serve as a long-term means of ensuring continued water flows to the seep. During construction, a temporary water line would also be extended to the well to support water levels, as is necessary.
3. Monitor as part of seep inspections to ensure fish, such as the Western Mosquito fish, are not present within this habitat area.
4. Review the habitat boundaries currently shown based upon more accurate data collected from a topographic survey during project final design, and revise habitat boundary as appropriate.
5. Construct fencing around the damselfly habitat boundary to protect native damselfly from disturbance by feral pigs.
6. Place small sticks upright and away from the edges of waterlogged areas to serve as molting safe zones to prevent predation. These sticks would protect naiads because ants would not cross water barriers.
7. A subsurface drainage system designed in a herringbone pattern would be implemented in the fill area above the well and seep. This system would ensure water flow is maintained to the well and seep.

Source: *David Liittschwager & Susan Middleton* photographers for National Geographic Society

Figure 23: Pair of damselflies in tandem
Source: *Hawaiian Memorial Park Final EIS*, April 2019
Appendix G: *Survey of Native Invertebrate Resources in proposed expansion of Hawaiian Memorial Park*, July 2017, page 20
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SM-A

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Steven Lee Montgomery, Ph. D.
94-610 Palai Street
Waipahu, Hawai'i 96797-4535 USA
tel: (808) 676-4974 cell: (808)-342-6244
email: manninga001@hawaii.rr.com

BIOLOGICAL CONSULTING

Experienced field collector of invertebrates and plants in Hawai'i and the Pacific

- experienced with land and fresh water ecosystems
- especially successful at locating extremely rare species
- discovered 30+ new species; many new state records, localities, re-discoveries

EDUCATION

1984 Ph. D. (Entomology), College of Tropical Agriculture, University of Hawai'i, Manoa
Lepidoptera

1973 Master of Science (Entomology), College of Tropical Agriculture, Univ. of Hawai'i
Drosophila

1969 B. A. (Biology), Grinnell College, Iowa

WORK EXPERIENCE

present - 1978 Biological Consultant, self-employed: provides scientific expertise on Hawai'i and the Pacific to private landowners, government agencies (surveys, collecting, identifications, checklists, and reports)

1988-82 Researcher, Hawai'i State Legislature
Rep. James Shon - Committees - Ocean and Marine Resources, Health
Sen. Anthony Chang - Committees - Environment, Judiciary

1980 Biological Consultant, Cooperative National Park Resources Studies Unit. Examined stomach contents from native Hawaiian birds to identify food items using partial remains (*e.g.*, caterpillar jaw or fly wing)

1979 Assistant Botanist, Island Forest Bird Census Team, U.S. Fish and Wildlife Service

1978 Field consultant, co-author, *Unique Wildlife Ecosystems Concept Plan*, U. S. Fish and Wildlife Service

1977-72 Natural Areas Specialist, Dept. of Land and Natural Resources, Natural Area Reserves System Commission, State of Hawai'i

1972-64 Employed in biological projects and programs in Hawai'i, Oklahoma, Louisiana, and Michigan for U.S. Public Health Service, U.S. Department of Agriculture, Notre Dame University, and University of Hawai'i

FIELD EXPERIENCE

since 1967	Extensive experience in the Hawaiian Islands on Ni'ihau, Kaua'i, O'ahu, Maui, Moloka'i, Lāna'i, Kaho'olawe, Hawai'i, Northwest Hawaiian Islands, off-shore islets
1988 and 1977	Scientific expeditions to several Pacific Islands, including the Marquesas, Tuamotu and Society Archipelagoes
1988	Scientific coordinator, Fatu Hiva Expedition in the Marquesas
since 1964	Field work in divergent environments: New Zealand; Easter Island; New Guinea; Japan (Kyoto, Osaka, Tokyo), Ogasawara Islands (Chichi Jima, Ha ha Jima); Indonesia; French Polynesia; Palau; Cook Islands; British Columbia, Grenada - West Indies, Puerto Rico; Alaska, Arizona, Indiana, Iowa, Louisiana, Michigan

COMMUNITY NETWORKING and SERVICE

since 1979	Associate in Science, Bishop Museum, Honolulu, HI
2014	Plants Advisory Subcommittee, Plant Quarantine Branch, HI Dept. Agriculture
2002-2006 1994-1976	Land Use Commission, Governor's appointee, State of Hawaii
2000-1993 1971-1970	Natural Area Reserve System Commission, Governor's appointee, State of Hawaii

Examples of activity at decision making level:

- 'Ahahui Malama I Ka Lokahi - current Board member
- National Wildlife Federation - 1995 - elected Board of Directors, Western states; 28 years Hawaii representative; chaired national committees, including International Affairs
- Conservation Council for Hawai'i (National Wildlife Federation affiliate) 2018 returning as Board member; previously: 20 years Hawaii representative; chaired several national committees

Recognition: selected awards

2016	Interfaith Alliance Hawai'i award
2010	Hawai'i Nature Center, 20+ year volunteer recognition
2003	Hele Wawae Mamao Award, Hike Leader of the Year, Sierra Club High School Hikers
2002	Unsung Hero, Hawaii's Thousand Friends
2002	Koa Award, Conservation Council for Hawai'i
2000	Coral Reef Award, Conservation Council for Hawai'i
1998	Outstanding Citizen Wildlife Contributor of the Year, Western Association of Fish and Wildlife Agencies
1997	Hawai'i Environmental Education Association, Award of Excellence Conservationist of Year, Earth Day Celebration Award
1996	Annual Conservation Service Award, Environmentalist of the Year, Rotary Club of West Honolulu; State Senate & Honolulu City Council resolutions Conservation Award, Hawai'i Audubon Society
1984	State House of Representatives, Resolution for Wildlife Week Service
1983	National Wildlife Federation, Conservation Service Citation
1980	Rep. Morris Udall, Alaska Coalition, Letter of Commendation
1971	National Science Foundation grant, Student Originated Studies, Project Director - Hawai'i Dryland Ecology study with 9 member team

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"Survey of Terrestrial Invertebrate Resources at Pāhala, Ka'ū, Hawai'i Island." June 2012, report to AECOS for Trustees of the Estate of Bernice Pauahi Bishop.

"Survey of Terrestrial Invertebrate Resources at Weliweli, Kōloa, Kaua'i Island." July 2011, report to AECOS for CIRI Land Development Company.

"Survey of Terrestrial Invertebrate Resources at Kīholo State Reserve Park, North Kona, Hawai'i Island." July 2011, report to Rana Biological Consulting, Inc. / Planning Solutions, Inc., 48 pp.

"Terrestrial Invertebrate resources at the site of the Mt. Ka'ala Radio Facility Project, Mt. Ka'ala, O'ahu, Hawai'i." May 2011. Report to Helber Hastert & Fee Planners, Inc. for Richard Matsunaga and Associates Architects, Inc. 25pp.

"Survey of Terrestrial Wildlife Resources at Kahuku, Ka'ū, Hawai'i Island." February 2011; June 2011, report to PBR Hawai'i & Associates for Nani Kahuku 'Āina, LLC. 73pp.

Multiple surveys and reports on endangered species presence/absence at Ulupalakua Ranch wind energy farm sites. 2010-2011. Tetra Tech and other firms for Sempra Generation. Multiple surveys of individual tobacco plants to determine absence / presence/ feeding by *Manduca*.

"Survey of Terrestrial Invertebrate Resources on agricultural lands at Honokōhau, North Kona, Hawai'i Island." Nov 2010, report to PBR Hawai'i & Associates for Lanihau Properties.

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"Regional Study Area Report for O'ahu, terrestrial invertebrate resources, for Hawaiian Electric Big Wind O'ahu Interconnection Project," May 2010, report to CH2M Hill, Honolulu, for Hawaiian Electric Company, Inc.

"Weed and Pest Prevention and Response Plan for Rogers Ranch, Pu'u Wa'awa'a, Hawai'i," April 2010. With Anita Manning.

"Results of survey for *Manduca* on *Nicotiana glauca* along Mamalahoa Highway (Route 190), Island of Hawaii." February 2010, report to Parsons Brinckerhoff for Hawai'i State Department of Transportation.

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"Survey of Invertebrate Resources at Anini, near Princeville, Hanalei District, Kaua'i," May 2009, report to Princeville Prince Golf Course, LLC.

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"Survey of Invertebrate Resources at Kaūmana, Hawai'i Island," Feb 2009, report to AECOS Consultants for Wil Chee Planning for Connections New Generation Public Charter School, Hilo, Hawai'i.

"Survey of Invertebrate Resources at Koa Ridge Makai, 'Ewa District, O'ahu, Hawai'i," Feb 2009, report to Helber Hastert & Fee for Castle & Cooke Homes Hawaii.

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"Survey of Invertebrate Resources at Waimanalo Gulch Sanitary Landfill Expansion Area, O'ahu, Hawai'i," Sept. 2008, report to AECOS Consultants for R. M. Towill Corporation and City & County of Honolulu, Department of Environmental Services.

"Survey of Native Invertebrate Resources at site of future expansion of Hawaiian Memorial Park, Kāne'ohe, O'ahu," August 2008, report to Helber Hastert & Fee for Hawaiian Memorial Life Plan Ltd.

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"Ecology of the dry land forest at Kānepu'u, island of Lāna'i," (with G. Spence), *Newsletter of the Hawaiian Botanical Society*, 1976, 15(4-5):62ff.

"Comparative Breeding Site Ecology and the Adaptive Radiation of Picture-Winged *Drosophila* in Hawaii," *Proceedings, Hawaiian Entomological Society,* 1975, 22 (1):65-103.

"Botanical Resources Along North Kona's Ancient Coastal Trail," *Na Ala Hele: Trails for Walking*, 1973, Department of Planning and Economic Development, State of Hawai'i.

"Ecology of the Hawaiian drylands: Forests - Hawaii, " (with R. Ahuna And C. S. K. Ching), Abstract Reports, presented at the meeting of the American Association for the Advancement of Science, Philadelphia, PA, December 28-29, 1971, pp. 292-299.

"The Need to Regulate Alien Animal Importation to the Hawaiian Islands," 1970, Report for the Hawaii State Legislature, Committees on Agriculture, Ecology and Environmental Protection.

DISCOVERIES *– a partial record*

NEW SPECIES

Hawaiian Islands

flies	*Drosophila montgomeryi*, Wai'anae, O'ahu
	D. antopocerus n. species, South Kona, Hawai'i
	D. touchardiae, on Olonā shrub above Kahana, O'ahu
	D. toxochaetae on Olonā at Mapulehu, Moloka'i
	D. paucicilia, Wai'anae, O'ahu
	D. obatae
	D. reynoldsiae
	D. ohemakai Moloka'i
	D. pulipes, Hawai'i
	Asteia montgomeryi, N. Kona Wiliwili Branch Fly
	Limonia hardyi [flightless crane fly]
	Campsicnemus n. sp. [Mt. Ka'ala, O'ahu flightless long-legged fly]

Hawaiian Islands

moths	*Agrotus* n. sp. [summit ice cutworm noctuid]
	Eupithecia n. sp. [East Maui orange]
	E. new species #8 [Moloka'i, Maui, O'ahu bristly Killer caterpillar]
	Aumakua omaomao, Maui & Moloka'i populations
other insects	*Nysius wekiuicola* [Wekiu vampire bug] with F. G. Howarth
	Plagithmysus montgomeryi [akoko longhorn wood borer]
plants	*Remya montgomeryi*, Kaua'i [aster family]
	Stenogyne campanulata, Kaua'i [woolly mint]
	Perottetia n. sp., Mōhihi wet forest, Kaua'i [Olomea]
	Hedyotis n. sp., Manono shrub Nāpali cliffs
	Chamaesyce elenorae, Kalalau [cliff 'akoko or spurge]
	Hibiscadelphus woodii, Kaua'i, with K. Wood

Pacific Islands

moths	*Gymnoscelis montgomeryi* on *Clematis* flower, Ogasawara Islands [dimorphic looper]
	Cleora sp, Ogasawara Islands [looper]
	Asymphorodes montgomeryi, Marquesas Is. [micromoth]
flies	*Chloropid* n. sp., Orohena, Tahiti [flightless fly]

REDISCOVERIES

Hawaiian Islands	*Cookeconcha*, Kōloa, Kaua'i
snails	*Newcombia*, on pua, Oloku'i, Moloka'i
insects	*Micromus cookeorum*, flightless brown lacewing, Maui
	Eupithecia niphoreas [ambush predatory behavior]
	Theridion grallator, Happyface spider [notice of markings on back]
	Caconemobius schauinslandii, Pu'ukoa'e, Kaho'olawe
plants	*Chamaesyce olowaluan*, a tree 'akoko, with S. Perlman
Marquesas	*Trichometra*, flightless water measurer bug

NEW LOCALITIES

Hawaiian Islands	*Euphorbia haeleeleanum,* 'akoko, Ha'ele'ele Valley on Kaua'i
plants	*Caesalpinia kavaiensis,* uhiuhi, Koai'e, Kaua'i

NEW STATE and ISLAND RECORDS partial record

arthropod	*Schizomida*, Mānoa Quarry cave, O'ahu, with F. G. Howarth
insects	*Hydrellia tritici*, rice leaf miner, Maui and Hawai'i
	Ephydridae, shore fly
plants	*Tibouchina herbacea*, Punalu'u, O'ahu

Testimony of
STEVE SPENGLER, PH.D.
ELEMENT ENVIRONMENTAL, LLC
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 001

My name is Steve Spengler and I am Vice President of Element Environmental, LLC, a consulting firm offering a range of services including environmental engineering, regulatory compliance, and hydrogeologic studies. I prepared the water quality study for the Hawaiian Memorial Park Cemetery Expansion Project (included as Appendix I in the Final Environmental Impact Statement). I have 30 years of experience managing and executing a variety of environmental and water resource evaluation projects in Hawai'i and the Pacific. Over the past 15 years, I have managed over 120 projects, and my experience includes involvement in a range of environmental investigation, assessment, and remediation projects dealing in part with ground water, storm water, and hazardous waste. A copy of my resume is attached.

Scope of Study

Element Environmental, LLC was retained by HHF Planners to evaluate the proposed project's water quality impact to Kāwā Stream, which is located near the Petition Area. My analysis was based on stream flow data and water samples collected at multiple locations during baseflow and stormflow periods. Water samples were analyzed for the presence of nutrients; total suspended solids; pesticides; and formaldehyde, a chemical present in embalming fluids. Regression modeling using the stream flow and water sampling data collected was utilized to assess the proposed project's impact on the water quality of Kāwā Stream.

I will briefly summarize my findings on the project's potential impacts to the water quality of Kāwā Stream.

Kāwā Stream Description

Kāwā Stream is a perennial stream located outside the Petition Area, and has a total run of about 2.8 miles of main and tributary stream courses serving a 1.13 square mile watershed area. The stream's main course originates within the Hawai'i State Veterans Cemetery and discharges into the southern portion of Kāne'ohe Bay. This stream is perennial due to baseflow that originates from springs located throughout the watershed that are fed by shallow, likely discontinuous perched groundwater bodies. Ephemeral drainageways within the Petition Area also carry site stormwater runoff toward the City's drainage system serving the lower residential subdivision that eventually feeds into Kāwā Stream.

The stream receives perched groundwater input and storm runoff that originates from both forested and urbanized areas that include two cemeteries (HMP and the adjacent Hawai'i State Veterans Cemetery), residential and commercial developments, schools and parks, a golf course, and a municipal sewer pumping station. The eastern edge of this watershed is delineated by the ridge of hills that separate Kāne'ohe from Kailua, and the shoreline runs from Kokokahi and Bay View Golf Park on the east to Waikalua (an early Hawaiian fishpond) on the west.

During dry periods of the year, groundwater baseflow enters the stream course from the basin located below HMP situated near the cemetery's baseyard (Cascade Spring). Another small volume of perched groundwater seeps into a subsurface drain that daylights adjacent to the Cascade Spring that is connected to a curbside storm drain that collects rainfall runoff from the cemetery grounds above. This upper section of the stream and other nearby branches receive runoff from the surrounding forested lands. These tributaries of Kāwā Stream converge and flow downslope toward the Parkway subdivision.

Estimated Surface Water Flow Rates

The average volume of groundwater input to the stream above the USGS monitoring station site, located across the street from the Bayview Golf Course, is estimated to be around 600 gallons per minute (GPM). Exhibit 1 shows the flow rates measured in various portions of the stream and its tributaries on February 12, 2018 after five days of dry conditions.

The stream flow measured at the Parkway site reflects the approximate volume of baseflow that originates from the basin located below the current HMP. A seepage run conducted on January 25, 2018 in the basin below the existing HMP cemetery measured spring flow of 5 gpm in the slope below HMP's maintenance facility (Cascade Spring); 2 gpm from the nearby buried culvert that drains HMP's cemetery and receives perched groundwater input; and around 8 gpm of perched groundwater inflow across the course of the small stream as it flows from the spring and culvert to behind the recreational center associated with the Parkway subdivision. Water samples collected

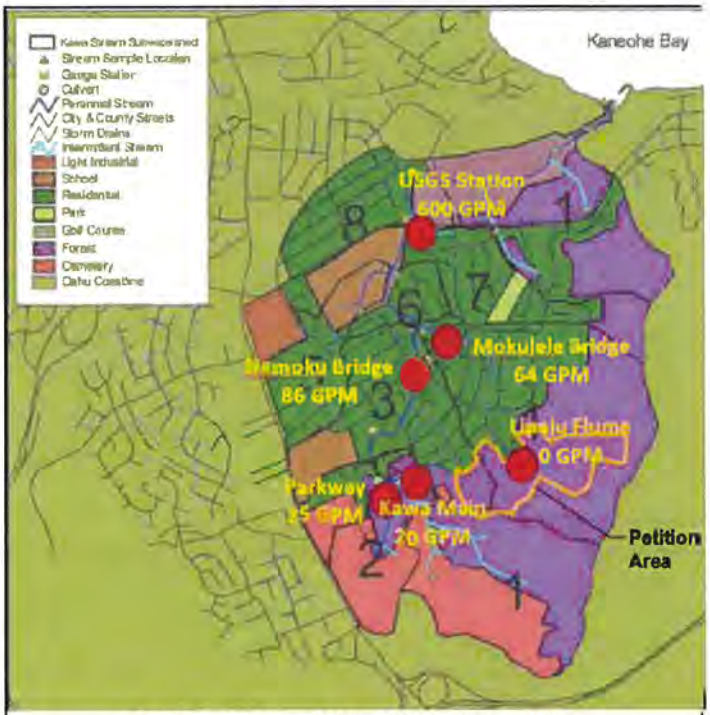


Exhibit 1: Flow Rates at Monitoring Sites

from Kāwā stream during this and previous studies from various monitoring locations throughout the watershed after several days of no rain reflect the water quality of the perched groundwater rather than the water quality of rainfall runoff.

Kāwā Stream is a Class 2 inland water body. The objective of Class 2 waters is to protect their use for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping, and navigation (§11-54-03, Hawaii Administrative Rules). A Stream Bioassessment report prepared for Kāwā Stream found that in general the stream does not provide good habitat for native aquatic organisms and does not support any substantial populations of native fish and crustaceans (Burr, 2001).

Līpalu Drainageway Flow Data

A flume (Līpalu Flume) was installed within the drainageway serving the Līpalu watershed (see Exhibit 2) about 200 feet mauka of the City's Līpalu Street catchment basin to allow continuous monitoring of stormwater flow in this ephemeral drainageway. Manual and tipping rain gauges were also installed on the ridgeline to record rainfall that fell along the ridgeline at the Petition Area between December 2017 and February 2018. The volume of stream and runoff flow in the lower portions of Kāwā Stream was obtained from the USGS gaging station.

Exhibit 2: Lipalu Watershed (Element Environmental, 2018)

It should be noted that monitoring at the flume was terminated on February 18, 2018 due to a large storm event that partially destroyed the installed flume. The highest one-hour rainfall total associated with this event was 2.51 inches. It is likely that the peak flow volume during this relatively intense storm above the flume was on the order of 200 cubic feet per second (cfs). During this storm event, the flow measured at the USGS gaging station rose from 10 cfs to 1,000 cfs during the initial intense period of rainfall that initiated this runoff event. By comparison, the one-hour, 100-year design storm event for the Kāne'ohe area is around 4.5 inches/hour.

An average of 40% of the rainfall that fell within the Kāwā watershed during nine storm events recorded between December 2017 and February 2018 ended up as runoff discharged within Kāwā Stream at the USGS gaging station. Within the smaller Līpalu watershed, an average of 5.4% of rainfall that fell on this area discharged as runoff during these storm events. During the

nine storm events recorded during the three-month monitoring period, only approximately 1.2% of the total runoff discharged from the Kāwā Stream watershed above the USGS gaging station originated from the forested Līpalu watershed area above the temporary flume.

Kāwā Stream Loads Estimate

Kāwā Stream is listed on the State Department of Health's (DOH) 2016 303(d) list. Inclusion on this list indicates a surface waterbody is in violation of State water quality standards. Total Maximum Daily Load (TMDL) standards, the maximum pollutant amount a waterbody may receive, were established for this stream during a prior water quality study conducted by Oceanit (2002). TMDL were established for nutrients (nitrogen and phosphorous) and sediments. The largest source area for nitrogen and sediment loads were estimated to originate from residential areas and cemetery lands, whereas the dominant source for phosphorous were from forest land and residential areas. The TMDL study concluded the pollutants leaving the watershed could enhance unwanted algae growth within Kāwā Stream and Kāne'ohe Bay. TMDL developed were updated in 2005 and include nutrients (nitrogen and phosphorous) and Total Suspended Solids (TSS).

The impact of pollutant loads including Total Nitrogen (TN), Total Phosphorous (TP), Nitrate plus Nitrate (N+N), and Total Suspended Solids (TSS) from the watershed on Kāwā Stream was estimated using stream flow and water quality data retrieved from the Kāwā Stream USGS station. An estimated 590.5 tons of TSS, 5.7 tons of TN, and 2.9 tons of TP were entrained in water passing the gauging station during the study's sampling period from December 11, 2017 to February 20, 2018. The majority of sediment and nutrient loads were carried in the stream during nine storm events during this three-month period. While 82% of stream flow occurred during these nine storm events, 99.2% of TSS and phosphorous loads and 91.6% of the TN load occurred during the events. The USGS observed that a single storm may deliver the equivalent of years and even decades of pollutant load received by coastal waters. This phenomenon is observed in the Kāwā watershed. Based on this data, the majority of sediment and nutrient loads entering Kāne'ohe Bay from Kāwā Stream occur during significant storm events (see Exhibit 3).

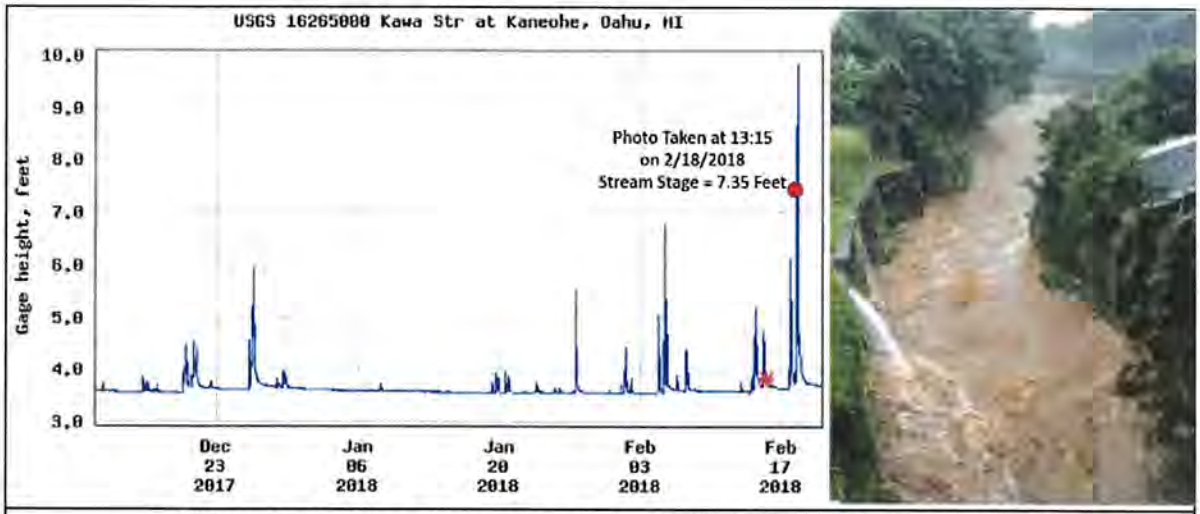


Exhibit 3: Graph of Kāwā Stream Gage Height and Photo During February 18th Storm
Source: Element Environmental LLC, 2018

Līpalu watershed streamflow and pollutant loads data from the Līpalu Flume similarly indicate these large storm events can contribute massive amounts of pollutants, overwhelming totals from smaller rainfall events and impacting Kāwā Stream and its water quality. The runoff volume from this undeveloped, forested watershed represents approximately 0.74% of total water flow measured at the Kāwā Stream gauging station. However, the TSS load leaving the area represents about 31.3% of the TSS load measured at the gaging station, indicating this undeveloped forested portion of the Petition Area experiences high levels of erosion and sediment runoff. This watershed also contributed 4.0% and 1.9%, respectively, of TN and TP mass measured at the gaging station. The high level of erosion and sediment runoff from the undeveloped portion of the Petition Area thus contributes a significant amount of TSS into Kāwā Stream. The data further confirms that large single storm events can contribute massive amounts of TSS and nutrients overwhelming totals resulting from other smaller rainfalls.

Water Quality Sampling Results

Stream and spring water samples were collected from within the Petition and surrounding areas. Areas sampled included the USGS Kāwā Stream gaging station, that receives ground and stormwater input from the entire watershed mauka of Kāne'ohe Bay Drive, and a small groundwater fed tributary behind the Parkway Subdivision recreation center (downslope from existing HMP areas). This tributary receives ground and stormwater input from existing portions of HMP and the adjacent residential community. Water quality characteristics of Kāwā Stream were also determined via analysis of data from previous water quality studies.

Sampling data suggests groundwater dominant baseflow in Kāwā Stream is characterized by relatively low concentrations of TP and TSS, with intermediate concentrations of TN and somewhat elevated concentrations of N+N. Stormwater dominant samples tend to have

somewhat elevated concentrations of TP, elevated concentrations of TSS, elevated concentrations of TN, and comparatively lower concentrations of N+N.

The relationship between nutrient concentrations (TN, TP, N+N) and total suspended solids (TSS) from USGS Kāwā Stream station and the Parkway site samples were evaluated. This analysis indicates TN concentrations generally increase as TSS concentrations rise. This pattern suggests groundwater dominant samples, possessing lower TSS concentrations, also have comparatively lower nitrogen concentrations. Elevated nitrogen concentrations result from the presence of stormwater runoff in samples. A positive relationship between TP and TSS concentrations was also observed, with phosphorous concentrations increasing as the presence of suspended solids rise. This relationship suggests phosphorous may be present in solids transmitted to the stream during runoff events. A negative relationship between N+N and TSS was observed, with N+N concentrations generally declining as TSS increases. This suggests groundwater, which generally has lower TSS concentrations, is the primary source of nitrates to Kāwā Stream.

Samples obtained from the Līpalu Flume provide an understanding of pollutant concentrations in runoff from the Petition Area and surrounding undeveloped forested area. TP, TN, and TSS concentrations from this area are significantly higher than samples from elsewhere in the watershed, including the Parkway site that receives runoff from the existing HMP cemetery. TSS concentrations in runoff from the undeveloped Līpalu watershed are elevated compared to concentrations measured elsewhere (see Exhibit 4, inset shows stream sample in a white bucket). Elevated concentrations may in part reflect the higher amounts of rainfall and rainfall intensity required to initiate flow in the forested watershed.

Exhibit 4: Photo of Turbid Runoff at Flume on February 5, 2018

The data indicates that samples from the USGS Kāwā Stream station and the Parkway site follow similar variation trends. This suggests nutrient and TSS contributions to Kāwā Stream from the existing HMP cemetery area are not elevated compared to contributions from the lower urbanized portions of the watershed. The pattern further suggests existing developed cemetery areas of HMP do not contribute high nutrient concentrations to Kāwā Stream that would affect its water quality.

Pesticide and Formaldehyde Analysis

A total of 42 stream and groundwater samples were collected and analyzed for Glyphosate, Diuron, and 2,4-D. Glyphosate was analyzed due to its widespread use and general ubiquity in the environment. Diuron and 2,4-D were analyzed due to the detection of these pesticides in a stormwater sample collected by the USGS from the newly installed USGS Kāwā Stream station in 2017. Thes pesticides have been also detected in other streams on O'ahu and Kaua'i at trace concentrations, typically in the low to mid-part per trillion levels. Glyphosate was the most commonly detected pesticide with concentrations detected in 15 of 42 samples gathered. Diuron was detected in 7 of the 42 samples, while 2,4-D was only detected in a single sample. Table 1 summarizes pesticide concentration levels detected in these 42 samples as well as the frequency of detection.

Pesticides were most commonly detected in turbid, runoff dominated samples where TSS concentrations tended to be elevated. This pattern suggests the source of detected pesticides are pesticide contaminated sediments that may be transported to Kāwā Stream during rainfall events. Pesticides may also be located in alluvial deposits adjacent to the stream where these pesticides are already present. Pesticides in these deposits may become resuspended in stream waters through the scouring of deposits during periods of high stream flow.

Table 1 - Pesticides Concentrations Detected

Location	Flow Regime	Glyphosate		Diuron		2,4-D		Sample Count
		Detect Range (ng/L)	Detect Frequency	Detect Range (ng/L)	Detect Frequency	Detect Range (ng/L)	Detect Frequency	
Perched Groundwater[1]	Groundwater Dominant	121 - 1,072	25%	1 J	13%	<1,000	0%	8
Kāwā Stream	Groundwater Dominant[2]	772	10%	<1	0%	<1,000	0%	10
Kāwā Stream	Runoff Dominant[3]	90 - 1,836	89%	4 - 6 J	22%	3,050	11%	9
Parkway	Groundwater Dominant	<1	0%	<1	0%	<1,000	0%	4
Parkway	Runoff Dominant	343 - 2,831	43%	1 - 1,293	29%	<1,000	0%	7
Līpalu Flume	Runoff Dominant	<1	0%	14 - 21 J	50%	<1,000	0%	4

J: Estimated value
[1] Perched groundwater includes samples collected from Cascade Spring, Maintenance Culvert, and Plantation Well
[2] Groundwater if conductance >200 µS/cm or TSS < 20 NTU.
[3] Runoff impacted if conductance < 200 µS/cm or TSS > 20 NTU.
Source: Element Environmental LLC, 2018

The detected concentration levels of glyphosate at the USGS Kāwā Stream gage site that receives runoff from the entire watershed, are generally similar at the Parkway monitoring site that receives runoff from the existing cemetery. This suggests input of glyphosate into the

stream from HMP's cemetery is broadly similar to glyphosate input from lower residential communities providing runoff to the stream. The trace concentrations of Diuron detected at the Līpalu flume may reflect residual pesticide input to the stream from prior agricultural usage of the undeveloped Līpalu watershed area (historic pineapple cultivation).

The relationship between turbidity and glyphosate concentration was assessed for samples obtained for this project and those obtained in other studies conducted on O'ahu and Kaua'i. Although variation was observed, stream samples containing over 0.5 parts per billion glyphosate are generally moderately to highly turbid (>50 NTU). This observed pattern aligns with findings of other studies indicating that glyphosate is commonly detected in stream bed sediments, supporting the suggested conclusion that glyphosate may be found in Kāwā Stream from runoff related resuspension of contaminated sediments.

The total mass/volume of glyphosate entering Kāwā Stream from runoff related to the February 5, 2018 storm event was estimated through analysis of glyphosate concentrations in Kāwā Stream USGS station samples from this event. Glyphosate was detected in concentrations ranging from 120 to 1,098 ng/L. The estimated total mass of glyphosate in the roughly 17.6 million gallons of runoff produced during the storm event is estimated to be 12.9 grams (less than a tablespoon) of glyphosate. Therefore, it can be concluded that glyphosate concentrations detected in Kāwā Stream are minimal.

Formaldehyde Sampling Results

Formaldehyde is a chemical used as part of the modern burial embalming process to temporarily prevent decomposition. Therefore, water samples were collected and analyzed to detect the presence of this chemical to address potential concerns with its leaching into perched groundwater from the Veterans and existing HMP cemeteries.

Four perched groundwater samples were collected from a small spring located outside of the HMP property in the hillslope situated below HMP's maintenance yard and at the well located at the northwestern corner of the cemetery expansion site. Formaldehyde was not detected in any of these samples at an analytical detection limit of 5 parts per billion. This is consistent with scientific studies that have found that formaldehyde will biodegrade to low levels in a few days if released to water. In addition, the predominant degradation product of formaldehyde in the environment, formic acid, rapidly biodegrades in soils.

Project Effects on Water Quality

Project improvements are expected to have an overall beneficial impact on the currently impaired water quality of Kāwā Stream and the eventual discharge point at Kāne'ohe Bay. Cemetery expansion improvements would overall reduce existing site slopes, lowering the velocity of runoff and improving runoff infiltration within the newly developed areas. Turf grass landscaping and construction of retention basins would also allow increased rainfall infiltration,

especially during smaller rainfall events. Implementation of these improvements should improve Kāwā Stream's water quality and TMDL by reducing stormwater discharge, TSS, and nutrients exiting this watershed area. As shown by water quality collected, the area below the existing HMP cemetery site (Parkway Site samples) has far lower TSS and nutrients being discharged into Kāwā Stream due to the cemetery's landscaped infiltration effects. In comparison, the undeveloped Līpalu watershed area into which the proposed expansion will occur currently experiences significant erosion during large rainfall events.

The cemetery expansion area would include maintenance activities to manage grass growth, such as lawn mowing. However, cemeteries are not intensively managed landscapes compared to golf courses. Fertilizer use is not necessary at the existing HMP cemetery due to generally fertile conditions, supportive weather conditions, and lower maintenance needed for turf grass. Pesticides are also not routinely used by maintenance staff for HMP's cemetery. HMP maintenance staff occasionally use the herbicide Roundup (glyphosate) to address spot areas needing treatment. However, use is infrequent due to Kāne'ohe's generally wet weather and the characteristics of the cemetery lawn.

Glyphosate concentrations generated by the project should not have a significant water quality impact. Detected concentration levels from the larger watershed serving the existing Veterans and HMP cemeteries are broadly similar to glyphosate input from lower residential communities. As already discussed, glyphosate use would be minimal with the cemetery expansion, and any discharge should be relatively small and minimally impact water quality. In addition, the proposed cemetery expansion will not lead to formaldehyde entering the stream based on the prior sampling results obtained on spring discharge leaving the current cemetery.

The Cultural Preserve would have minimal effect on existing runoff volumes and water quality because no major site improvements would occur within the Preserve area. Runoff from this site would therefore continue to result in some erosion and discharge that include TSS and nutrients from the undeveloped forested portions of the Preserve area.

Proposed Mitigative Measures

The project would have a beneficial long-term water quality impact by reducing the velocity of runoff and the corresponding amount of TSS and nutrients discharged into drainageways and Kāwā Stream. Therefore, long-term mitigative measures are not necessary.

However, short-term construction related activities could impact water quality due to the discharge of sediment from grading activities. Design plans will include BMPs to address mitigating these effects and plans would be coordinated with the City for review and approval during the project design phase. In summary, BMPs such as those minimizing impacts to site soils would address water quality and effects on Kāwā Stream. Permits including grading, grubbing, stockpiling, and a National Pollution Discharge Elimination System (NPDES) permit would be obtained after agency review, and would discuss applicable BMPs. An Erosion and

Sediment Control Plan (ESCP) would also be prepared. BMPs would be incorporated as part of permit approval and development of the ESCP. Actual BMPs implemented would be determined during the project's design phase.

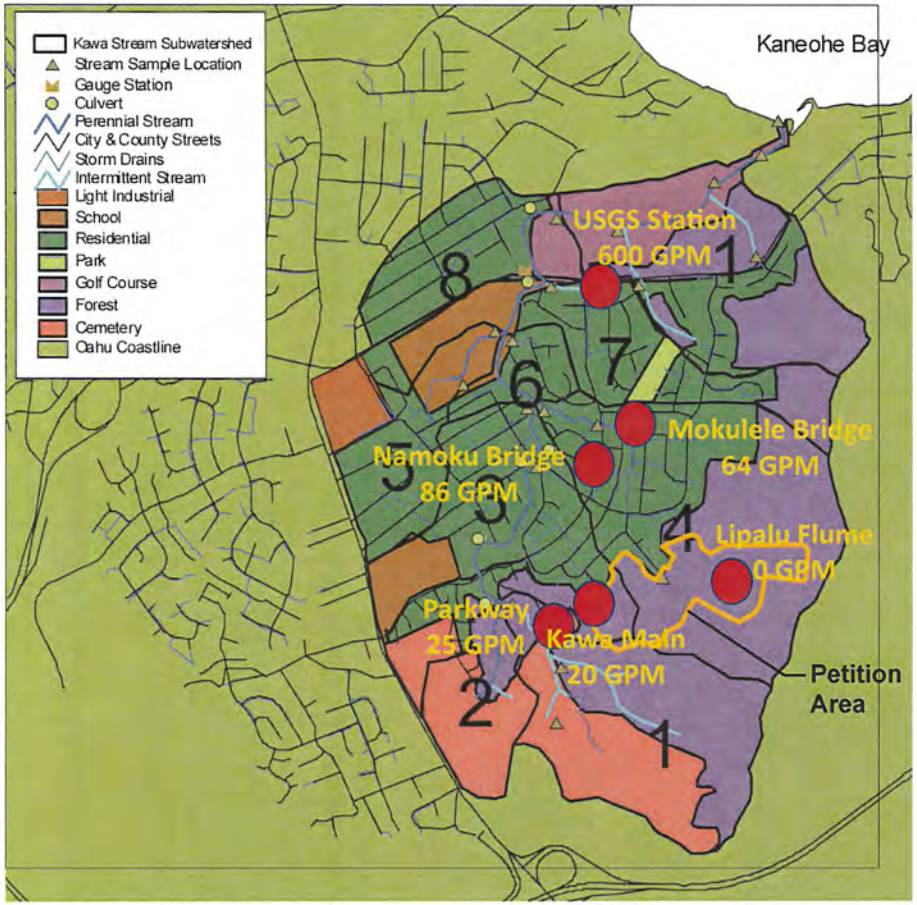


Exhibit 3.22 Synoptic Baseflow Measurements: 2/12/2018
Source: *Hawaiian Memorial Park Cemetery Expansion Project Final Environmental Impact Statement* April 2019; page 3-80 Element Environmental, LLC

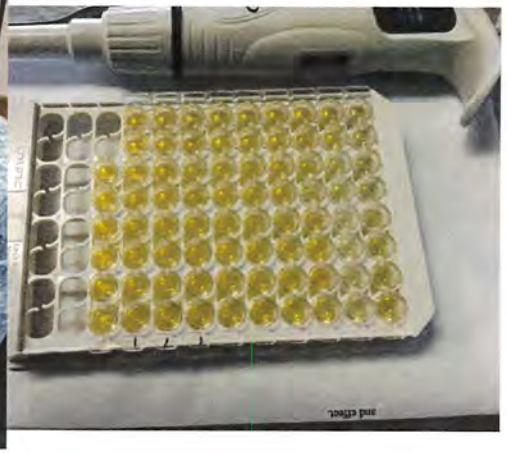
Increase in Stream Turbidity and Suspended Sediment Load Observed During Increasingly Larger Runoff Events at USGS Gaging Station. Source: Element Environmental, LLC, December 2019

Turbid Runoff at Lipalu Flume on 2/5/2018 around 15:30. Source: Element Environmental, LLC, December 2019

Exhibit SS-A

Perched Groundwater Sampling Sites: Cascade Spring and Drain Pipe from Cemetery

Perched Groundwater Sampling Sites: Plantation Well and Seep



Immunoassay Analysis for Pesticides

2/7/18 Storm Samples (L to R): Kawa@12:53; Kawa@13:35; Mokulele Bridge@13:40; Parkway Bridge@13:46; Parkway@13:52; Lipalu Flume@14:00; Kawa@14:10
Source: *Hawaiian Memorial Park Final EIS* April 2019
Appendix I, Kawa Stream Watrershed Impact Analysis Report, Water Quality Report on Impacts to Kawa Stream from Proposed Expansion of Hawaiian Memorial Park, Kaneohe, Oahu, Hawaii, July 2018, page 8
Element Environmental, LLC

Exhibit SS-B

Source: Element Environmental, LLC, December 2019

Curriculum Vitae **Steven R. Spengler, Ph.D.**

EDUCATION:

Ph.D., Geology & Geophysics (Hydrogeology) - University of Hawaii at Manoa, 1990
M.S., Geology & Geophysics (Geochemistry) - University of Hawaii at Manoa, 1986
B.S., Geology - University of California at Santa Cruz, 1984
B.S., Chemistry - University of California at Riverside, 1981

SUMMARY OF EXPERIENCE:

Dr. Spengler has 30 years of experience managing and executing large environmental and water resource evaluation projects in Hawaii and throughout the Pacific. He has been involved in a wide range of environmental investigation, assessment and remediation projects dealing with ground water, drinking water, storm water, wastewater, petroleum contamination, PCB contamination, solid waste, and hazardous waste. His professional experience has included work on projects in Hawaii, Kure Atoll, French Frigate Shoals, South Korea, Guam, Japan, Diego Garcia, Wake Island, Johnston Atoll, Yap, Palau, Pohnpei, Kosrae, Saipan, Kwajalein, America Samoa and Christmas Island.

Dr. Spengler specializes in the use of numerical models to simulate groundwater and surface water flow. He has also conducted numerous assessments of groundwater availability and pollutant fate and transport. Over the past fifteen years, Dr. Spengler has managed and executed over 120 individual projects with a total budget of $25 million dollars and has delivered quality work product on schedule and within budget. Dr. Spengler also successfully completed two research projects for the Defense Advanced Research Projects Agency (DARPA) and United States Coast Guard (USCG) with a combined budget of $900,000. This competitively funded research involved using saprophytic fungi to remediate PCB contamination in the interiors of decommissioned military vessels and in PCB contaminated landfill soils at the Former USCG LORAN station on Kure Atoll, Northwest Hawaiian Islands.

Dr. Spengler assisted the Hawaii Department of Health in developing the Source Water Assessment Program (SWAP) plan for the State. The SWAP plan addressed the approximately 465 groundwater, surface water, and groundwater under the direct influence of surface water sources linked to public water systems throughout the State of Hawaii. During implementation of the SWAP, well head protection areas (WHPA) around each public water supply were delineated using the two-dimensional, finite difference model FLOWPATH. The model was used to simulate the conservative advection of dissolved phase contaminants and microbes within the groundwater system over 2-, 10- and 25-years of travel. Dr. Spengler also led a groundwater monitoring and modeling project of the Ewa coastal plain conducted for the City and County of Honolulu. Monthly surface and groundwater and marine water sampling was conducted at over twenty locations over a nine-month monitoring period in order to establish baseline water quality conditions within the shallow caprock aquifer and near-shore marine environments. This monitoring data was entered into a numerical groundwater model which was used to evaluate the environmental impact of injecting variable volumes of secondary treated wastewater effluent into the shallow coastal aquifer.

Prior to working in the environmental field, Dr. Spengler worked for the United States Geological Survey where he served as project chief of a groundwater availability study of the Central Corridor region of Oahu. A quasi-three-dimensional, finite-difference groundwater model (SHARP) was used with input spatial parameters collected from a previously assembled GIS model for the island. He also served as a field manager for a large-scale hydrogeologic investigation of Kwajalein Atoll which involved drilling and installation of a number of nested piezometers throughout the atoll. As a hydrogeologist for the Pohnpei State Government, he designed and constructed a water treatment system for removing iron and manganese from groundwater pumped from the most productive aquifer on the island. Dr. Spengler, as a research assistant with the East-West Center, mapped the geology and hydrogeology of the island of Pohnpei, Federated States of Micronesia. During this work he delineated and assisted with development of additional sources of groundwater and surface water supplies for the islands rapidly growing population.

PROFESSIONAL EXPERIENCE

Vice President | Chief Scientist
Element Environmental, LLC 2006-Present

Currently serve as the vice president and chief scientist of Element Environmental, a Hawaii-based environmental, engineering and water resource consulting company. Since co-founding the company in 2006, the firm has grown from two to 25 employees with annual revenues in excess of $10 million dollars. Managed multiple Indefinite Delivery, Indefinite Quantity contracts with various federal clients including Naval Facilities Engineering Command (NAVFAC) Hawaii, NAVFAC-Pacific, U.S. Army Corps of Engineers, and the U.S. Coast Guard. Local government clients include the City and County of Honolulu and the State of Hawaii. Private sector clients include Kamehameha Schools, Samsung Corporation and Hawaiian Electric Company.

President | Chief Scientist
Pacific Hydrogeologic, LLC 2006-2012

Conducted numerical modeling studies and environmental investigations on a number of project sites located in Hawaii and South Korea. Successfully competed for and completed two research projects for the Defense Advanced Research Projects Agency (DARPA) and United States Coast Guard (USCG) using saprophytic fungi to remediate PCB contamination in the interiors of decommissioned military vessels and in PCB contaminated landfill soils at the Former USCG LORAN station on Kure Atoll, Northwest Hawaiian Islands.

Chief Executive Officer | Program Manager | Chief Scientist
Environet, Inc. 2000-2006

Served as the Chief Executive Officer between 2003 to 2005 of Environet, an 8A environmental and engineering consulting firm. During tenure as CEO, the firm ranged between 15 and 20 employees with gross annual revenues of between $3.0 to $4.2 million dollars. Managed multiple Indefinite Delivery, Indefinite Quantity contracts with various federal clients including the U.S. Army Corps of Engineers, U.S. Navy Naval Facilities Pacific and the U.S. Coast Guard.

Served as Chief Scientist from 2000 to 2003 and in 2006. Managed and executed a wide variety of projects with federal, state and private sector clients that totaled over $5.0 million gross revenues. Worked on phytoremediation research projects that utilized grasses and fungi to breakdown energetic, metals and PCB contamination in tropical soils.

Senior Hydrogeologist | Project Manager
Woodward-Clyde / URS Corporation 1991-2000

Worked on various environmental investigations and numerical groundwater modeling projects at locations throughout the State of Hawaii and the Pacific Rim (Korea, Japan, Guam, Saipan, FSM). Managed up to five staff while working on larger environmental projects.

Hydrogeologist
United States Geological Survey 1988-1991

Served as project chief of a groundwater availability study of the Central Corridor region of Oahu. A quasi-three-dimensional, finite-difference groundwater model (SHARP) was used with input spatial parameters collected from a previously assembled GIS model for the island. In charge of equipment installation for monitoring the relationship between groundwater flow and ground displacement within an active slow-moving landslide in Manoa Valley and in potential debris flow initiation sites located above Nuuanu Valley.

SELECTED PROJECT EXPERIENCE

- Principal investigator for a large-scale pump test conducted on a 1,600-foot deep basaltic well located in Kalaeloa proposed for use in a desalination project for the Honolulu Board of Water Supply. The deep well was pumped for three consecutive days at pump rates of between 520 to 540 gallons per minute and the pumped water was injected into a nearby injection well that was screened 300 feet into the underlying caprock aquifer. Water quality measurements were made throughout the duration of the pump test for temperature, conductivity, turbidity, pH, oxygen reducing potential, dissolved oxygen and silt density index. The drawdown and tidal efficiency of the basaltic well was determined by installing a CDT probe in the pumping well while the efficiency of the caprock injection well was determined using a pressure transducer. A total of six water samples were collected during the duration of the pump test and submitted for analysis for all drinking water constituents including those listed in Appendix A of HAR Chapter 11-20 as well as secondary standards defined by the USEPA.

- Principal investigator for a Total Maximum Daily Load (TMDL) study for JBPHH-Wahiawa Annex. This monitoring work was conducted to comply with terms of National Pollutant Discharge Elimination System (NPDES) Permit for the Navy's municipal separate storm sewer system (MS4). Cutthroat flumes were installed at three areas where runoff exits the facility and flows towards Kaukonahua Stream to allow quantification of the volume of flow exiting the installation. Water quality monitoring of the runoff has been conducted for 2.5 years for Total Nitrogen and its components (ammonia, Kjeldahl nitrogen, and Nitrate/Nitrite as N), turbidity and Total Suspended Solids (TSS)). A predictive analytical model was developed for JBPHH-Wahiawa Annex that allows calculation of the daily nitrogen and turbidity loads exiting the facility towards Kaukonahua Stream using continuous rainfall data collected at the installation. This model will save the Navy money complying with the terms of their NPDES permit.

- Principal investigator for a TMDL analysis for the proposed expansion of the Hawaiian Memorial Cemetery within the Kawa watershed, located in Kaneohe, Oahu. Kawa stream is included on the State's Clean Water Act Section 303(d) list of impaired waters that do not meet State Water Quality Standards and is considered to be impaired by sediments, turbidity, and the nutrients nitrogen and phosphorus. This work was conducted as part of an Environmental Impact Statement (EIS) being prepared for this development. The analysis quantified the net reduction in mass of Total Suspended Solid (TSS), Total Nitrogen (TN) and Total Phosphorous (TP) TSS, TN and TP that would enter Kaneohe Bay as a result of construction of the proposed development, which will include a series of retention ponds and basins within the newly developed cemetery lands. Installed a cutthroat flume in the watershed which will be impacted by the proposed development and collected storm runoff samples from throughout the watershed to assist in quantifying incremental changes to TSS, TN, TP and pesticide (glyphosate) loads to Kawa stream that would result from the proposed development.

- Principal investigator for a hydrologic and condition assessment of the nineteen-mile long Kokee Ditch and the twenty-seven-mile long Kekaha Ditch systems on Kauai. Collected physical inventory information and stream flow measurements for both ditch systems to assist the Commission on Water Resource Management in the matter of the Complaint for Dispute Resolution and Complaint for Declaratory Order Against Waste in the Waimea River and its Tributaries filed by Earthjustice on behalf of Poai Wai Ola and the West Kauai Water shed alliance. Investigation and fact gathering work conducted involved meeting with the parties pertinent to the complaint, conducting an inventory and assessment of the existing infrastructure of the Kokee and Kekaha Ditch Irrigation Systems, measuring and monitoring streamflow throughout both systems, assessing the existing uses of water from both systems and preparation of a comprehensive report describing the findings from these assessments to the Commission.

- Principal investigator for a hydrologic monitoring program at the Kanaha Pond Wildlife Sanctuary in Kahalui, Maui. The sanctuary serves as an important wetland habitat for native wildlife and plants. Water sources into the pond that were monitored over a ten-month period included natural groundwater inflow, rainfall, surface runoff and water pumped into the pond from a nearby groundwater well while monitored water sinks include evaporation, infiltration, and drainage channel interception. The

hydrologic data collected was used: 1) to examine the seasonal relationships between the various inputs and outputs to the ponds; and 2) to develop restoration alternatives for the pond to enhance the habitat for the endangered wildlife and plants that utilize the sanctuary.

- Provided hydrogeological consulting services for locating, drilling, installation, and testing of new water supply wells at the Agriculture Biomass-to-Energy Facility located in Koloa, Kauai, Hawaii. A total of three wells were drilled at the site and subjected to 24-hour duration step-drawdown and continuous pump tests in order to assess the permeability and water production characteristics of the subsurface volcanic formation (Koloa Volcanics) present at the facility.

- Conducted an inventory and assessment of current methods used to measure diverted streamflow throughout the State of Hawaii for the Commission on Water Resource Management. A records review identified the major diversion structure types and user types (i.e. small agricultural, large agricultural, industrial, etc.) present in the State. CWRM staff and existing stream diversion users/permittees were interviewed to gain an understanding of their current capabilities, methods and understanding of measuring diverted streamflow. A handbook was prepared that described the attributes of the various flow measurements being used throughout the State along with a discussion of the advantages, disadvantages and limitations of each methodology for the various diversion types (i.e. pipe, ditch, tunnel, etc.). The report was written in an easy to understand, descriptive manner that could be understood by non-scientific trained personnel that currently utilize and monitor streamflow in Hawaii.

- Conducted baseline water quality monitoring and prepared the Groundwater Monitoring Plan for the Princeville Construction and Demolition Solid Waste Landfill in Princeville, Kauai. A total of eight rounds of quarterly groundwater monitoring were conducted to establish the baseline water conditions at the landfill. Three monitoring wells at the landfill are currently being monitored on a semi-annual basis in compliance with the Groundwater Monitoring Plan.

- Principal investigator for a hydrogeologic study conducted in the Cantonment Area on Diego Garcia (British Indian Ocean Territory) to evaluate the potential harmful impact to the water supply aquifer from injection of reject water created by the recently constructed nanofiltration plant (average reject water disposal rate 80 gallons per minute). A temporary injection well was installed roughly 100 feet south of the nanofiltration plant recharge field. A total of 34 piezometers were installed at various depths (0-3, 7-12, 22-27, 42-47 feet below the ground surface) within the shallow aquifer to track the migration of the solutes present in the simulated reject water injected. A nine-hour duration injection test was conducted during which a total of 23,500 gallons of bromide-spiked, simulated reject water was injected into the temporary seven-foot deep, 10-inch diameter injection well. The migration of the injected simulated reject water was tracked by monitoring the conductivity and bromide concentration in the nested piezometers surrounding the temporary injection well by both collecting groundwater samples and using ion selective (bromide) and conductivity, temperature, and depth (CTD) sensors. Monitoring of the reject water plume was conducted for 125 days after the initial injection date. Pump test, average hydraulic gradient and water quality breakthrough data collected during and after the nine-hour injection test was entered into a three-dimensional, density dependent groundwater model (SEAWAT) constructed for the area directly around the injection well. The "Block" model was used to simulate both the measured changes in total dissolved solids (based on the monitored conductance data) and hydraulic head observed in the piezometer network. This model was used to determine the combination of aquifer hydraulic properties that best fit the observed breakthrough and decay curves of conductivity measured in the piezometers surrounding the injection well during the injection test and the following 125 days. A three-layer model best matched the observed head and concentration data: two upper Holocene era carbonate sediment layers of increasing permeability with depth and a highly permeable Pleistocene limestone unit at 50-foot depth. A second three-dimensional SEAWAT model of 4,000-feet by 800-feet by 100-feet dimension was then constructed that covered half the island. The hydraulic parameters derived from the "Block" model was entered into the coastal portion of this half-island model. The hydraulic conductivity value (100 feet/day) calculated from pump test data collected from a nearby water supply well was assigned to the inland portion of the half-island model. The model was calibrated by matching the difference in average synoptic water levels measured in three shallow

monitoring wells that extended across the model domain. The weekly pumping rate data over the past year for the five Cantonment wells located in closest proximity to the infiltration gallery was input into the model. A drought scenario simulation was also performed that simulated the migration of the reject water plume under conditions where no natural recharge occurs to the aquifer over a one-year period of time.

- Principal investigator for a hydrologic study to estimate the flux of groundwater entering a recently constructed lagoon located in the Ewa Plain of the island of Oahu. A density-dependent, numerical groundwater model (SEAWAT) was created of the area to estimate the groundwater influx rate into the lagoon. The model was calibrated using average water levels and recent vertical chloride concentration profile data measured in monitoring wells located in the vicinity of the lagoon. The model derived groundwater flux data was combined with groundwater nutrient data to develop a maintenance program to limit the spread of an algal species, *Chara* spp. (muckgrass), within the lagoon while maintaining a sufficient biomass of algae to maintain the good clarity and low overall nutrient levels present in the lagoon water.

- Principal investigator for a surface water and groundwater modeling study performed for the live firing range at Makua Valley, Oahu. The simulation results were used to estimate future environmental impacts resulting from on-going live fire training exercises conducted by the Army. Installed a total of eight automated tipping rain gauges, crest gauge stream flow monitoring sites and an ISCO automated surface water sampling device in the major ephemeral stream in the valley. A total of ten deep monitoring wells were also installed at strategic locations throughout the firing range. The streamflow and groundwater data collected from these wells and monitoring devices were used to calibrate the numerical groundwater (MODFLOW/MT3D/SEAWAT) and watershed runoff (GSSHA/WMS) models used. The simulation results were integrated into an Environmental Impact Statement prepared for the firing range.

- Principal investigator for a groundwater availability assessment for the 40.75 square mile Kawailoa property owned by Kamehameha Schools in the North Shore portion of Oahu. The average daily recharge to the property was calculated by creating a GIS-based model that took into account spatial variation in rainfall, evapotranspiration, irrigation, crop and soil type as well as the temporal variation in rainfall and evapotranspiration across the property.

- Hydrogeologist for a feasibility study and analysis for a proposed hydroelectric pumped storage project located on Maui, Hawai'i. Summarized the historic usage and availability of groundwater and surface water resources in the vicinity of a proposed hydroelectric pumped storage project on the island of Maui as well as issues related to reuse of R1 generated wastewater at the Kihei Wastewater Treatment Plant. The historic usage of groundwater, site geology, hydrogeology, current water usage rates and the legal issues related to use of the water in the context of the proposed project were reviewed.

- Hydrogeologist for a hydroelectric pumped storage project located on Oahu, Hawai'i. Summarized the historic usage and availability of groundwater resources in the vicinity of a proposed hydroelectric pumped storage project on the island of Oahu. The historic use of groundwater usage, geology, hydrogeology, current water usage rates and the legal issues related to use of the water in the context of the proposed project were reviewed.

- Principal investigator for a Section 206 Ecosystem Restoration study along a 2.5-mile stretch of coastline located just to the south of the main tourist district on Saipan. The project involved collection of baseline stormwater, marine water and groundwater quality data. Flora and fauna transects were conducted in the offshore lagoon to map the spatial distribution of habitat in the lagoon. A series of restoration alternatives were developed to improve the water quality in the near-shore environment which will allow the lagoon to be restored to a less degraded, more natural ecological condition. Conceptual engineering designs were prepared for storm water retention structures that recharge the underlying slightly brackish aquifer, creating an additional potable water source for the island. An incremental cost analysis was also performed to optimize the amount of environmental benefit obtained for construction budget spent.

- Completed an assessment of the Wahiawa Irrigation System for the State Agribusiness Development Corporation. The assessment consists of: (1) assessment of source waters, ownership, legal rights, and liabilities; (2) inventory and physical condition assessment of the system; (3) sediment sampling in Lake Wilson; (4) research on water quality issues; and (5) preparation of construction repair and maintenance cost estimates.

- Principal investigator for a groundwater availability assessment for the Mahukona aquifer system on the island of Hawaii. A detailed, GIS-based water budget recharge analysis was performed for this aquifer system which is located in an area that is currently undergoing rapid development. The results of this recharge analysis were input into a two-dimensional areal model constructed for the aquifer system which was developed to simulate the direction and magnitude of groundwater flow in the area. A three-dimensional, density-dependent numerical flow model, SEAWAT, was used to predict the increase in salinity within the aquifer that will result from the projected future increases in groundwater withdrawal from the aquifer system. This analysis was used to derive a refined estimate of sustainable yield for this aquifer system which is currently being considered by the State of Hawaii Water Commission.

- Principal investigator for a drinking water assessment investigation conducted for the Federated States of Micronesia by the Asian Development Bank. The project involved developing a water supply system on Yap and Kosrae and performing power sector improvements on Chuuk. On Chuuk, provided assistance to local government officials with assessing their water supply system deficiencies. On Yap, the existing wellfield on the island was assessed for the viability of adding additional extraction capacity to the well field. On Kosrae, the possibility of developing groundwater supplies to augment their existing surface water systems was assessed.

- Principal investigator for a groundwater monitoring and modeling project of the Ewa coastal plain conducted for the City and County of Honolulu. Monthly groundwater sampling was conducted from a set of sixteen monitoring and water supply wells located within the coastal plain. In addition, marine water sampling was conducted from six near-shore sampling sites. The data generated during this monthly sampling was used to establish baseline water quality conditions within the shallow caprock aquifer and near-shore marine environments. A three-dimensional fate and transport groundwater model was prepared for the area using the finite element, density dependent model FEMWATER. This model was used to simulate the impact to the existent water quality in the shallow groundwater and near-shore marine environments caused by the infiltration of variable volumes of reclaimed water (secondary treated wastewater effluent) injected via an infiltration trench located roughly one and one-half miles inland from the coast.

- Program manager for assisting the Department of Health in developing the Source Water Assessment Program (SWAP) plan for the State of Hawaii. The plan was approved by the USEPA within three months of submittal. The SWAP plan addresses the approximately 465 groundwater, surface water, and groundwater under the direct influence of surface water sources linked to public water systems throughout the State of Hawaii. During implementation of the SWAP, well head protection areas (WHPA) around each public water supply were delineated using the two-dimensional, finite difference model FLOWPATH. The model was be used to simulate the conservative advection of dissolved phase contaminants and microbes within the groundwater system over 2-, 10- and 25-years of travel. The WHPA corresponds with the area where potential contaminating activities will be inventoried, field verified, and ranked as potential contamination sources to the public water source.

- Principal investigator for a RCRA soil and groundwater investigation prepared under a Consent Order issued by EPA Region IX for a former wood processing plant on Oahu. Work performed included drilling and soil sampling of 42 soil borings to delimit the lateral and vertical extent of contamination, logging each individual boring, establishment and development of seven monitoring wells on and in the vicinity of the plant, sampling groundwater from monitoring wells, describing the geology and hydrology of the site, and preparing the report. Defined the extent of floating product (pentachlorophenol and mineral spirits) on the site and initiated product recovery. Conducted aerial and cross-sectional numerical transport simulations using the USGS model SUTRA. Groundwater remediation alternatives for the site were

evaluated using both numerical and analytical models (MODFLOW, FLOTRANS, QUICKFLOW, and AQTESOLV). MODFLOW was used to perform capture zone analysis for various remedial pumping scenarios at the facility.

- Principal investigator for a project which involved preparation of an ecological risk assessment for lead and PCB contaminated coral soil found near a closed landfill on Kure Atoll. Project involved collecting soil, groundwater and fish samples from the vicinity of the landfill to evaluate the extent of lead and PCB contamination. Conducted extensive literature research on the effects of these contaminants on the Hawaiian Monk Seal (an endangered species) and Green Sea Turtle (a threatened species). Prepared a cross-sectional fate and transport model (SUTRA/FEMWASTE) of the landfill to evaluate the rate and concentration of contaminants migrating to the nearby lagoon.

- Task manager for effluent reuse study prepared for the Board of Water Supply. This project was initiated because the total water demand on O'ahu is approaching current estimates of long-term sustainable yield of the island aquifers, 415 million gallons per day (mgd). Only a portion of the water currently allocated is used for drinking purposes (155-175 mgd) and the remainder is consumed by activities that do not necessarily require potability. For these other uses, reclaimed wastewater is a viable alternative source, which can essentially "free-up" potable water supplies for future human consumption. The island of O'ahu currently generates about 110 mgd of wastewater. The vast majority of this wastewater is currently disposed of via deep-ocean outfall with minor amounts being reclaimed through application on golf courses. Prepared a summary report that described: 1) the factors influencing the optimal location of effluent reuse in the Central O'ahu area; 2) a summary of previous studies related to potential effects of water reuse on O'ahu; 3) the water quality of treated effluent and potential receiving waters; and 4) recommendations for additional studies and work required to begin implementation of a large scale effluent reuse program on O'ahu.

- Principal Investigator for a soil and groundwater investigation and a POL and hazardous material storage facility inventory at Kunsan Air Base, South Korea. A total of 18 monitoring wells were installed at five facilities identified by base personnel as potentially posing an environmental concern. Soil samples collected were analyzed in the field using enzyme immunoassay test kits. Based on the soil and groundwater analytical data obtained, a preliminary risk assessment was performed for each facility using the State of Hawaii Department of Health's Tier II and Tier III analysis spreadsheets. Aquifer testing and monitoring was also conducted to generate site-specific hydraulic data, which was then input into a two-dimensional, finite element fate and transport model (FLOTRANS). This model was used to evaluate the potential for off-base migration of contaminants via the groundwater pathway while drawdown analysis was done using the finite difference model MODFLOW.

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ABSTRACTS

S.R. Spengler, J. Silberman, D. Mead, M. Neal, R. Yamauchi, B. Balete, K. Duman and A. Lutey. 2011. Successful Field Scale Removal of PCB Soil Contamination at a Remote Former LORAN Station Site Poster presented at 2011 Coast Guard Innovation Expo, Tampa Florida, October 25-27, 2011.

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Testimony of
SUSAN BURR
AECOS, INC.
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 1,

My name is Susan Burr and I am Vice President with AECOS, Inc. (AECOS), a consulting firm that provides environmental consulting and analytical laboratory services to clients throughout the Pacific Basin. Specific expertise of our firm includes marine and freshwater ecology and terrestrial botany. I am an environmental scientist with 25 years of experience in the environmental field, specializing in aquatic biology. A copy of my resume is attached. I have managed over 300 marine and freshwater biological survey and assessment projects, and have conducted jurisdictional determinations, wetland delineations, and developed restoration and mitigation plans.

Scope of Study

AECOS was retained by HHF Planners to conduct a survey of surface water features associated with a seep, which is located within the western portion of the Petition Area, to assess the extent of federal jurisdiction under the Clean Water Act (CWA). This survey included: 1) a wetland determination; and 2) identification of the jurisdictional limits of seep waters and other waters of the U.S. The results of this survey are included as Figure 8 in Appendix O in the Final Environmental Impact Statement. In addition, I conducted a preliminary survey of an ephemeral drainageway (referred to as the "Lipalu Channel"), located within the eastern end of the Petition Area, to identify the potential extent of federal jurisdiction within that channel. The preliminary results of this survey are included as Figure 2 in the memo in Appendix O in the Final Environmental Impact Statement. The surveys conducted were consistent with current CWA regulations and US Army Corps of Engineers (USACE) policy in determining whether these surface waters fall under regulatory jurisdiction. Attached to this document is Exhibit SB-A, which shows the survey area and our results.

I will first provide information on the regulations defining jurisdictional waters of the U.S (WoUS). I will then summarize the results of our surveys conducted and my assessment of the extent of federal jurisdiction over the surface water features surveyed.

Regulatory Background: Jurisdictional Waters

Jurisdictional waters are surface water bodies that come under federal jurisdiction as authorized by the CWA and the Rivers and Harbors Act (RHA). Authority over these waters is granted to various federal agencies, including the U.S. Environmental Protection Agency (USEPA), with the USACE having permit authority for actions impacting jurisdictional waters.

Jurisdictional waters include all tidal waters and a subset of streams (both perennial and intermittent), lakes, reservoirs, and wetlands.

A 2015 rule issued by the USACE and USEPA, "The Clean Water Rule," clarified the scope of waters of the U.S., with the intent of increasing predictability and consistency of waters protected under the CWA.[1] The basis for assuming jurisdiction of certain waters, as described in the Clean Water Rule, is the extent of connectivity to traditional navigable waters, interstate waters, or territorial seas. In the three years since it was enacted, the validity of the rule has been contested through the courts and the rule is not implemented in many states. At the time of our surveys, the Clean Water Rule was in effect in Hawai'i[2] and our determination was made based on that rule. Our survey assessed whether the surface water features in question could be defined as tributaries or wetlands, which would qualify the features as jurisdictional waters under the Clean Water Rule.

On October 22, 2019, the USACE and USEPA issued a final rule to repeal the 2015 Clean Water Rule and recodify pre-existing rules.[3] The recodification of pre-existing rules come into effect on December 23, 2019. The pre-existing definitions of jurisdictional waters under the authority of the Clean Water Act include: (1) territorial seas and tidal waters; (2) tributaries to territorial seas and tidal waters; (3) ditches constructed in a tributary, ditches that relocate a tributary, or ditches constructed in an adjacent wetland; (4) certain lakes and ponds; (5) impoundments of tributaries, tidal waters, jurisdictional ditches, and lakes and ponds; and (6) wetlands adjacent to tributaries, tidal waters, jurisdictional ditches, and lakes and ponds.

Survey Results

Western Drainageway with Seep

A jurisdictional drainageway serves a small basin that encompasses the western end of the Petition Area. This includes the area where the well and seep are located. Runoff flows in non-jurisdictional erosional gullies from upland areas into an incised channel in the lower basin area. The incised channel merges with the seep channel, which enters the City's drainage catchment basin at the end of the Ohaha Place. This storm drain system discharges into Kāwā Stream. Exhibit 1 shows the area of the seep and incised channel surveyed.

[1] U.S. Army Corps of Engineers and U.S. Environmental Protection Agency. 2015. Part II. Department of Defense, Department of the Army, Corps of Engineers, 33 CFR Part 328, Environmental Protection Agency, 40 CFR Parts 110, 112, 116, 117, 122, 230, 232, 300, 302, and 401, Clean Water Rule: Definition of "Waters of the United States. Federal Register, 80 (124; Monday, June 29, 2015)

[2] (South Carolina Coastal Conservation League et al. v. Pruitt et al. No. 2-18-cv-330-DCN)

[3] U.S. Army Corps of Engineers and U.S. Environmental Protection Agency. 2019. Department of Defense, Department of the Army, Corps of Engineers, 33 CFR Part 328, Environmental Protection Agency, 40 CFR Parts 110, 112, 116, 117, 122, 230, 232, 300, 302, and 401, Definition of "Waters of the United States"—Recodification of Pre-Existing Rules. *Federal Register*, 84 (204; Tuesday, October 22, 2019): 56626-56671.

Wetland Determination

A wetland data determination form was used to characterize the area just upslope of the incised channel near the seep. It is a location within the area selected as most likely to be a wetland based on topography. We filled in the wetland data sheet following methods described in the Corps of Engineers Wetland Delineation Manual[4] and Regional Supplement for Hawai'i and Pacific Islands[5]. Other sources used for the delineation effort included: the National Wetlands Inventory (NWI) Wetlands Mapper[6], USDA-NRCS web soil survey[7], and the State Flood Hazard Assessment Tool[8]. Hydrophytic vegetation, hydric soils, and wetland hydrology (the three criteria required to be considered a wetland) were absent in this area investigated for the presence of a wetland (SP 1 on Exhibit 1); therefore, it is not a wetland.

Seep, Seep Channel, and Incised Channel Descriptions

The shallow well feature is 11.5 feet deep with a water level consistently above the sloped ground level on the downstream side of the well. The seep emerges from the ground just downslope from the well. Flow from the seep has eroded a shallow and somewhat braided channel ("seep channel") extending downslope.

Although wetland plants are rooted in a few short segments of the seep channel, the channel is best classified as a tributary rather than a wetland because: 1) plants cover less than 5% of the area; and 2) the channel has been carved by flowing water and physical indicators of flow are apparent in the channel. The seep channel and a segment of the incised channel have physical indicators of flow (i.e., bed and banks and ordinary high water marks).

The seep channel is between 3 to 16 feet wide with water levels less than 4 inches in depth. Banks are low and generally less than 8 inches in height. Water appears to regularly occupy the bed of organic-rich silt. Bacterial sheens are present in the seep channel, indicating groundwater seepage occurs throughout the length of the channel. Boulders present in the area are sometimes on the streambed or stream banks with some appearing to have been placed to manipulate flow. Little shelving occurs within the channel, indicating flow volume is

[4] U.S. Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual. Tech. Rept. Y-87-1. Environmental Laboratory, Dept. of the Army, Waterways Experiment Station, Vicksberg.
[5] U.S. Army Corps of Engineers (USACE). 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawai'i and Pacific Islands Region Version 2.0,* ed. J. F. Berkowitz, J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-12-5. U.S. Army Engineer Research and Development Center. Vicksberg, MS. 130 pp.
[6] U.S. Fish and Wildlife Service (USFWS). no date. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Available online at URL: http://www.fws.gov/wetlands/Data/Mapper.html; last accessed on December 14, 2018. NOTE: relevant polygons date from 2005.
[7] U.S. Department of Agriculture–Natural Resources Conservation Service (USDA-NRCS). 2018a. Web Soil Survey, Soil Map—Island Of O'ahu Area, Hawai'i. Available online at URL: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx; last accessed December 14, 2018; relevant polygons date from October 2017.
[8] Hawai'i Department of Land and Natural Resources (HDLNR). 2018. Flood Hazard Assessment Tool. Available online at: http://gis.hawaiinfip.org/ FHAT/; last visited December 13, 2018.

limited and relatively constant. Soil is saturated within the channel but appears to have low moisture outside the channel. Flows from the seep channel enter the lower end of the incised channel.

The incised channel is between 3 to 10 feet wide and its nearly vertical banks are up to about 5 feet high. Physical indicators of flow, such as bed and banks and ordinary high water mark (OHWM), first appear in the incised channel approximately 118 feet upslope from its confluence with the seep channel. The incised channel did not contain water at the time of our survey. The stream bed consists of boulders and recently deposited silt with the channel configured in "steps" that form a series of small waterfalls and plunge pools when the stream is flowing. Exposed tree roots growing on the stream banks were observed. Terrestrial plants are rooted above the OHWM and roots are exposed on the eroding banks. Wracking is present at and above the OHWM. No aquatic flora and fauna were observed in the incised channel.

Upslope of the seep and incised channel, erosional gullies on the hillslope direct runoff into the incised channel. Flows in these small gullies likely occur only after large storm events, and are not of sufficient volume and duration to create physical indicators of flow, such as a stream bed and banks.

Eastern Drainageway (Lipalu Channel)

Lipalu Channel includes three unnamed branches as shown in Exhibit 1, and is a tributary to Kāwā Stream. This channel is a non-relatively permanent waterbody (non-RPW), with sufficient flow to create discontinuous indicators of an OHWM. Similar to OHWM indicators, the channel has bed and banks that are non-continuous throughout the length of the channel. The average width of each branch is about 3 feet and the branches are incised to mostly less than 3 feet, becoming broader and deeper near the Lipalu Street culvert entrance. Sediment sorting, destruction of terrestrial vegetation, and a break in bank slope were the most frequently observed indicators of OHWM.

Lipalu Channel enters the City and County of Honolulu storm drain system through a culvert beneath Lipalu Street. This portion of the storm drain system discharges into a channelized tributary of Kāwā Stream approximately 820 feet away at Namoku Street. The nearest NOAA rain gage, "Luluku" (located mauka of the survey area), recorded approximately 0.09 inches of rain during our survey. Lipalu Channel was mostly dry during our survey, but this brief rain shower resulted in flowing water through some segments. Isolated pools contained aquatic insects, but we did not observe any fishes or crustaceans in Lipalu Channel, whose presence would indicate perennial flow.

Preliminary Assessment of Federal Jurisdiction

Western Drainageway with Seep

Survey results indicate that the seep channel and a portion of the incised channel have physical indicators of flow within the Petition Area. Flow from these surface water features is directed to an underground culvert that is part of the City's storm water system servicing the Pikoiloa subdivision. Petition Area waters flow approximately 2,000 feet in the stormwater system before discharging into Kāwā Stream, which discharges into Kāne'ohe Bay.

The Clean Water Rule specifies that waters otherwise qualifying as tributaries do not lose status as tributaries if, for any length, there are one or more constructed or natural breaks; so long as a bed and banks and OHWM can be identified upstream from the break. Given that these indicators were identified in our survey, the seep channel and a section of the incised channel would likely be considered jurisdictional waters under both the Clean Water Rule and the re-codified pre-existing rules.

The likely jurisdictional extent of the seep channel is 223 feet in length from the culvert entrance, and 100 feet for the incised channel above its confluence with the seep channel. The section of the incised channel along with the seep that are likely jurisdictional would be preserved and not impacted or altered by the project's grading activities. A jurisdictional determination of this seep and incised channel would be made based upon USACE review during the project's design phase.

Eastern Drainageway (Lipalu Channel)

The portions of the Lipalu Channel shown on Exhibit 1 are likely jurisdictional by rule under both the Clean Water Rule and the re-codified pre-existing rules as it is a tributary to Kāwā Stream, which discharges into Kāne'ohe Bay. A Department of Army Permit from the USACE would be obtained for grading plans altering the Lipalu Channel located on the eastern end of the Petition Area. A more formal survey would be prepared for submission to the USACE for review and a jurisdictional determination as part of the project's design phase.

AECOS, Inc.
45-939 Kamehameha Highway, Suite 104♦Kaneohe HI 96744
Telephone: (808)234-7770♦ Fax: (808)234-7775 ♦Email: aecos@aecos.com

SUSAN BURR

Professional Experience

Vice president, Environmental scientist
AECOS, Inc. **Kāneohe, Hawai'i, USA** **2001 - present**
Manager of over 300 marine and freshwater biological survey and assessment projects and jurisdictional determination, wetland delineation, restoration, and mitigation efforts. Projects also include water quality studies and botanical and avian surveys. Prepare permit applications and ensure client compliance with federal, state, and local policies and regulations. Conduct projects throughout the Pacific in perennial, intermittent, and ephemeral streams; coastal wetlands; nearshore environments; and various construction sites.

Planner
Hawai'i State Environmental Planning Office **2000 - 2001**
Worked with industry, community groups, NGOs, and local governments to revise state policy and regulations to protect water quality. Implemented a biotic-index method to assess ecosystem health. Developed policy to implement the federal total maximum daily load program in State waters.

Marine Biologist and Planner at CNMI Division of Environmental Quality
Saipan, Commonwealth of the Northern Mariana Islands **1994-2000**
Established and implemented a long-term coral reef monitoring program. Developed a non-point source (NPS) pollution program and developed local policy to reduce NPS pollution.

Education

Oregon State University, College of Oceanic and Atmospheric Sciences
Master of Science (M.S.) Marine Resources Management
Pomona College, Claremont, California
Bachelor of Arts (B.A.) Biology

Professional Experience

Working towards Professional Wetland Scientist certification
Certified open water and rescue SCUBA, NITROX diving, oxygen administration for divers
Wilderness first aid, CPR, AED certifications
Certified hazardous waste site worker

AECOS, Inc.
45-939 Kamehameha Highway, Suite 104♦Kaneohe HI 96744
Telephone: (808)234-7770♦ Fax: (808)234-7775 ♦Email: aecos@aecos.com

SUSAN BURR

Representative Projects

Ordinary High Water Mark (OHWM) delineation of two gulches, South Kohala District, Hawai'i (2019). Assessed extent of federal jurisdiction authorized by the Clean Water Act over two streams on the leeward slope of Mauna Kea. Delineated 6 km of jurisdictional limits within the gulches.

Jurisdictional waters delineation of Ka'elepulu Stream and Keopa flood control basin, Kailua, O'ahu (2019). Assessed extent of federal jurisdiction authorized by the Clean Water Act over a stream and wetland in a flood control basin for an emergency repair project. Working with the U.S. Army Corps of Engineers to receive a Jurisdictional Determination.

Ordinary High Water Mark (OHWM) delineation of a gulch, South Kohala District, Hawai'i (2019). Assessed extent of federal jurisdiction authorized by the Clean Water Act over features on a valley bottom within Kāne'ohe watershed. Features included a tributary, man-made swales and ditches, and erosional features.

Clean Water Act, federal jurisdiction issues for the proposed Adventist Health Castle Hawai'i Loa campus hospital facility, Ko'olaupoko District, O'ahu (2018). Assessed extent of federal jurisdiction authorized by the Clean Water Act over a stream on the leeward slope of Mauna Kea. Delineated 2.2 km of jurisdictional limits within the gulch.

Environmental surveys in 'Ō'io Gulch for a bridge widening project, Kahuku, O'ahu (2018). Conducted a botanical survey, aquatic biota survey, avian survey (including waterbird and stationary visual counts), terrestrial mammal survey, water quality survey, and evaluated jurisdictional considerations with respect to the Clean Water Act. Delineated 0.2 km of jurisdictional limits within the gulch.

Wetland delineation of a wetland adjacent to Ka'elepulu Pond, Kailua, O'ahu (2018). Assessed extent of federal jurisdiction authorized by the Clean Water Act over a wetland on a 2-acre parcel adjacent to Ka'elepulu Pond.

Environmental surveys of Makakupa'ia Stream and vicinity for the Makakupa'ia Stream Bridge replacement project near Kawela, Moloka'i (2016). Served as biologist to conduct a botanical survey, aquatic biota survey in the *muliwai*, avian surveys (including waterbird and stationary visual counts), terrestrial mammal surveys, and to evaluate jurisdictional considerations with respect to the Clean Water Act.

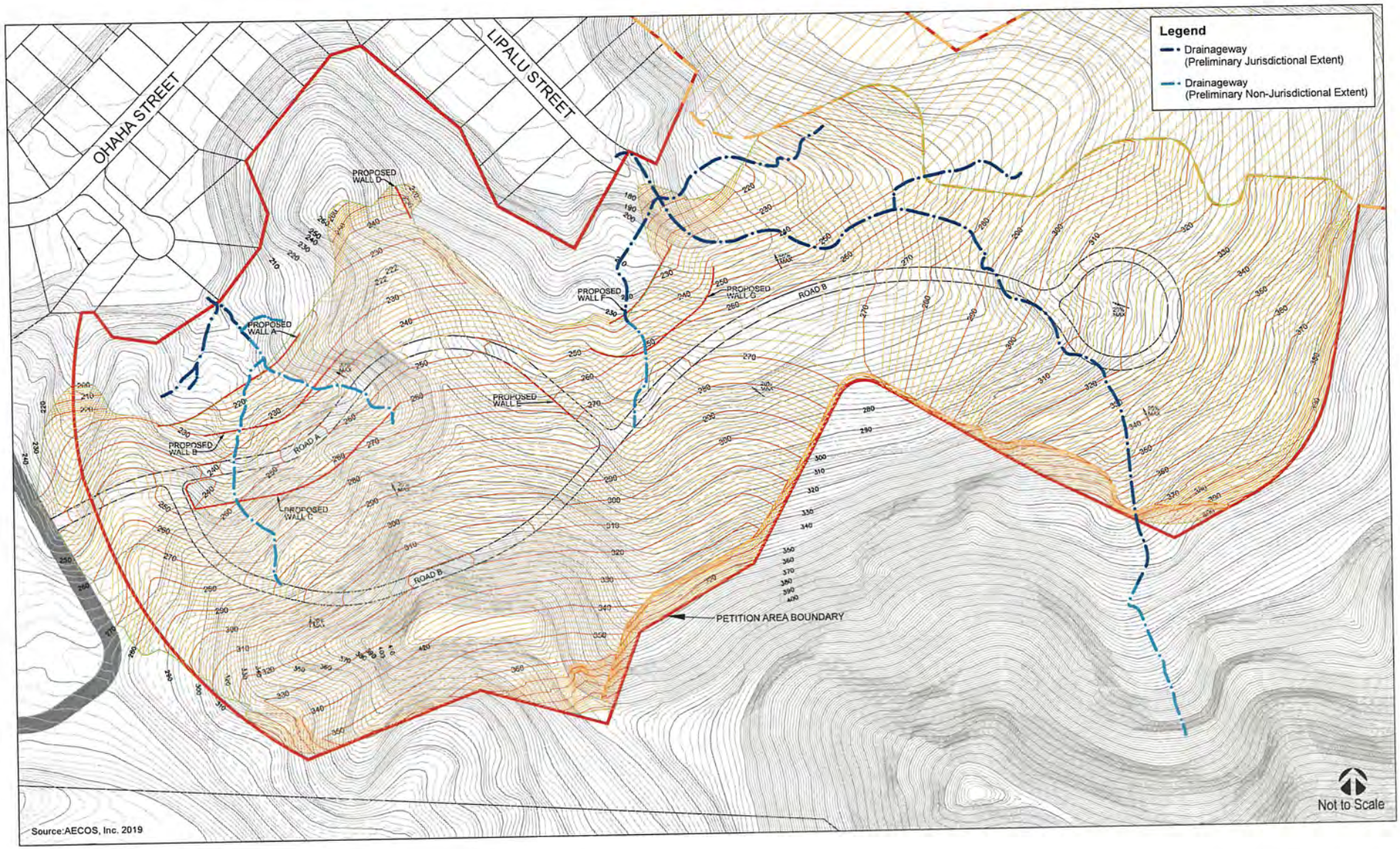


Figure 3.11a Petition Area Drainageways
Source: *Hawaiian Memorial Park Final EIS*, April 2019, page 3-77
AECOS, Inc.

Exhibit SB-A

Testimony of
REGINALD DAVID
RANA BIOLOGICAL CONSULTING
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 1,

My name is Reginald David and I am President of Rana Biological Consulting, a biological consulting firm specializing in avian and mammalian species with an emphasis on endangered species. I have worked as a terrestrial vertebrate biologist in Hawai'i and the Tropical Pacific for over 30 years and have conducted over 1,200 faunal surveys for clients that include the U.S. Fish and Wildlife Service (USFWS), the State of Hawai'i, most branches of the military, and private owners.

I am also experienced in the radar tracking of seabirds and bats as well as ultrasonic and thermal imaging censusing of bats. I have authored/co-authored over 25 peer-reviewed papers, one book and over 600 technical reports on birds and mammals. I have an excellent working knowledge of USFWS, State of Hawai'i, and the Federal Department of Transportation environmental laws and regulations. I am experienced in preparing Biological Assessments (BAs) required under Section "7" of the Endangered Species Act (ESA) and in negotiating mitigation under Section "7" of the ESA with the USFWS as well as under section "10" of the ESA and Hawaii State Statute 195D. A copy of my resume is attached.

Scope of Study

Rana Biological Consulting was retained by HHF Planners to analyze the Proposed Project's impact to avian and mammalian species inhabiting the Petition Area. The avian survey I conducted followed standard Hawaii point count protocols which involved audio and visual observation at eight count stations sited roughly equidistant from each other within the Petition Area. The mammalian survey involved visual and auditory detection, coupled with visual observation of scat, tracks, and other animal signs. I maintained a tally of all terrestrial vertebrate mammalian species identified within the Petition Area during the period spent on site.

The results of my avian and mammalian survey for the Hawaiian Memorial Park (HMP) Cemetery Expansion Project is included as Appendix F in the Final Environmental Impact Statement. No avian or mammalian species currently proposed for listing or listed as threatened or endangered under either Federal of State endangered species statues were identified within the Petition Area. There is no federally delineated Critical Habitat for any species within, or close to the Petition Area.

I will summarize my survey findings and the resulting analysis on the project's potential impacts to Petition Area avian and mammalian species.

Avian Survey Results

A total of 227 individual birds of 19 species, representing 15 separate families, were recorded. All avian species detected are alien to the Hawaiian Islands. Avian survey findings are consistent with habitats that are currently present within the Petition Area, which is dominated by alien plant species. This avian survey is also consistent with a prior faunal survey conducted on the property in September 2006.[1]

The Pacific Golden-Plover (*Pluvialis fulva*) was detected as an incidental observation in the existing HMP cemetery area while transiting to the Petition Area. The Pacific Golden-Plover is a native, indigenous migratory species. This species is present in Hawai'i and the Tropical Pacific during fall and winter months and is widely distributed in the Hawaiian Islands.

Short-eared Owl – Pueʻo

No owl species were recorded during this survey. There are two resident owl species on Oʻahu, which are the introduced Barn Owl (*Tyto alba*) and the indigenous endemic sub-species of the Short-eared Owl (*Asio flammeus sandwichesis*), or Pueʻo as it is locally known. While both species are found on all the main Hawaiian islands, Pueʻo have become increasingly scarce on Oʻahu. The island's Pueʻo population is listed as an endangered species by the State of Hawai'i, but is not listed under federal statute.

Pueʻo forage in grasslands, agricultural fields and pastures, as well as upland forested areas. This owl species occupies a variety of habitat including wet and dry forests and most commonly inhabit open areas such as grassland, shrubland, and montane parkland. This species is not habitat restricted on Oʻahu, though there is likely less suitable nesting habitat than there once was. The majority of Oʻahu's Pueʻo population is found on the leeward side of the island and on the North Shore. They are a ground nesting diurnal species, and prefer to nest in tall grass (e.g. pastures and grasslands).

The numbers and density of mammalian predators on Oʻahu makes it difficult for this species to successfully nest, except within protected areas with a strong mammalian predator control program in place. There is no suitable habitat for this species to forage or nest within the Petition Area. The Petition Area's alien forest canopy does not have grassland for nesting and the Pueʻo would be vulnerable to mammalian predators present. Pueʻo prefer small mammals (e.g. rats) for their diet, and the existing thick canopy forest of the Petition Area and larger property prevents foraging within this area.

[1] Bruner, P. (2006). Avifaunal and Feral Mammal Field Survey for the Hawaiian Memorial Park Expansion Area, Kāneʻohe, Oʻahu, Hawai'i. Prepared for Clark and Green Associates.

Seabird Species

Although seabirds were not detected during this survey, several seabird species potentially overfly the site on occasion. These species include the Wedge-tailed Shearwater or 'Ua'u Kani (*Ardenna pacifica*), the "threatened" Newell's Shearwater (*Puffinus newelli*). The state listed "endangered" White Tern (*Gygis alba*) endangered species by the State, but it is not listed under federal statute. This ephemeral species was not recorded during this survey, nor was it expected. The current resident population of White Tern on O'ahu is found on the leeward side of the island concentrated in the Waikīkī area.

Mammalian Survey Results

All mammalian species detected are alien and deleterious to native ecosystems and their dependent organisms. The findings of the mammalian survey are consistent with the current habitat present on the site and the current land use of the area surveyed.

Three terrestrial mammalian species were detected on site during the survey. These species include dogs (*Canis familiaris*) that were heard barking from outside the Petition Area, a small Indian mongoose (*Herpestes auropunctatus*) seen near the dead end of Lipalu Street and the Petition Area, and a small amount of pig (*Sus scrofa*) rooting detected in the lower section of the cemetery expansion area. Rooting is indicative that feral pigs may be present. Although rodents were not identified during this survey, it is likely that one or more of the four established alien Muridae species found on O'ahu use resources found within the Petition Area.

No endangered Hawaiian hoary bats were detected on site. It is possible that this species may use resources in the Petition Area.

Project Effects on Species

Implementation of the project should not significantly impact avian or mammalian species identified in the Petition Area as none of the species identified were listed or proposed for listing as endangered or threatened under federal or state endangered species statutes. Grading improvements for the cemetery expansion area would change the existing forested landscape to an open grassed landscape consisting mainly of grass and landscape plantings. This landscape would have minimal impact to the alien avian species detected and would not be an attractive habitat for alien mammalian species identified during my survey. In particular, the grass landscape established by the proposed project could provide additional loafing and wintering habitat for Pacific Golden-Plover.

Project Effects on Seabirds

Protected seabird species may occasionally overfly the Petition Area and could be downed after becoming disoriented by outdoor lights during nesting season. The two main areas outdoor lighting could pose a threat to these nocturnally flying seabirds are: 1) night-time construction activities; and 2) streetlights or other exterior lighting during the seabird fledging season (September 15 through December 15).

It is not expected that the project would not impact protected seabirds because: 1) no night-time construction is planned, and 2) no exterior lighting is planned as part of cemetery expansion site improvements. The cemetery would be closed at night. The proposed Cultural Preserve would remain similar to present conditions with select portions of the area re-vegetated with native plants. No outdoor lighting is planned and cultural activities would similarly occur during daylight hours.

Minimization Measures for Hawaiian Hoary Bats

Although Hawaiian hoary bats were not detected in the Petition Area, bats may be present. The main impact the project may have on these bats is from cemetery clearing large trees and shrubs and grubbing activities during the birthing and rearing season (June 1 through September 15).

Potential adverse effects from such disturbance can be avoided or minimized by not clearing woody vegetation taller than 4.6 meters (15-feet) during birthing and rearing season. The Final EIS included implementing this minimization measure to avoid impacting potential bats that may be present within the Petition Area. An Incidental Take Permit under Section 10 of the Endangered Species Act would not be required because this standard minimization practice, is an agency accepted practice, would minimize to the maximum extent practicable any potential impacts to roosting Hawaiian hoary bats.

Reginald E. David

Rana Biological Consulting
Terrestrial Vertebrate Biologist

Over the past 30 years I have worked as a terrestrial vertebrate biologist in Hawai'i and the Tropical Pacific. I specialize in avian species with an emphasis on endangered species.

Experience Summary

Between 1986 and the present I have conducted over 1200 faunal surveys for the USFWS, the State of Hawai'i, and numerous private concerns, on all of the main Hawaiian Islands as well as on Midway, Nihoa, Necker, and Kure Atolls. I have extensive field experience in New Zealand, Tahiti, Kiritimati, Guam, Saipan, Tinian, Gilbert Islands, Vanuatu, Republic of Palau, Eastern Siberia, Korea and the western United States. I am also experienced in the radar tracking of seabirds and bats as well as ultrasonic and thermal imaging censusing of bats. I have authored/co-authored over 25 peer- reviewed papers, one book and over 600 technical reports on birds and mammals. I am also the co-discoverer of a seabird new to science, which has recently been described at Bryan's Shearwater (*Puffinus bryani*).

I have a good working knowledge of USFWS, State of Hawai'i, and the Federal Department of Transportation environmental laws and regulations. I am experienced in preparing Biological Assessments (BA's) required under Section "7" of the Endangered Species Act (ESA) and in negotiating mitigation under Section "7" of the ESA with the USFWS as well as under section "10" of the ESA and Hawaii State Statute 195D. I also have experience in preparing Natural Resource Management Plans (NRMP's) and DoD, Integrated Natural Resource Management Plans (INRMP's) as well as State of Hawai'i Section 343 Environmental Assessments.

Related Activities:

- Hawaii Bird Records Committee: Vice-chair – 2017- present
- State of Hawaii Department of Land and Natural Resources, Natural Areas Reserve Commission (NARS) Commissioner: 1999 – 2004
- Moderator – HawaiiBirding internet chatline and website 1999-present
- US Fish & Wildlife Service, 'Alala Recovery Team Member: 1994 – 2016.
- National Audubon Society: Board of Directors member: 1993-1996 Hawaii Audubon Society: Board of Directors member: 1989 - 1996, 1998
- Hawai'i Audubon Society: Treasurer 1998
- Hawai'i Audubon Society: President 1990-1994

I have also served on the following committees:

- US Fish & Wildlife & DLNR, Newell's Shearwater Working Group
- US Fish & Wildlife & DLNR, Hawaiian hoary bat Technical Working Group
- The Mauna Kea Management Board – Environmental Committee
- US Fish & Wildlife & DLNR, Hawaii Endangered Waterfowl Recovery Team Advisory Committee
-

- Professional Experience A 53-page list of my publications, and technical reports is available upon request.

Testimony of
MAYA LEGRANDE
LEGRANDE BIOLOGICAL SURVEYS INC
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 1,

My name is Maya LeGrande and I am the President of LeGrande Biological Surveys Inc., a biological consulting firm specializing in botanical resources with special expertise in native Hawaiian plants, conservation biology, tropical and sub-tropical plants, and Hawai'i ecosystem restoration. Working for the private sector and state and federal government agencies, I have over 18 years of experience facilitating a wide range of projects and field locales in the Hawaiian Islands. A copy of my resume is attached.

Scope of Study

LeGrande Biological Surveys Inc. was retained by HHF Planners to conduct a botanical survey of the Petition Area and assess the Proposed Project's impacts on botanical resources. The objectives of my field study were to describe existing vegetation, identify threatened or endangered plant species that may be present, and propose mitigative measures that may be required to ensure any threatened or endangered plants identified were not adversely impacted by the Proposed Project.

Before initiating field work, existing botanical research pertinent to the Petition Area was reviewed. A walk through survey method was utilized, requiring that the survey area be inspected on foot. GPS was utilized to locate boundaries and track transects examined. I then prepared the botanical resource assessment report for the Hawaiian Memorial Park Cemetery Expansion Project that is included as Appendix E in the Final Environmental Impact Statement (Final EIS).

I will briefly summarize my survey findings and the resulting analysis on likely impacts to botanical resources within Petition Area.

Survey Results

None of the plant species observed in the Petition Area are threatened, endangered or a species of concern. The entire survey area can be characterized as a Lowland Alien Wet Forest dominated by introduced plant species. The area has been historically disturbed, being previously used for pineapple cultivation and dairy farming activities.

Alteration of native plant habitat has been in place for some time with few native plant elements remaining. A total of 109 plant species were observed within the survey area. Of this total, 91 (84%) are alien (introduced), seven (6%) are Polynesian introductions, eight (7%) are indigenous (native to the Hawaiian Islands and elsewhere), and three (3%) are endemic (native to the Hawaiian Islands). A total of 10% are native species.

Cemetery Expansion Area

The cemetery expansion area is primarily populated by alien tree, vine, shrub, and grass species. Within open areas, groundcover consists mainly of fern species including Pala'a (*Sphenomeris chinensis*) and introduced Laua'e (*Phymatosorus grossus*). The alien grass species, Basket Grass (*Oplismenus hirtellus*), was also identified. A few small patches of the native fern, Pala'a, were observed along drier areas of the ridge tops. The shallow well and seep downslope from the northwestern portion of the cemetery expansion area is dominated by Laua'e (*Phymatosorus grossus*) and some vestiges of Kalo (*Colocasia esculenta)* plants scattered along spring banks or in pools.

Seven Polynesian introduced plant species were observed within the survey area. They include Ti (*Cordyline fruticose*), Kalo, Niu (*Cocos nucifera*), Kukui (*Aleurites moluccana*), Mai'a (*Musa sp,*), Noni (*Morinda citrifolia*), and Hau (*Hibiscus tiliaceus*). Kukui and Hau were found scattered throughout the survey area, especially in small gulches and ravines. Ti plants were observed within scrub vegetation, as well as along several ridges in the cemetery expansion area. A few coconut trees were observed near the bottom of the gulch at the end of Lipalu Street.

Eight indigenous species were observed infrequently in the area; 'Uhaloa (*Waltheria indica*), Hala (*Pandanus tectorius*), Pala'a, Moa (*Psilotum nudum*), Palapalai (*Microlepia strigosa*), 'Ekaha (*Asplenium nidus*), Popolo (*Solanum americanum*), and Ka'e'e or Sea Bean (*Mucuna gigantea*). Ka'e'e populations observed are robust, but being smothered by other vine species such as Maile Pilau and passion fruit. Several of the seed pods were observed to have insect damage.

Endemic species identified within the cemetery expansion area include 'Akia (*Wikstroemia oahuensis var. oahuensis*) and 'Ohi'a Lehua (*Metrosideros polymorpha*) trees that were observed infrequently near the Ocean View Garden boundary and upper elevations on the ridgeline in the southwestern section of the Petition Area. Exhibit ML-A shows the location of these 'Ohi'a Lehua along with other notable plants.

Cultural Preserve

A prior 2006 botanical survey indicated that the main section of the Kawa'ewa'e heiau was cleared of most plant species. During the current survey, I found the area to be overgrown, and the heiau itself mostly obscured with vegetation. Some plants growing within the heiau structure include Ti, Papaya (*Carica papaya*), and Spanish Needle (*Bidens pilosa*). Two juvenile Koa (*Acacia koa*) trees were observed at the southern end of the heiau. These trees appear to

have been planted. The remainder of the Preserve area to the east is dominated by thickets of Christmas Berry, Java Plum, and Guava with a thick understory of introduced Laua'e fern and Basket Grass.

Laua'e Fern

Laua'e (*Phymatosorus grossus*) was identified in expansive and widely spread areas within the cemetery expansion area as well as within the proposed Cultural Preserve. Exhibit 1 identifies the general areas where this plant species is located. Many believe *P. grossus* is the Laua'e fern discussed in native Hawaiian stories and legends. However, evidence about this species suggests *P. grossus* was introduced to the islands in the early 20th century.

The name "Laua'e" was originally associated with *Microsorum spectrum*, which is an endemic species. *P. grossus* is similar in both frond size and scent to *M. spectrum*. The fern species known in Hawaiian lore as "Laua'e" is likely *M. spectrum* rather than *P. grossus*. However, the name "Laua'e" is now associated with *P. grossus*. *M. Spectrum* specimen were not observed in the Petition Area. Both the introduced and endemic Laua'e varieties possess native Hawaiian cultural significance and are used in cultural practices.

Project Effects on Botanical Resources

The proposed project would significantly alter existing botanical characteristics of the cemetery expansion area as the area would undergo extensive grading. The majority of existing plant species (90%) displaced from grading activities are alien (84%) or of Polynesian introduction (6%). However, proposed improvements would not impact Federal or State-listed threatened or endangered plant species or species of concern because none were observed within the Petition Area.

After grading activities, the current Lowland Alien Wet Forest dominated by introduced plant species would change to an open landscaped character consisting mainly of grass and landscape plantings typical of cemetery areas. Fringe areas surrounding landscaped burial areas would likely become dominated by other existing surrounding vegetation and trees that are mainly introduced species. This would establish conditions similar to the buffer area surrounding Ocean View Garden. This would include areas left undeveloped, such as the seep area, serving as vegetative buffers between residences or upslope areas. The vegetative character of the Cultural Preserve would remain similar to existing conditions because no major site disturbing improvements are proposed in the area.

The introduced fern species commonly known as Laua'e (*P. grossus*) would be impacted by grading activities within the cemetery expansion area, but not within the proposed Cultural Preserve. Native plant populations including the Ohi'a Lehua and Ka'e'e populations would also be displaced due to grading activities.

Proposed Mitigative Measures

The proposed Cultural Preserve is an appropriate location where native and Polynesian introduced plants displaced by cemetery expansion activities could be replanted, particularly in the area surrounding Kawa'ewa'e Heiau. Native plants would also be used in cemetery expansion area landscaping, which would aid perpetuation of these extant taxa in the immediate area. The presence of plants, such as 'Ohi'a Lehua, 'Akia, and Laua'e, within the Cultural Preserve or cemetery area would support its use for cultural practices. Seeds and cuttings from these plants found on site could be collected and grown for these efforts. Laua'e could also be used to landscape the cemetery expansion area.

Measures proposed in the Final EIS to mitigate the project's impact are:

1. Seeds or cuttings from extant indigenous and endemic plants would be collected and grown to use in replanting efforts in and around the cemetery expansion area or within the Cultural Preserve.
2. The preservation plan to be developed for the Cultural Preserve would include landscaping guidance related to the preservation of the Petition Area's indigenous and endemic plant species. Landscaping guidance would use information resulting from the botanical survey to establish proper collection and replanting procedures.

Maya LeGrande
Years Experience: 18

Education

University of Hawai'i at Mānoa
Master of Science in Botanical Science

University of Hawai'i at Mānoa
Bachelor of Science in Botanical Science

Areas of Special Competence

Native Hawaiian Plants

Conservation Biology

Tropical and Sub-Tropical Plants

Hawai'i Ecosystem Restoration

RECENT EXPERIENCE IN RELEVANT AREA

Maya LeGrande was born and raised on the island of O'ahu. She graduated with a high school diploma from Punahou School in 1991 and received both her undergraduate and graduate degrees in Botany from the University of Hawai'i in 1998 and 2006, respectively. Her interests in native plant systematics and field surveys led her to work with Winona Char (Char and Associates) for five years during her time in college. Maya started her own consulting company, LeGrande Biological Surveys Inc. (LBS Inc.) in 2005.

Working for both the private sector and state and federal government agencies has given Maya experience facilitating a wide range of projects and field locales in the Hawaiian Islands. During her college tenure she worked with the Kaho'olawe Island Reserve Commission carrying out field surveys for native plants on Kaho'olawe as well as its off shore islets. Several rare plant projects were conducted including preservation actions of the extremely rare species Ka Palupalu o Kanaloa (*Kanaloa kahoolawensis*) and *'ohai* (*Sesbania tomentosa*), including *in-situ* conservation efforts, seed collections, and pest control. Maya was a member of the Offshore Islet Restoration Committee, formed in 2002 to facilitate the conservation and restoration of many of Hawai'i's offshore islets. Maya carried out field surveys of the islets as well as formulating and writing the 5-Year Action Plan for the organization, outlining goals, objectives, specific tasks, and timelines for the group.

Along with biological assessments performed in natural areas of the Hawaiian Islands, Maya also has experience working in urban areas and sensitive habitats that are in close proximity to developments. LBS Inc. works with the O'ahu Invasive Species Committee (OISC) to implement reliable and effective weed control for invasive species and recommending mitigation for specific projects.

SELECTED PROJECT EXPERIENCE

Kawainui-Hāmākua Marsh Complex Master Plan
Kailua, O'ahu, Hawai'i

Botanical survey and report preparation.

Blue Trail Clearance
Mākua, O'ahu, Hawai'i

Biological monitoring for rare plant and animal elements during transect inventory for UXO/MEC clearance.

Mānele Bay Expansion Project, Lāna'i
Mānele Bay, Lāna'i, Hawai'i

Botanical survey and report preparation.

Laniākea Bypass Project
North Shore, O'ahu, Hawai'i

Flora and fauna survey and report preparation.

Dillingham Ranch Subdivision
North Shore, O'ahu, Hawai'i

Botanical survey and report preparation.

Honua'ula Mitigation Project
Wailea, Maui, Hawai'i

Botanical consulting and survey for proposed development.

Nani Kahuku 'Aina
Ka'ū, Hawai'i Island, Hawai'i

Flora and fauna survey and report preparation.

Kanahena Point RI/FS
Wailea-Makena, Maui, Hawai'i

Biological monitoring for rare plant and animal elements during transect inventory for UXO/MEC clearance.

Waikāne MEC Clearance
Former Waikāne Valley Training Area, O'ahu, Hawai'i

Botanical monitoring for rare plant elements during brush cutting for UXO/MEC clearance.

Wailea 670 Development Project
Wailea, Maui, Hawai'i

Mapping native plant species within project area and determine priority species for preservation and mitigation on the site.

Hokuli'a
Hawai'i Island, Hawai'i

Botanical survey and report preparation for rezoning application by client.

Kahuku Village Subdivision Project
North Shore, O'ahu, Hawai'i

Flora and fauna survey and report preparation.

'Ohikilolo Makai Parcels
Mākua, O'ahu, Hawai'i

Botanical survey and report preparation for proposed land division.

Marconi Road Improvements
North Shore, O'ahu, Hawai'i

Flora and fauna survey and report preparation for road widening and improvements.

Makakilo Drive Extension
Makakilo, O'ahu, Hawai'i

Botanical survey and report preparation for proposed Makakilo Drive extension

Marconi Point Farm Lots, O'ahu
North Shore, O'ahu, Hawai'i

Botanical survey and report preparation.

East Kapolei Development
Kapolei, O'ahu, Hawai'i

Botanical survey and report preparation for D. Horton Schuler.

Po'ipulani Project, Koloa, Kaua'i
Kōloa, Kaua'i

Botanical survey and report preparation for Eric A. Knudsen Trust.

Maku'u Residential Subdivision
Puna, Hawai'i Island, Hawai'i

Botanical survey and report preparation for DHHL housing development.

Aviator Recovery Project
Ko'olau Mountains, O'ahu, Hawai'i

Botanical survey and report preparation for NAVFAC recovery project.

Coconut Beach Resort Development
Waipouli, Kaua'i, Hawai'i

Botanical survey and report preparation for AA Capital Partners LLC.

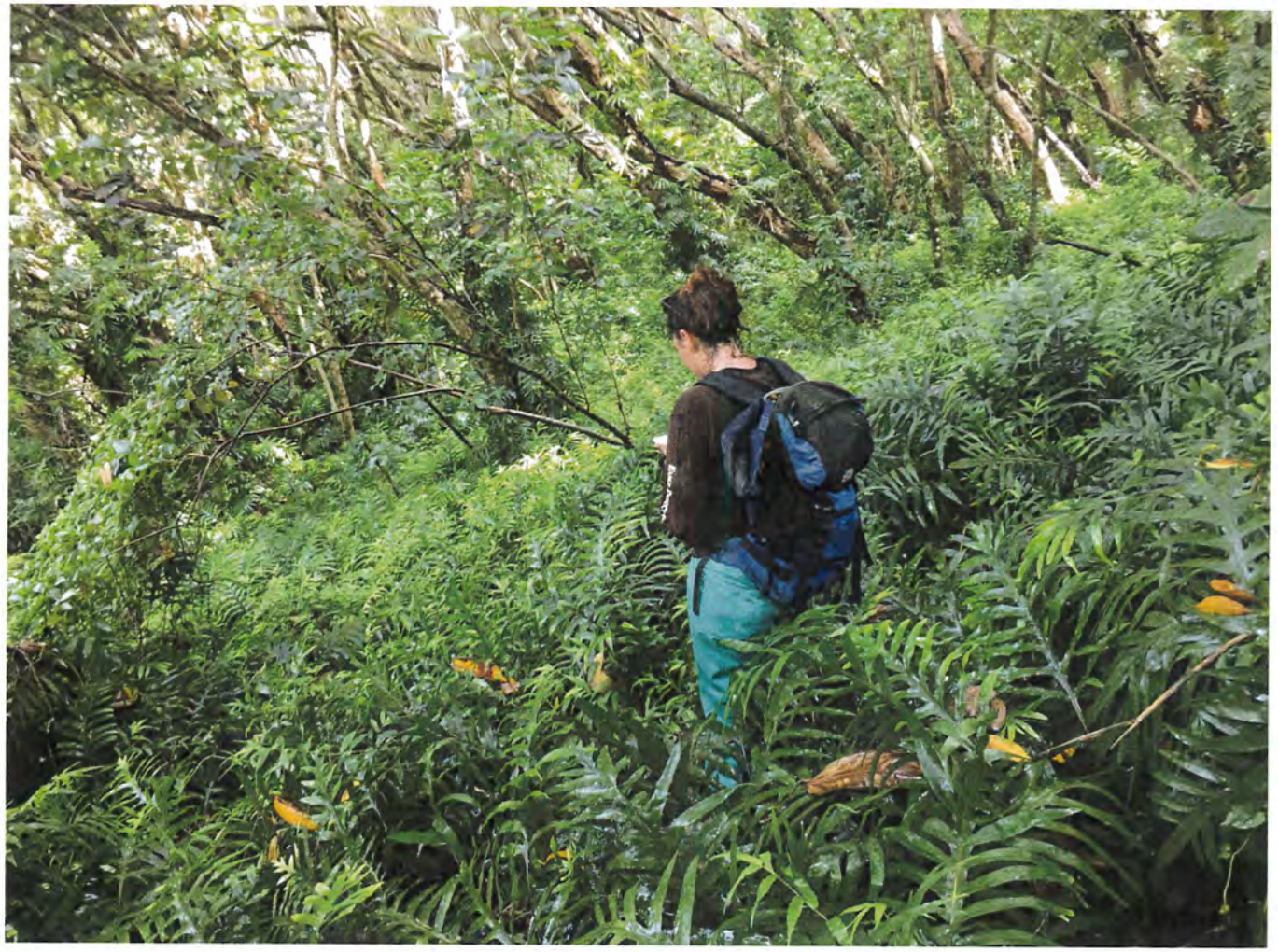


Figure 5: Thick groundcover of laua'e fern in the proposed cultural preserve, page 12
Source: *Hawaiian Memorial Park Final EIS*, April 2019
Appendix E: *Botanical Resources Assessment*, January 2018
LeGrande Biological Surveys, Inc.

Exhibit ML-A

FINAL

Testimony of
TODD BEILER, PE.
CENSEO AV+ACOUSTICS
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 1

My name is Todd Beiler and I am the President of CENSEO AV+Acoustics, a consulting firm specializing in acoustical engineering. My firm has specific expertise and experience in conducting and completing environmental noise assessments and related studies. As a licensed professional engineer with more than 20 years of experience, my expertise includes many areas including sound isolation, mechanical noise and vibration control, industrial noise, environmental noise assessments, audio/visual system design, and theatre design services. As an expert witness, I have offered professional testimony in court proceedings and in other legal pursuits, including prior Land Use Commission hearings. A copy of my resume is attached.

Scope of Study

CENSEO AV+Acoustics was retained by HHF Planners to identify potential noise impacts to the area surrounding the Petition Area due to project construction, increase in vehicular traffic on the nearby roads, and long-term operation of the future cemetery expansion area. Our firm prepared the environmental noise assessment and prediction report for the Hawaiian Memorial Park Cemetery Expansion Project. The report is included as Appendix L in the Final Environmental Impact Statement (Final EIS) and we coordinated with HHF Planners to address construction noise effects in more detail.

Ambient noise level measurements, which included both long-term and short-term noise measurements, were conducted to document the existing ambient noise environment in the Petition Area vicinity. Noise levels during the project construction period were predicted using information on potential construction machinery that may be used. Noise due to the long-term operation of the expanded cemetery area was also assessed for potential long-term impacts.

Existing Conditions

Ambient noise level measurements were taken in November 2017 to assess the existing acoustic environment near the Petition Area. Noise measurements were taken at one long-term noise measurement location and four short-term noise measurement locations. Three of the short-term noise measurement locations were at locations near existing residences, as shown in Exhibit TB-A.

Long-Term Measurement Results

One long-term measurement was conducted on the northern boundary of the Ocean View Garden section of Hawaiian Memorial Park (HMP). The measured 1-hour equivalent sound level (L_{eq}) and the 90% exceedance level (L_{90}) were recorded. The L_{90} noise level is widely accepted as the standard for determining the background noise level.

Dominant sound sources included park maintenance activities and vehicles. The range of background noise levels was consistent across the measurement period. The highest measured sound levels during the measurement period were due to trucks or construction vehicles on the cemetery grounds. Dogs, roosters, air traffic (MCBH Kāne'ohe Bay), and vehicular road traffic from Kamehameha Highway also contributed to ambient noise levels. Overall, the average day sound level was 54 dBA and the average night sound level was 47 dBA. A table of the long-term measurement results is shown in Exhibit TB-A.

Short-Term Measurement Results

Short-term measurements were performed at four sites along the residential area surrounding HMP and the Petition Area. Traffic noise was the dominant noise source at the measurement site located near the northern entrance of HMP along Kamehameha Highway (70 dBA average sound level). Noise from HMP maintenance vehicles, although intermittent, resulted in an average sound level of 48 dBA at the measurement site in the northwest corner of Ocean View Garden. A table of the short-term measurement results is shown in Exhibit TB-A.

Ambient noises within HMP typically originated from traffic along Kamehameha Highway or from animals (e.g. roosters). Ambient noise levels measured along the adjacent neighborhood (sites at the end of Ohaha Place and Lipalu Place) are determined primarily by dogs or roosters in the surrounding area. Proximity to nearby roads and associated vehicular traffic had less of an influence on sound levels because neighborhood vehicular traffic was minimal.

Assessment of Project Impacts

The main noise effects from the project would be from short-term construction activities as compared to the long-term operation of the cemetery expansion.

Long-Term Impacts from Operations

The primary long-term noise sources during normal daytime operations in the cemetery expansion area would be maintenance vehicles and equipment. This includes lawn mowers and grass trimmers. Maintenance equipment, while likely audible if used near residences, are mobile and temporary noise sources. This equipment is not regulated for noise at the federal, state, or local levels. Maintenance equipment would only be used during daytime hours, which is consistent with current cemetery operations.

Backhoes are used during normal operations to create burial spaces. These activities occur sparingly and only during daytime hours. Typical backhoe operations at 25 feet or further from the property line are expected to be less than the 90 dBA construction noise limit identified under the FTA's criteria for residential land use areas. The State Department of Health (DOH) does not specifically quantify allowable construction noise levels. Instead, the State DOH specifies the times at which noisy construction activities may occur.

Cultural practices and restoration activities occurring within the Cultural Preserve are not expected to generate significant noise, and noises generated would likely not occur on a daily basis.

Traffic noise within the cemetery as a whole is expected to increase by only one decibel due to the expansion project. Though noise from internal cemetery traffic may be audible at nearby homes, noise events should be intermittent. HMP closes its gates to traffic at night, so nighttime traffic noise from within the cemetery would not occur.

Short-Term Construction Noise Impacts

A worst-case construction noise level prediction was developed using noise level data for various types of construction equipment published in the Federal Transit Authority's (FTA) Noise and Vibration Manual.[1] The common noise level data for the typical construction equipment is reported for a listener location of 50 feet from the equipment. Predictions assume the earthwork phase of project construction would be the main noise concern. The equipment incorporated into construction noise level predictions were the loudest types of equipment expected to be used for this project. This equipment includes tractors, trucks, scrapers, graders, and mounted impact hammers (hoe rams). The FTA's construction noise limit guidelines were used in this analysis as the State DOH does not specifically quantify allowable construction sound levels.

Predicted noise levels at nearby sensitive receivers from the various construction phases are shown in the table below. The lowest worst-case predicted noise level during the project's earthwork phase was 74 dBA for noise sensitive receivers located 470 feet from the project earthwork boundary. The highest worst-case predicted noise level was 91 dBA for noise sensitive receivers located 85 feet from the earthwork boundary. Both of these noise sensitive receiver locations are residential uses located generally downslope from the Petition Area's northern boundary.

[1] Federal Transit Administration, Chapter 12, Noise and Vibration During Construction, Transit Noise and Impact Assessment, May 2006

Sensitive Receiver	Distance to Earthwork Boundary	Earthwork Phase Noise Level	Post-Earthwork Phase Noise Level
Kumakua Place Residences	400 ft	75 dBA	67 dBA
45-440 to 45-450 Ohaha Street	220 ft	81 dBA	67 dBA
Ohaha Place Residences	180 ft	83 dBA	70 dBA
45-420 Ohaha Street	260 ft	79 dBA	64 dBA
45-450 to 45-470 Lipalu Street	85 ft	91 dBA	70 dBA
Lipalu Place Residences	370 ft	76 dBA	62 dBA
45-150 to 45-170 Namoku Street	470 ft	74 dBA	60 dBA

(This table is also shown in Exhibit TB-A)

With the exception of receptors located 85 feet from the project earthwork boundary, construction noise levels are not expected to exceed the FTA's noise impact threshold of 90 dBA for residential land uses. Actual noise levels experienced would vary greatly and are primarily based on a function of the distance of the receiver from the noise source, sound attenuation between the noise source and the receptor, and the quantity of noise sources (construction equipment) used. The duration of the construction activities does not have an impact on the noise level.

Without consideration for atmospheric conditions, topography, and other factors, a common simplified method of predicting approximate sound level reductions due to increasing distance is to estimate that the sound level is reduced by 6 dB when the distance (between source and receiver) is doubled. Subjectively, a 6 dB reduction is considered to be a "significant difference" and a 10 dB reduction is considered to be about "half as loud" to most listeners.

It is important to note that the predictions of construction noise in the table above represent the predicted noise levels for construction activities that may occur at the closest possible locations to the residences (the distances are included in the table). Therefore, construction activities that occur at distances that are further away from the residences, which includes most of the project site, will likely result in noise levels that are less than the values predicted in the table.

Given the results of this analysis, construction activities would inevitably result in short-term, minor to moderate noise impacts. The extent of impacts would vary depending on the stage of construction, wind direction, equipment used, distance to the receptor, and activity duration. Therefore, the ability to control construction noise levels relates primarily to the duration and time of construction activities. Mitigative measures were recommended to address noise levels that were also included in the Final EIS. I will elaborate on these measures later in my testimony.

Construction noise levels should not be high enough to cause hearing loss for nearby residents. The Federal Occupational Safety and Health Administration (OSHA) sets the Permissible Exposure Limit at 90 dBA of noise exposure over an 8-hour time period, while an exposure of 85 dBA (for an 8-hour period) is commonly used as threshold to begin monitoring noise levels. Hearing risk exposure of 85 dBA, or less, for eight hours per day, followed by 10 hours of recovery time generally results in negligible risk to hearing. In comparison, average noise from a gas-powered lawnmower is about 90 dBA, measured at 4 feet from the lawnmower. Additionally, construction equipment usage would likely not occur continuously over a full eight-hour period. A table of additional common sound levels can be found in Exhibit TB-A

Construction vibration can be an annoyance. However, extreme cases such as close-proximity pile driving can cause structural damage. It is best practice for pile drivers and hydraulic breakers to not be used within 50 feet of normal residential buildings. Care should be taken when using pile drivers and hydraulic breakers within 100 feet of structures. Therefore, the 150-foot buffer away from residences would thus minimize such construction vibration issues. It is also important to note that most people are less sensitive to vibration during the day compared to the night hours (typical sleeping hours). The construction activities would occur during the day and not at night.

Mitigative Measures for Construction Noise

In situations where construction noise exceeds, or is expected to exceed, the State's "maximum permissible" property line noise levels, a construction noise permit must be obtained from the State DOH to allow operation of vehicles, equipment, and other items used during construction that exceed permissible noise levels. This state-issued permit is typical for construction activities. The DOH noise permit does not limit the noise level generated at the construction site. Rather, the permit limits the times noisy construction can occur. Specific permit restrictions for construction activities are:

1. No permit shall allow construction activities emitting noise in excess of the maximum permissible sound levels before 7:00 AM and after 6:00 PM of the same day, Monday through Friday.
2. No permit shall allow construction activities emitting noise in excess of the maximum permissible sound levels before 9:00 AM and after 6:00 PM on Saturday.
3. No permit shall allow construction activities emitting noise in excess of the maximum permissible sound levels on Sundays and holidays.

Measures proposed in the Final EIS to mitigate noise impacts during the project construction phase consist of the following:

1. A construction noise permit should be obtained from the State DOH for construction equipment operation.
2. The contractor should use reasonable and standard practices to mitigate noise, such as using mufflers on diesel and gasoline engines and using properly tuned and balanced machines. Unavoidable noise impacts may be reduced by using equipment

intermittently or by blocking the line-of-sight from noise sources to noise-sensitive receptors with barriers or other designed noise mitigation measures. Conducting noise and/or vibration monitoring during construction can also help quantify any potential exposures to noise and vibration.

3. Possible source control methods including substitution of quieter construction methods or equipment when possible should be considered during the design phase as part of contractor requirements. These methods can be applied to most construction equipment.
4. Possible source control methods listed in the table below would be considered during the design phase as part of contractor requirements, and such methods can be applied to most construction equipment.

Noise Control Methods	
Scheduling	Limit activities that generate the most noise to least sensitive time periods (e.g. daytime hours).
Substitution	Use quieter methods/equipment when possible (e.g. low noise generators, smaller excavators, etc.).
Exhaust Mufflers	Install quality mufflers on equipment.
Reduced Power Options	Use smallest size and/or lowest power as required.
Quieter Backup Alarms	Install manual adjustable or ambient sensitive alarms. Do not use backup alarms during night work.
Motors	Insulate or enclose motors
Equipment Selection	Electric equipment is often quieter than pneumatic equipment
Equipment Retrofit	Rubber chucks in jackhammers
Equipment Maintenance	Sharpen and balance tools, repair silencing equipment, replace worn parts and open airways
Staging Area	Maximize the distance between the construction staging areas and nearby receptors to the greatest extent possible
Temporary Barrier	Install temporary plywood barriers between construction activities and residences. To be effective, the barrier must block the line-of-sight

In addition, if vibration from a hydraulic breaker is disturbing to nearby residents and generating neighborhood complaints, we recommend that the vibration inducing activities be scheduled for the middle of the day when many residents are least likely to be home.

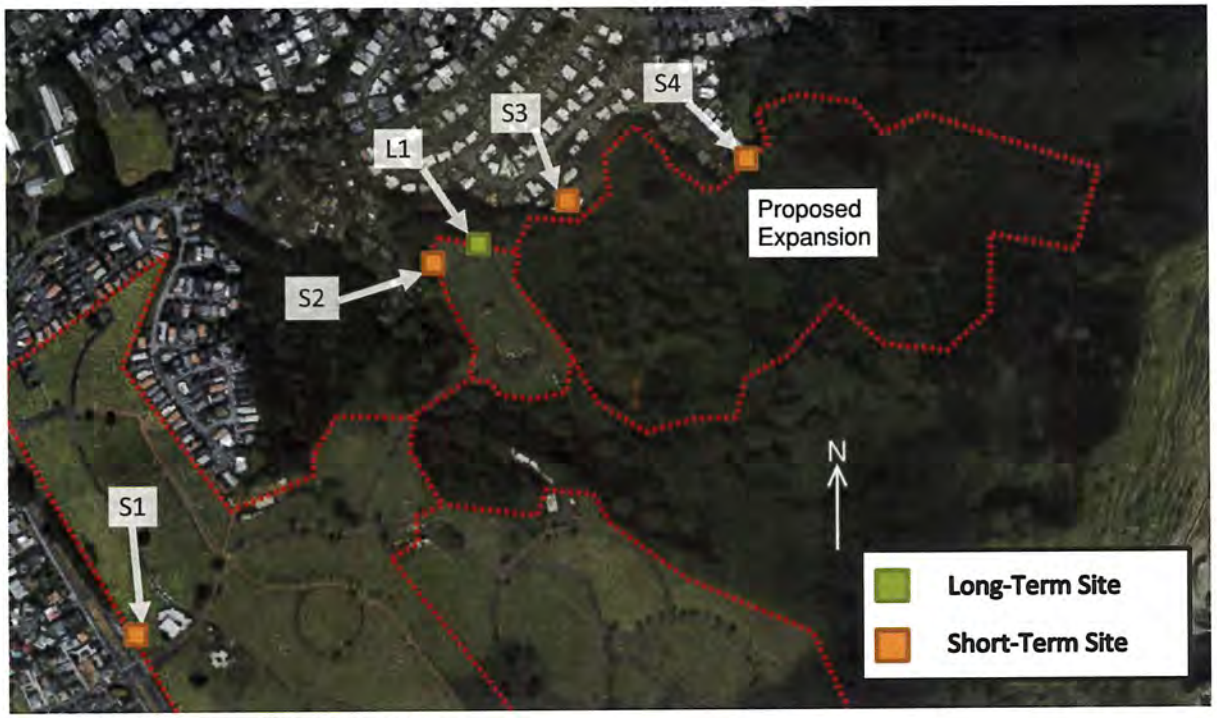


Figure 2: Noise Measurement Locations, page 6

Common Outdoor Sounds	Sound Pressure Level (dBA)	Common Indoor Sounds	Subjective Evaluation
Auto horn at 10 ft Jackhammer at 50 ft	100	Printing plant	Deafening
Gas lawn mower at 4 ft Pneumatic drill at 50 ft	90	Auditorium during applause Food blender at 3 ft	Very Loud
Concrete mixer at 50 ft Jet flyover at 5000 ft	80	Telephone ringing at 8 ft Vacuum cleaner at 5 ft	
Large dog barking at 50 ft Large transformer at 50 ft	70	Electric shaver at 1 ft	Loud
Automobile at 55 mph at 150 ft Urban residential	60	Normal conversation at 3 ft	
Small town residence	50	Office noise Dishwasher in adjacent room	Moderate
	40	Soft stereo music in residence Library	
Rustling leaves	30	Average bedroom at night Soft whisper at 3 ft	
Quiet rural nighttime	20	Broadcast and recording studio	Faint
	10	Human breathing	Very Faint
	0	Threshold of hearing (audibility)	

Appendix B: Common Sounds Levels in dBA

Average (Day) Sound Level – $L_{eq\ (day)}$[1]	Average (Night) Sound Level - $L_{eq\ (night)}$[2]	Average Day/Night Level - L_{dn}[3]
54 dBA	47 dBA	55 dBA

Notes:

1. $L_{eq\ (day)}$ is an average of the equivalent sound levels during the daytime hours only (between 7am and 10pm) within a 24-hour measurement period.
2. $L_{eq\ (night)}$ is an average of the equivalent sound levels during the nighttime hours only (between 10pm and 7am) within a 24-hour measurement period.
3. The L_{dn} is the 24-hour L_{eq} obtained after addition of 10 dBA to the sound levels from 10pm to 7am.

Table 7: Overall Daily Average Sound Levels, page 9

Location ID	Location Description	L_{eq}[1]
S1	Kamehameha Hwy	70 dBA
S2	Ocean View Garden	48 dBA
S3	Ohaha Place	45 dBA
S4	Lipalu Street	57 dBA

Notes:

1. Average sound level

Table 8: Measurement Results Summary, page 10

Sensitive Receiver	Distance to Earthwork Boundary	Earthwork Phase Noise Level	Post-Earthwork Phase Noise Level
Kumakua Place Residences	400 ft	75 dBA	67 dBA
45-440 to 45-450 Ohaha Street	220 ft	81 dBA	67 dBA
Ohaha Place Residences	180 ft	83 dBA	70 dBA
45-420 Ohaha Street	260 ft	79 dBA	64 dBA
45-450 to 45-470 Lipalu Street	85 ft	91 dBA	70 dBA
Lipalu Place Residences	370 ft	76 dBA	62 dBA
45-150 to 45-170 Namoku Street	470 ft	74 dBA	60 dBA

Table 10: Predicted Construction Noise Levels at Nearby Residences, page 12

Source: *Hawaiian Memorial Park Final Environmental Impact Statement*, April 2019
Appendix L: *Environmental Noise Assessment and Prediction Report*, May 2018
Censeo AV + Acoustics

Exhibit TB-A

Years of Experience

CENSEO AV+Acoustics: 7
With other Firms: 14

Education

M.S. Mechanical Engineering
University of Hawaii

B.S. Mechanical Engineering
Purdue University

License

Professional Engineer:
Hawaii / 12957 (2008)

Prof. Acoustical Engineer:
Oregon / 66994 (2003)

Board Certified INCE (2009)

Certified Technology
Specialist: (2018)

Associations

Construction Specifications Institute (CSI)

Institute of Noise Control Engineering (INCE)

Acoustical Society of America (ASA)

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

American Society of Testing and Materials (ASTM)

Personal Interest

Musician & Technician

TODD R. BEILER PE, CTS, INCE Bd. Cert.

Principal / Acoustics & AV Design

CENSEO
AV+Acoustics

Qualifications

Todd R. Beiler is an acoustical consultant and audio/visual (AV) design engineer with more than 20 years of experience. Mr. Beiler's expertise includes room acoustics, sound insulation, noise and vibration control, industrial noise, environmental noise assessments, audio/visual systems, sound reinforcement systems, sound masking systems, room lighting and shade control systems, stage rigging systems, stage pit lifts, and performance lighting systems. With expertise, detail, and innovative design; Mr. Beiler lends his individualized attention to each project. As an expert witness, Mr. Beiler has offered his professional testimony in court proceedings and in other legal pursuits. Mr. Beiler's consultation and insight on engineering solutions have proven successful for a wide range of project types including educational facilities, performing arts centers, research laboratories, healthcare, government and military facilities, resorts/hotels, residential, commercial, and others. Mr. Beiler has worked on projects in the United States as well as Guam, South Korea, Singapore, Japan, and other countries in the Pacific region.

Project Examples

- Waiea Residential Tower, Oahu
- Anaha Residential Tower, Oahu
- University of Hawaii Music Complex Renovation, Oahu
- University of Hawaii Hilo Ka Haka 'Ula O Ke'elikolani, Hawaii
- University of Hawaii Hilo College of Pharmacy, Hawaii
- University of Hawaii Translational Health Science Simulation Center, Oahu
- PBS Hawaii, Oahu
- 808Futsal Kapolei, Oahu
- Kahekili Highway Environmental Impact Statement, Oahu
- MCAS Airport Terminal and Operations Complex MCBH, Oahu
- Westin Ka'anapali Ocean Resort, Maui
- Fairmont Kea Lani Resort Renovations, Maui
- Farrington High School Renovation Phase I, Oahu
- Ritz-Carlton at Kapalua Bay
- Hilton Waikoloa Ballroom Renovation, Hawaii
- North Charleston Creative Arts Elementary School, Charleston, SC
- Mount Pleasant Town Hall, Mount Pleasant, SC
- KROC Community Center, Oahu
- Molokai High School Science Facility, Molokai
- University of Hawaii Kennedy Theater Stage Pit Lift, Oahu
- Iolani High School Sullivan Center, Oahu
- Grand Wailea Performance System, Maui
- HECO Executive Boardroom, Oahu
- Salt Lake Boulevard Environmental Assessment, Oahu

Testimony of
Matt Nakamoto, P.E.
Austin, Tsutsumi & Associates, Inc.
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion 1,

My name is Matt Nakamoto, P.E. I am Vice President and the Chief Transportation Engineer at Austin, Tsutsumi, and Associates, Inc. (ATA), a consulting firm specializing in traffic engineering, civil engineering, environmental engineering, and land surveying. As ATA's Chief Transportation Engineer, with over 18 years with the firm, I am responsible for overseeing the firm's transportation section. I manage a variety of transportation engineering projects including traffic impact analysis, traffic signal design and optimization, and roundabout design. A copy of my resume is attached.

Scope of Study

ATA was retained by HHF Planners to conduct a traffic impact analysis study to address the likely impacts to transportation facilities in the vicinity of the Petition Area. This study analyzed Hawaiian Memorial Park's (HMP) two existing unsignalized driveway intersections: 1) Kamehameha Highway, Mahinui Road, and HMP Driveway 1 (main entrance); and 2) Kamehameha Highway, Halekou Road, and HMP Driveway 2. The traffic impact analysis report (TIAR) for the Petition is included as Appendix N in the Final Environmental Impact Statement.

Traffic counts were taken at these study intersections during the weekday commuter morning and afternoon peak periods, along with a weekend (Saturday) mid-day peak period. Traffic projections with and without the project were developed for the study year 2040. Analysis of traffic conditions was conducted using the traffic count data and projections.

The traffic analysis software Synchro was used to calculate intersection volume to capacity ratios and delays prescribed under the Transportation Research Board's *Highway Capacity Manual 6th Edition*. The analysis methodology used Level of Service (LOS) as a qualitative measure to describe traffic flow conditions at study intersections. LOS values range from free-flow conditions (LOS A) to congested conditions (LOS F). These results, as confirmed or refined by field observations, constitute the technical analysis informing the basis of study recommendations.

Existing Transportation Facilities and Conditions

Major roadways at the Petition Area intersections consist of Kamehameha Highway, Halekou Road, and Mahinui Road. Kamehameha Highway is a four lane, two-way, divided arterial State roadway generally oriented north-south, and has a posted speed limit near study intersections of 35 miles per hour (mph). Kamehameha Highway serves as the regional north-south travel corridor for vehicles in Kāne'ohe. During the morning (AM) peak hour, southbound traffic

heading towards the Pali Highway to travel into downtown and urban Honolulu is heavier than northbound traffic. During the afternoon (PM) peak hour, this condition is reversed.

Mahinui Road is an undivided two-way, two-lane City roadway running in an east-west direction. This road forms the western leg of a four-way unsignalized intersection with Kamehameha Highway and HMP Driveway No. 1. Mahinui Road has a posted speed limit of 25 mph.

Halekou Road is an undivided two-way, two-lane City roadway running in an east-west direction. This road forms the western leg of a four-way unsignalized intersection with Kamehameha Highway and HMP's Driveway No. 2. This roadway has a posted speed limit of 25 mph. Driveway No. 2 serves as HMP's main entrance and also provides access to the Hawai'i State Veterans Cemetery and Petition Area.

Private, internal roads within HMP are used for visitors and daily cemetery operations. These private roads are owned and maintained by HMP. The roadways within the State-owned Veterans Cemetery are owned and maintained by the State Department of Defense.

Analysis of Existing Traffic Conditions.

Existing counts of vehicles entering and exiting HMP at the cemetery's driveways reflect activities beyond those occurring at HMP. There are four separate "users" contributing to traffic entering and exiting study intersections. Users directly related to HMP consist of HMP staff and visitors to the cemetery for funerals or burial site visitation. A second user consisted of employees of Hawaiian Memorial Park Mortuary (not part of HMP) that operated on site providing funeral services. Another major user is the Hawai'i State Veterans Cemetery that includes State staff operating there and visitors to that cemetery. Finally, the fourth user consists of nearby residents participating in recreational activities (walking) within the cemetery (both HMP and Veterans Cemetery).

Existing movements at the Kamehameha Highway and Mahinui Road/HMP Driveway 1 intersection operate at LOS D or better during the weekday and weekend peak hours, with the exception of minor street movements that in some cases operate at LOS E during the weekday morning and afternoon peak periods. All movements at the intersection of Kamehameha Highway and Halekou Road/HMP Driveway 2 operate at LOS D or better with the exception of minor street movements that operate at LOS E/F during peak hours.

Vehicles making left-turns from the minor east-west approaches (HMP driveways and City roads) are able to use the space created by Kamehameha Highway's wide median to turn onto or off of the highway in two stages. During the weekday AM and PM peak traffic hour, both minor street left-turn movements onto Kamehameha Highway were executed during a gap in traffic which is suspected to occur when the upstream and downstream traffic signal minor movement phase is occurring. Significant queueing was not observed at either of the study intersections.

Generally, traffic within the HMP vicinity was lighter during the Saturday midday peak hour compared to weekday commuter peak hour traffic. Left-turn movements from minor streets were easier to execute as longer gaps were observed along Kamehameha Highway. No significant queuing was observed at the study intersections.

A traffic signal study for the intersection of Kamehameha Highway with Halekou Road is currently underway by the State DOT. This study is still in progress and therefore does not have formalized recommendations at this time.

Future Traffic Conditions and Impacts

Future traffic conditions with and without the project were developed for study intersections for the year 2040. Projections without the project were formulated by applying the growth rate in the O'ahu Regional Travel Demand Model to existing traffic volumes. The annual growth rate along Kamehameha Highway was determined to be approximately 0.4 percent per year.

The anticipated number of trips generated by the proposed project were derived using existing trip generation rates. The project is forecast to generate approximately only 25, 27, and 71 additional trips (entering and exiting) during the weekday morning, afternoon, and Saturday peak hours, respectively. Exhibit MN-A shows the configuration of these study intersections and future projected traffic volumes with the project.

With the project, all study intersections would operate at an LOS similar to baseline conditions for Year 2040 given the project's relatively small traffic increase. While Kamehameha Highway's turning movements would operate with little delay, some of the minor movements would continue to experience LOS E or F during all peak hours of traffic.

We analyzed future year 2040 conditions with and without a traffic signal at the intersection of Kamehameha Highway, Halekou Road, and HMP Driveway 2. If the traffic signal were to be installed, all minor movements at this intersection would improve to LOS E or better with or without the project.

The State DOT reviewed and concurred with the TIAR findings in the Draft EIS that the proposed project is not anticipated to significantly impact State highways. The State DOT concurred with our recommendations to restripe HMP approaches to Kamehameha Highway to provide better exiting traffic flow. DOT also recommended the Petitioner provide appropriate traffic control plans in the event certain cemetery activities cause traffic issues at access driveways. This recommendation was included in the Final EIS as a minimization measure. A copy of the State DOT comment letter is enclosed as Exhibit 1.

ATA Austin Tsutsumi

MATT K. NAKAMOTO, P.E.,
Vice President & Chief Transportation Engineer

EDUCATION
BSCE University of Hawaii – Manoa
MSCE University of Hawaii - Manoa

YEARS OF EXPERIENCE
With firm 17 years

PROFESSIONAL REGISTRATION
Professional Civil Engineer – Hawaii - #11472-CE

PROFESSIONAL ORGANIZATIONS
Institute of Transportation Engineers

As ATA's Chief Transportation Engineer, Matt is responsible for overseeing the transportation section. Matt manages a wide variety of transportation engineering projects including traffic impact analysis, traffic signal design and optimization, and roundabout design. As ATA's in-house expert on roundabout design, Matt has designed a number of roundabouts on Maui and Kauai, including the Piikea-Liloa Roundabout in Kihei, Maui which has been favorably reviewed by a well-known health and wellness organization. Notable projects include the following:

Notable Projects:

- Traffic Operational Improvements at Various Locations, Statewide
- Oahu Signal Traffic Signal Optimization, Phases 3a and 5
- Joint Base Pearl Harbor-Hickam Main Gate Study, Honolulu, HI
- Halawa Gate Commercial Vehicle Inspection Station Upgrade, Halawa, HI
- Traffic Signal Prioritization Methodology
- Hoopili Comprehensive Transportation Master Plan, Ewa-Kapolei, HI
- Zipper Lane Extension Feasibility Study, Ewa-Kapolei, HI
- PM Tow-Away Zone Study; Honolulu, Oahu, Hawaii
- Daniel K. Inouye International Airport; Honolulu, Hawaii
- Poipu Roundabout at Lawai Road, Poipu, Kauai, Hawaii
- Roundabout at Kapaa Bypass Road/Olohena Road, Kapaa, Kauai, Hawaii
- Piikea Avenue/Liloa Drive Roundabout, Kihei, HI
- Kuhio Collection Multimodal Transportation Plan, Waikiki, HI
- King Kalakaua Plaza TIAR, Waikiki, HI
- Makalapua Project District TIAR, Kailua-Kona, HI
- Traffic Signals at Various Locations on Oahu, Phases 5, 5a, 7, 8, and 9

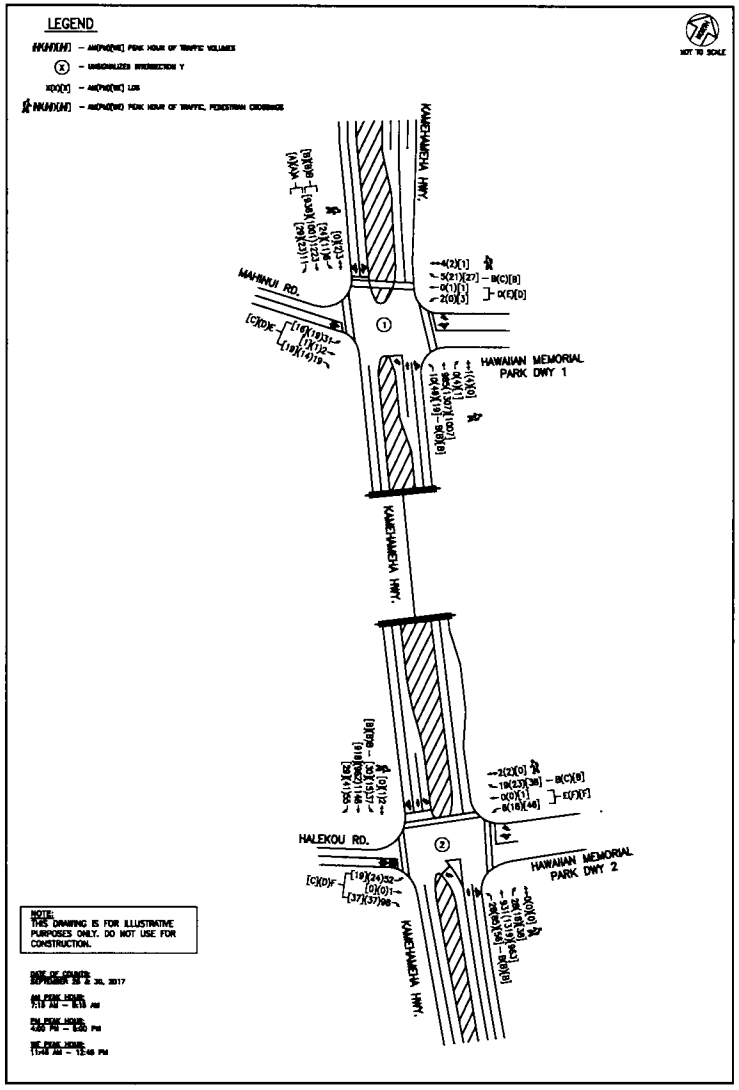


Figure 2.1, Existing Lane Configuration, LOS and Volumes, page 9

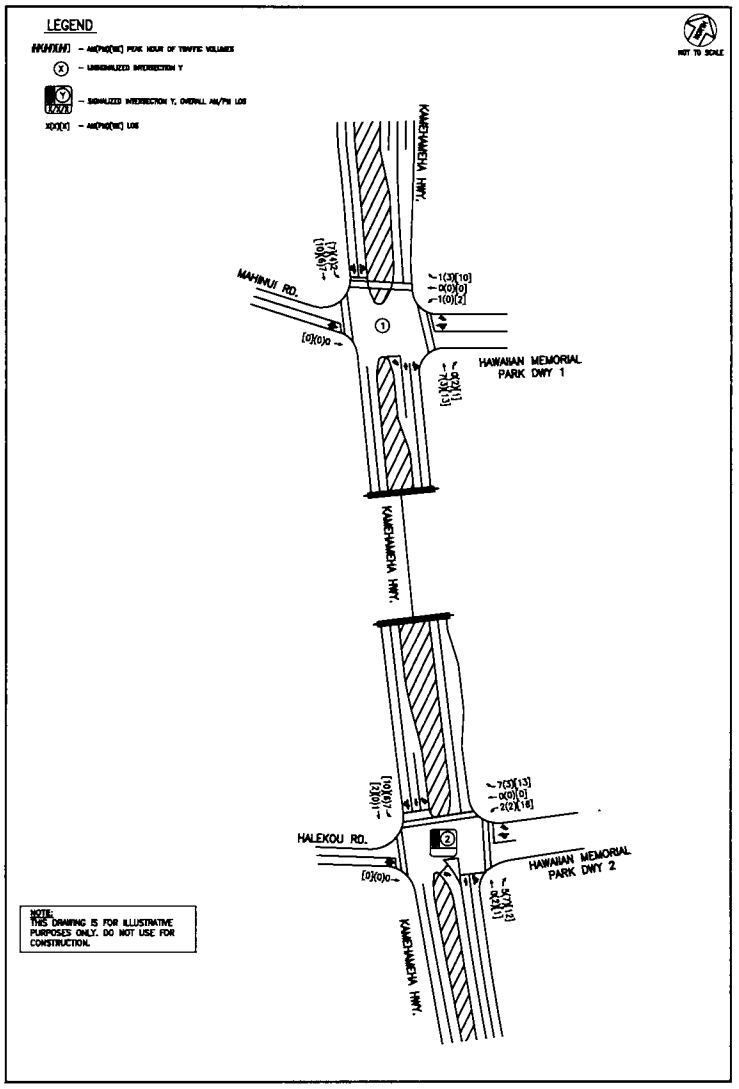


Figure 4.1, Project Trips, page 19

Source: *Hawaiian Memorial Park Final EIS*, April 2019
Appendix N: *Traffic Impact Analysis Report, Hawaiian Memorial Park Cemetery Expansion*, January 2019
Austin, Tsutsumi & Associates Inc..

Exhibit MN-A

Exhibit 1 - State DOT DEIS Comment Letter

DAVID Y. IGE
GOVERNOR

JADE T. BUTAY
DIRECTOR

Deputy Directors
ROY CATALANI
ROSS M. HIGASHI
EDWIN H. SNIFFEN
DARRELL T. YOUNG

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

IN REPLY REFER TO:
DIR 1029
STP 8.2544

October 23, 2018

TO: THE HONORABLE LUIS P. SALAVERIA, DIRECTOR
DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT
AND TOURISM

ATTN: SCOTT DERRICKSON
LAND USE COMMISSION

FROM: JADE T. BUTAY
DIRECTOR OF TRANSPORTATION

SUBJECT: HAWAIIAN MEMORIAL PARK (HMP) CEMETERY EXPANSION PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT
KANEOHE, OAHU, HAWAII
TMK: (1) 4-5-033:001 (POR.)

The applicant, Hawaiian Memorial Life Plan, Ltd., which owns and manages HMP, proposes an expansion to ensure that a sufficient supply of burial plots can be maintained. The applicant proposes reclassification of a 53.45 acres portion of Parcel 001 (164.4 acres) from Conservation District to Urban District. The reclassified area will consist of 28.2 acres for cemetery use, 14.5 acres for cultural preserve and the remainder for open space and internal roadways. The Department of Transportation (DOT) offer the following comments:

Highways Division

Kamehameha Highway in the project vicinity is a four-lane facility and HMP has two stop-controlled driveways across from Mahinui Road and from Halekou Road. The Traffic Impact Analysis Report (TIAR) noted that DOT was evaluating the Halekou Road intersection for possible signalization but, no decision had been made. The TIAR included two alternatives: one with a traffic signal, and one without a traffic signal.

1. Based on the TIAR, the proposed expansion is not anticipated to have a significant impact to our State highways; therefore, HMP has no transportation improvements to the State Highway System. HMP should implement the TIAR recommendation for restriping the HMP approaches to Kamehameha Highway to provide for better exiting traffic flow.

2. HMP should provide for appropriate traffic control plans in the event some activity within HMP and/or areas contained with its boundaries may cause traffic issues at access driveways.

3. If there should be unexpected traffic issues not provided for in the TIAR that can be attributed to HMP, the traffic issues should be mitigated to the satisfaction of the DOT.

If there are any questions, please contact Mr. Blayne Nikaido of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7979 or by email at blayne.h.nikaido@hawaii.gov.

c: Ronald A. Sato, HHF Planners

Testimony of
ROSANNA THURMAN, M.A.
HONUA CONSULTING
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion of 001

My name is Rosanna Thurman and I am the principal investigator for Honua Consulting, a firm with expertise in environmental and cultural assessments; community consultation and mediation facilitation; and strategic planning. I have 12 years of experience working as an archaeologist in Hawai'i and received my Masters degree at University of Hawai'i at Mānoa. I have worked at Honua Consulting since 2014 facilitating cultural resource management projects. My team and I prepared the archaeological inventory survey (AIS) for the Hawaiian Memorial Park Cemetery Expansion Project (included as Appendix J, of the Final Environmental Impact Statement). I was primarily responsible for the preparation of the AIS study. A copy of my curriculum vitae is enclosed.

Scope of Study

Honua Consulting was retained by HHF Planners to assess the impact of the proposed project to archaeological and cultural resources with the Petition Area. Our efforts resulted in the completion of an Archaeological Inventory Survey (AIS) and Cultural Impact Analysis (CIA). The area of potential effect (APE) for the AIS study consisted of the entire 53.45-acre Petition Area. The AIS involved background research on pertinent historic and archaeological information; a 100% pedestrian surface survey of the Petition Area; site documentation of all historic properties encountered; excavation of one site area; and completion of an AIS report. The AIS has been finalized and accepted by the State Historic Preservation Division (SHPD) as documented in their April 8, 2019 acceptance letter included in Exhibit 1.

Our work supporting the AIS allowed our team to identify potential impacts to historic properties and cultural resources and develop reasonable mitigation measures to minimize potential impacts. I will briefly summarize the findings from the AIS.

I. ARCHAEOLOGICAL INVENTORY SURVEY RESULTS

Consultations Supporting Background Research

Consultation with interested community members has been on-going since 2016. Several lineal and cultural descendants, recognized cultural experts, and other knowledgeable individuals interviewed as part of the CIA supported background research during the AIS preparation.

Fieldwork Results

Archaeological fieldwork identified a total of 24 sites that were documented and are shown on Exhibit 2. Table 1 identifies these sites and provides additional information on their site type, features, possible function, age, eligibility, project area location, and recommendations.

- **Ten** of the sites documented were identified in prior archaeological studies of the Petition Area (McAllister 1933, Szabian et al. 1989, McCurdy and Hammatt 2009).
- The remaining **14** sites documented during this investigation were newly identified (Honua 1 to 14, SIHP #50-80-10-8228 to -8241).

All previously identified sites from prior studies were relocated by Honua, previous plan maps and descriptions were amended to account for current conditions and observations. Three of the previously documented sites were expanded in size to include additional features (Kawa'ewa'e Heiau [-354], -4681 [hab complex], and -7079 [ag complex]).

A summary of the location of all sites relative to the Petition Area and Cultural Preserve is provided.

1. Of the 24 total sites identified, 22 are located within the Petition Area.
2. Two sites identified as SIHP -4681 (hab complex) and SIHP -8235 (Honua 8, hab site) are located outside of the Petition Area.
3. A total of 11 sites are within, or partially within, the proposed Cultural Preserve.
    a. **Eight** of the ten previously identified sites are located within the Cultural Preserve (SIHP # -354 [heiau], -4683 [charcoal kiln], -4684 [hab complex], -6930 [enclosure], -6931 [alignments], -6932 [storage feature], -6933 [charcoal kiln], and -7079 [ag complex]).
    b. Some features associated with SIHP # -7079 (agricultural complex) are located outside the proposed Cultural Preserve area (Feature D, mound).
    c. **Three** newly identified sites are located within the Cultural Preserve (SIHP # -8231 (Honua 4, terraced 'auwai), -8240 (Honua 13, terraces), and -8241 (Honua 14, walled pit).

The historic properties were evaluated for significance according to the five broad criteria used by the Hawai'i State Register of Historic Places (HAR 13-284-6) (summarized in Table 1).

Table 1. Table List Documented Sites, Type, Features, Possible Function, Age, Eligibility, Project Area Location, and Recommendations

No.	Site (SIHP #50-80-10) & Study	Site Type	No. of Features	Feature Types	Possible Function	Age	State & National Register Eligibility	Location/ Recommendation
1.	-354 (McAllister 1933)	Kawa'ewa'e Heiau	8 Heiau Features (1-8), 1 Exterior Feature (A)	1: entrance; 2: east end of south wall; 3: east wall; 4: interior of heiau, 4A: newly documented terrace; 5: central portion of south wall; 6: western portion of heiau on steep slope 6A: stone-lined pit within southeast interior corner; 7: north wall; 8: semi-circular earthen terrace, 8A-8D: newly documented earthen pits; Feature A: enclosure	Ceremonial	Pre-Contact	Criterion A through E	Preservation Within Cultural Preserve
2.	-4680 (Szabian 1989)	Terrace	2 Features (A-B)	A: large terrace; B: small terrace	Water Retention	Historic	Criterion D	Outside Cemetery Expansion Area (Within Cemetery Buffer Area), **No Further Work**
3.	-4681 (Szabian 1989)	Habitation Complex	8 Features (A-H)	A: c-shape; B1: hearth, B2-B3: terraces; C1-C2: terraces; D: terrace; E: c-shape; F1-F3: terraces (potential Hale o Papa); G1-G3: terraces; H1-H2: terraces	Habitation/ Agriculture/ Ceremonial	Pre-Contact	Criterion C, D and E	Outside Petition Area, Preservation
4.	-4683 (Szabian 1989)	Pit Feature and Terracing	2 Features (A-B)	A: earthen pit; B: terraces	Charcoal Kiln/ Agriculture	Historic	Criterion D	Preservation Within Cultural Preserve
5.	-4684 (Szabian 1989)	Habitation Complex	7 Features (A-G)	A: enclosure; B: terrace; C: terrace; D: c-shape; E: possible hearth; F: c-shape; G: c-shape	Habitation	Pre-Contact	Criterion D	Preservation Within Cultural Preserve

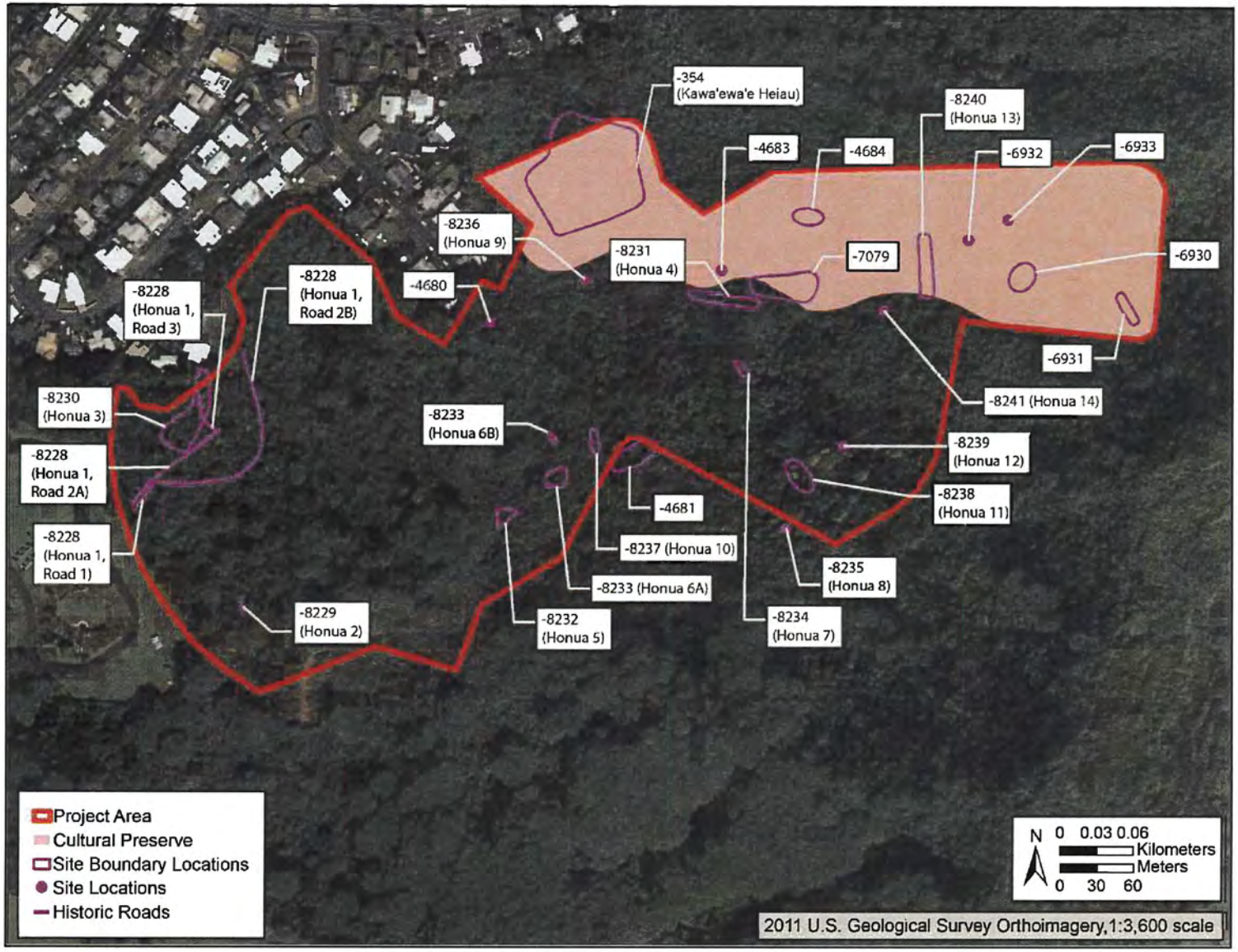
No.	Site (SIHP #50-80-10) & Study	Site Type	No. of Features	Feature Types	Possible Function	Age	State & National Register Eligibility	Location/ Recommendation
6.	-6930 (McCurdy & Hammatt 2009)	Stone Enclosure	1 Feature	Enclosure	Ceremonial	Pre-Contact	Criterion C, D and E	Preservation Within Cultural Preserve
7.	-6931 (McCurdy & Hammatt 2009)	Stone Alignments	4 Features (A-D)	A-C: terraces; Feature D: potential ceremonial area	Ceremonial	Pre-Contact	Criterion D and E	Preservation Within Cultural Preserve
8.	-6932 (McCurdy & Hammatt 2009)	Storage Feature	1 Feature	Stone Storage Feature	Storage	Historic	Criterion D	Preservation Within Cultural Preserve
9.	-6933 (McCurdy & Hammatt 2009)	Pit Feature and Stone Wall	2 Features (A-B)	A: earthen pit; B: terrace	Charcoal Kiln	Historic	Criterion D	Preservation Within Cultural Preserve
10.	-7079 (McCurdy & Hammatt 2009)	Agricultural Complex	6 Features (A-F)	A: grinding stone; B-C: terrace remnants; D: mound; E-F: terrace remnants	Agriculture	Pre-Contact	Criterion D	Preservation Within Cultural Preserve (Partially) or Data Recovery
11.	Honua 1 -8228	Historic Dairy Roads (Roads 1 - 3)	3 Features (1-3)	Road 1-3: dirt roadways	Dairy	Historic	Criterion D	Cemetery Expansion Area, **No Further Work**
12.	Honua 2 -8229	Historic Road	1 Feature	Dirt roadway	Dairy	Historic	Criterion D	Cemetery Expansion Area, **No Further Work**

No.	Site (SIHP #50-80-10) & Study	Site Type	No. of Features	Feature Types	Possible Function	Age	State & National Register Eligibility	Location/ Recommendation
13.	Honua 3 -8230	'Auwai	3 Features (A-C)	A1: concrete capped spring; A2: terrace; A3: soil terrace; A4: metal pipe; A5: water hole; A6: historic road crossing; B: small terrace; C: large terrace 'auwai determined to be a native damselfly habitat	Water Collection and Retention	Historic	Criterion D	Outside Cemetery Expansion Area (Within Cemetery Buffer Area), Preservation
14.	Honua 4 -8231	Terraced 'Auwai	7 Features (A-G)	A-C: terraces; D-F: mounds; G: terrace remnant	Agriculture	Pre-Contact	Criterion D	Preservation Within Cultural Preserve
15.	Honua 5 -8232	Terrace Remnants	5 Features (A-E)	A1-A2: mounds; B-E: terrace remnants	Agriculture	Pre-Contact	Criterion D	Cemetery Expansion Area, **No Further Work**
16.	Honua 6 -8233	6A - Terrace Remnants 6B - Modified Outcrop	5 Features (A-E) 1 Feature	A-E: terraces; Feature C3: mound Modified outcrop	6A: Agriculture; 6B: Possible Temporary Habitation	Pre-Contact	Criterion D	Cemetery Expansion Area, **6A: No Further Work;** 6B: Data Recovery
17.	Honua 7 -8234	Terrace	2 Features (A-B)	A: terrace; B1-B2: likely natural terraces	Agriculture	Pre-Contact	Criterion D	Cemetery Expansion Area, Data Recovery
18.	Honua 8 -8235	Habitation Site	1 Feature	Rectangular stone alignment	Temporary Habitation	Possibly early Post-Contact	Criterion D	Outside of Petition Area, Data Recovery, Preservation
19.	Honua 9 -8236	Terrace	1 Feature	Water retention terrace	Water Retention	Historic	Criterion D	Cemetery Expansion Area, **No Further Work**
20.	Honua 10 -8237	Terrace Remnants	2 Features (A-B)	A1-A4: terrace remnants, B1-B2: terrace remnants	Agriculture	Pre-Contact	Criterion D	Cemetery Expansion Area, **No Further Work**
21.	Honua 11 -8238	Possible Habitation Site	6 Features (A-F)	A-F: terraces	Habitation and Agriculture	Possibly early Post-Contact	Criterion D	Cemetery Expansion Area, Data Recovery
22.	Honua 12 -8239	Earthen Pit	1 Feature	Earthen pit	Charcoal Kiln or Fire Pit	Unknown	Criterion D	Cemetery Expansion Area, Data Recovery

No.	Site (SIHP #50-80-10) & Study	Site Type	No. of Features	Feature Types	Possible Function	Age	State & National Register Eligibility	Location/ Recommendation
23.	Honua 13 -8240	Terraces	3 Features (A-C)	A-C: terraces	Agriculture/ Horticulture	Pre-Contact	Criterion D	Preservation Within Cultural Preserve
24	Honua 14 -8241	Walled Pit	3 Features (A-C)	A-C: stacked-stone walls	Unknown	Unknown	Criterion C and D	Preservation Within Cultural Preserve, **No Further Work**
Source: Honua, 2018								

Testimony of Rosanna Thurman, M.A.
SLUC Docket No. A17-804

Exhibit 2



Properties Outside the Petition Area (Preserved) (2 sites)

Two sites are located outside the Petition Area as shown on Exhibit 2, and would not be effected by the project. These sites include the following: 1) SIHP # 50-80-10-4681 is a traditional habitation complex located upslope from the central section of the cemetery expansion area; and 2) SIHP -8235 (Honua 8) is a habitation site located further upslope and east of SIHP -4681. SIHP # -4681 is considered historically significant under Federal and Hawai'i State Register of Historic Places Criteria C, D, and E and would be preserved in place. Honua 8 is considered historically significant under Federal and State Register Criterion D. Honua 8 is recommended for data recovery and would also be preserved in place.

Properties Preserved Within the Cultural Preserve (11 sites)

Eleven sites are within the Cultural Preserve as shown on Exhibit 2 and identified in Table 1.

A portion of SIHP # -7079 (remnant ag complex) site's boundary is located outside the Cultural Preserve, and would result in a portion of site features being impacted by grading activities associated with the cemetery expansion. Data recovery is recommended for SIHP # -7079, Feature D (mound). SIHP # -7079, Feature A (grinding stone) should either be preserved in place or relocated to an appropriate location within the CP.

No further work is recommended for SIHP # -8241 (Honua 14, charcoal kiln) due to data collected via excavation during this AIS.

Sites within the Cultural Preserve would benefit from the project because:
The sites would be preserved, protected, and maintained; The cultural landscape and particular historic sites would be restored; cultural use and practices could occur.

The preservation plan to be developed for the Cultural Preserve in conjunction with the Ko'olaupoko Hawaiian Civic Club and the Petitioner would ensure appropriate long-term management and maintenance of these sites occurs.

Properties Outside the Cultural Preserve (11 sites, 9 to be affected by grading activities)

A total of 11 sites are situated outside the Cultural Preserve. Two sites would not be impacted by the cemetery expansion, but the remaining **9** sites would be affected by grading activities.

Properties Unaffected by Cemetery Expansion

Two sites would not be affected by cemetery expansion grading activities as shown on Exhibit 2 because they are either being preserved or are located within a buffer separating the expanded cemetery from nearby residences. These sites include a water retention terrace (SIHP # 50-80-10-4680) and an 'auwai (Honua 3; SIHP # 50-80-10-8230), and are summarized below.

1. SIHP # -4680 is located in the northern end of the Petition Area boundary mauka of the end of Līpalu Street, and would be part of a buffer area between the cemetery and residential subdivision. Site -4680 is a terrace in fair condition previously used for water retention. This site is considered historical significant under Federal and State Register Criterion D with No Further Work recommended for the site given its historic function and remnant condition.
2. SIHP # -8230 (Honua 3) is also located in the northwest corner of the Petition Area within an area that would be preserved. The 'auwai system associated with this feature provides habitat for the endangered Blackline Hawaiian Damselfly. This site is considered historically significant under State Register Criterion D with preservation recommended.

Properties Affected by Cemetery Expansion

Nine sites would be affected by grading activities as part of the cemetery expansion. All nine sites are considered historically significant under Federal and State Register **Criterion D**. Data Recovery is recommended for four sites, and No Further Work is recommended for the remaining sites, given their historic function and remnant condition. A summary of these sites is provided.

1. SIHP # -8228 (Honua 1) Historic Dairy Roads. This site consists of four road features that are identified as Roads 1, 2A, 2B, and 3 on Exhibit 2. These roadways are located in the western corner of the Petition Area generally mauka of Ohaha Place, and are in poor condition. The sites include several historic dairy roads that are relatively level, but damaged by natural tree growth and soil erosion.
   a. Road 1 extends for only about 100 feet and varies from 4.5 to 7 feet wide.
   b. Road 2 is divided into Roads 2A and 2B that are generally cut into a hillside. These roads are about 8 to 9 feet wide; Road 2A is in poor condition, and Road 2B is in poor to fair condition.
   c. Road 3 is in poor condition and extends from Road 2 to the historic 'auwai (-8230). After crossing over a section of the 'auwai, it becomes unobservable.
2. SIHP # -8229 (Honua 2) Historic Road. This site consists of a short segment of an old dirt road that is in poor condition. The road segment is about 10 feet wide and runs in a north-south direction for about 33 feet. The ends of this roadway have been removed, likely bulldozed, leaving only this short segment remaining.
3. SIHP # -8232 (Honua 5) Traditional Terrace Remnants. This site consists of the remnants of a traditional terrace that is in poor condition. It is comprised of five features, consisting of a series of basalt cobble-lined terraces situated on a moderate to steeply sloped hillside. The terraces are watered by natural hillside runoff and an adjacent 'auwai. The condition of these features has been affected by natural water erosion and rockfall. A photo of this site is included in Exhibit RT-B.


Exhibit 3 Photo of Modified Outcrop (Honua 6B)

4. SIHP # -8233 (Honua 6) Traditional Terrace Remnants (6A) and Modified Outcrop (6B). This site is comprised of two feature areas identified as Features 6A and 6B that are in poor to fair condition. The terraces have been heavily disturbed by natural erosion and rockfall. Feature 6A includes a series of five traditional terrace remnants on a moderately sloping hillside. These terraces are watered by natural drainage. A photo of Feature 6A is included in Exhibit RT-B. Feature 6B includes a modified basalt outcrop with a leveled surface about 100 feet downslope (makai) of Feature 6A. This feature could have been used as a temporary habitation. Exhibit 3 shows the modified basalt outcrop. **Data Recovery** would be implemented for Feature 6B.

5. SIHP # -8234 (Honua 7) Traditional Terrace. Site features include a low stone terrace and two features that are likely natural terraces located near the convergence of two drainage ditches. This site was determined to be in fair condition. A photo of the site is included in Exhibit RT-B. **Data Recovery** would be implemented for this site.

Exhibit 4 Historic Water Retention Feature, Honua 9

6. SIHP # -8236 (Honua 9) Historic Water Retention. This site is in good condition, and is shown in Exhibit 4. Site features include a basalt boulder and cobble concentration located on the steep slope of a west-tending drainage ditch. The construction style is roughly stacked and appears to be historic-era. This site may have been used for water retention, given its location within a large ditch.

7. SIHP # -8237 (Honua 10) Traditional Terrace Remnants. This site includes remnants of a traditional terrace located on a moderately sloping, north-tending hillside. It is watered by a natural streambed created by intermittent runoff. The site is in poor condition due to natural erosion and thick vegetation growth.

8. SIHP # -8238 (Honua 11) Habitation and Agricultural Terraces. The site served as agricultural terraces with possible habitation, and was determined to be in poor to fair condition. A terraced north-tending hillside and level area atop the hillside are features associated with this site. The shape of the site indicates the top portion may have served as a habitation site with six associated agricultural terraces below. An ephemeral drainageway is located just east of the site. A photo of the site is included in Exhibit RT-B. **Data Recovery** would be implemented for this site.

9. SIHP # -8239 (Honua 12) Earthen Pit. This site is comprised of an earthen pit located at the top of a steep hillside that is in good condition. The interior southern pit wall has a flat, large basalt boulder and black, hardened soil. The darkened, cemented soil indicates fires were burned within the site. Similarities were apparent with the other two charcoal kilns documented within the proposed Cultural Preserve and this site. However, the site location at the top of a foothill suggests usage as a signal fire, should the sites be pre-contact in origin. **Data Recovery** would be implemented for this site.

Testimony of Rosanna Thurman, M.A.
SLUC Docket No. A17-804

Exhibit RT-B

Sites Within Cultural Preserve

Figure 40: SIHP -384 ([illegible] Heiau), Fea. 2 (exterior wall), page 77

Figure 73: SIHP -[illegible] (enclosure), page 102

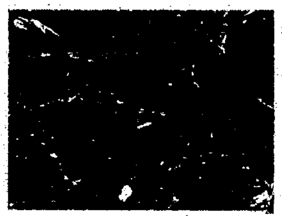


Figure 101: SIHP -8231 (Honua 4), Fea. B (terrace), page 125

Figure 111: SIHP -8341 (Honua 14, charcoal kiln), page 134

Sites Within Cemetery Expansion

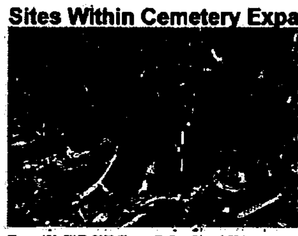


Figure 163: SIHP -8232 (Honua 5), Fea. C1 and C2 (terrace remnants), No Further Work Determined, page 181

Figure 169: SIHP -8233 (Honua 6A), Fea. B and C1 (terrace remnants), No Further Work Determined, page 186

Figure 175: SIHP -8232 (Honua 7), Fea. A (terrace), Data Recovery Determined, page 190

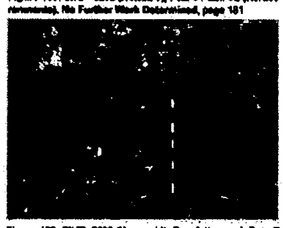


Figure 18[illegible]: SIHP -8238 (Honua 11), Fea. A (terrace), Data Recovery Determined, page 202

Exhibit RT-B

Source:
Hawaiian Memorial Park Final EIS, April 2019
Appendix J: Draft Archaeological Inventory Survey for Hawaiian Memorial Park March 2019
Honua Consulting

Laboratory Analysis Results

A summary of artifacts and materials recovered during site investigation is provided. Materials recovered include a piece of volcanic glass, cow bones, and kukui nut shells. Several modern to historic bottles were documented in the field, but were not collected.

1. Glass Bottles. One milk bottle was collected from SIHP # -8230 (Honua 3, Historic 'Auwai). The base of the bottle was embossed with a mark from the Owens-Illinois Glass Company. Based upon the marking, the milk bottle was either made in 1937 or 1947 at a plant in Los Angeles, California. Several early- through late-20th century glass bottles were observed during the surface survey and were documented in the field.
2. Lithic Analysis. One piece of volcanic glass was recovered during excavation of SIHP # -8241 (Honua 14, charcoal kiln). The artifact contained outer cortex on one side and did not exhibit obvious flake scars or worked edges. Energy Dispersive X-Ray Fluorescence analysis identifying its chemical composition determined the fragment is similar to dyke material found within the Ko'olau Mountain Range, particularly on Mokoli'i Island in Kualoa Ahupua'a of the Ko'olaupoko District.
3. Faunal Analysis. Approximately 90 pieces of cow bone were collected from SIHP # -8241 (Honua 14, charcoal kiln). The animal appeared to have been scavenged, as the bones were found largely in one concentration with a few fragments found in other portions of the test excavation. No cut marks were observed on the cow bones.
4. Charcoal Identification. Three charcoal samples were collected from SIHP # -8241 and tested for plant species identification. One sample was unable to be identified, while the remaining samples were determined to contain guava. The production of guava charcoal was a common industry in Windward O'ahu throughout the late 19th century and again in the 20th century.

Mitigative Measures

Based upon the final AIS that has been accepted by SHPD, data recovery would be conducted followed by development of a Preservation Plan, and archaeological monitoring would then be implemented.

Data Recovery

The Data Recovery program would begin with completion of a Data Recovery Plan, written in accordance with HAR 13-278, that would outline the proposed testing strategy and research objectives. The plan would be reviewed and accepted by SHPD prior to controlled excavation of select sites.

Data Recovery would be conducted for four sites within the area proposed to be affected by grading activities (Honua 6B, Honua 7, Honua 11, Honua 12), one site located outside of the petition area (Honua 8), and one additional potential site located on the boundary of the CP (SIHP # -7079). Table 3 lists sites recommended for data recovery and includes rationale for their investigation. Data recovery efforts would attempt to establish function, usage, and the age of these sites, how they relate to each other, and aid determination of any further mitigation measures that may be needed.

If all or portions of SIHP # -7079 are impacted by the cemetery expansion grading plans, it is recommended that Data Recovery be conducted on one or more of the features, particularly Feature D (mound), and that Feature A (grinding stone) either be preserved in place or relocated to an appropriate location within the Cultural Preserve.

Data recovery is recommended for one site that is not proposed to be affected by the project, SIHP # -8235 (Honua 8, hab site). This site is recommended for data recovery in order to see if data can be obtained to understand how the site relates with others in the project area also to find evidence regarding what types of activities were being conducted (what resources were being utilized, etc.)

Table 3
Sites Recommended for Data Recovery

Site	Type	Rationale
Honua 6B	Modified Outcrop	Feature creates a flat area on edge of hillside; excavation could answer if site was used for temporary habitation and associated time-period
Honua 7	Low Terrace	Terrace in Fair Condition located on level area by stream; could provide data on what plants were grown and associated time period
Honua 8	Habitation Site	Excavation would provide data on activities and use of the site as well as associated time period
Honua 11	Habitation Site	Excavation would provide data on activities and use of the site as well as associated time period
Honua 12	Earthen Pit	Excavation would provide data on function, use, and associated time period
SIHP # -7079	Agricultural Complex	The function of Feature D (mound) is unknown; excavation would provide data on function and potential time period
Source: Honua 2018		

Preservation Plan

The Petitioner intends to preserve and protect (conserve) all features within the proposed Cultural Preserve through creation of a Preservation Plan, written in accordance with HAR 13-277.

Cemetery expansion may impact some or all features of SIHP # -7079 (Agricultural Complex in poor to remnant condition). If impacted, Feature A (grinding stone) would either be preserved in place or relocated to an appropriate location within the Cultural Preserve in accordance with the Preservation Plan developed.

Two sites not located within the Petition Area (SIHP # -4681 [hab complex] and Honua 8 # -8235 [hab site]) would be avoided and thus protected. SIHP # -8230, Honua 3 ('Auwai) is not located within the Cultural Preserve, but would be avoided and consequently preserved due to its function as a habitat for the endangered Blackline Hawaiian Damselfly.

The Preservation Plan would include a management component that establishes guidelines for managing activities occurring within the Preserve, which continues to allow cultural practitioners to access the site for cultural practices and gathering. This Preservation Plan for the Cultural Preserve would address:

1. Establish the proposed Cultural Preserve and support development of a preservation and management plan that includes participation by cultural advisory groups, the Ko'olaupoko Hawaiian Civic Club, and the Petitioner to foster appropriate cultural management of the preserve.
2. Allow community members and organizations to engage in regular maintenance of Kawa'ewa'e Heiau and the surrounding cultural landscape and historic sites.
2. Determining buffer areas for the Heiau and other sites.
3. Working with the community to develop educational and interpretive programs.
4. Working with practitioners to protect culturally significant hula and medicinal plants.
5. Allowing for restoration of the cultural landscape, including but not limited to 'auwai and historic terraces. The 'auwai associated with the well and seep (SIHP # -8230 site) could be included as part of these restoration and management activities.
6. Addressing new burials within the Preserve following traditional native Hawaiian protocols.
7. Follow recommendations for all historic sites presented in the final AIS.

Archaeological Monitoring

An archaeological monitoring program would be designed in coordination with SHPD. The monitoring plan would be approved by SHPD prior to project implementation, in accordance with HAR 13-279.

Proposed Mitigative Measures

The proposed Cultural Preserve has been expanded and redesigned to account for the several newly identified sites found on or near the CP boundary (see Exhibit RT-A). This has occurred to ensure the most number of sites could be preserved and most significant historic sites, culturally significant resources, and traditional and customary practices would not be impacted by project improvements.

Exhibit RT-A

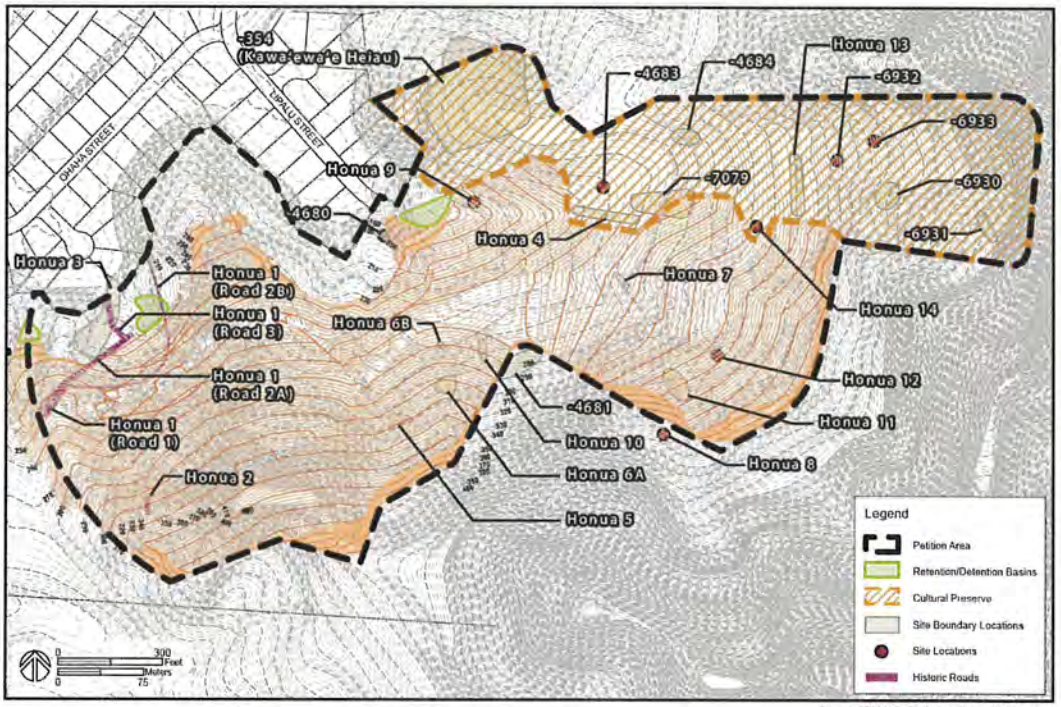


Figure 4.4 Existing Historic Sites Affected by Project
Source: *Hawaiian Memorial Park Cemetery Exansion Project Final Environmental Impact Statement* April 2019; page 4-28
Honua Consulting

Exhibit RT-A

EXHIBIT 1

DAVID Y. IGE
GOVERNOR OF
HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES
ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE
COMMISSION LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD., STE 555
KAPOLEI, HI 96707

April 8, 2019

IN REPLY REFER TO:
Log No. 2018.02114
2019.00690
Doc. No. 1904SL01
Archaeology

Daniel E. Orodenker
Executive Officer
Land Use Commission
Department of Business, Economic Development & Tourism
State of Hawaii
235 S. Beretania Street, # 406
Honolulu, HI 96813

Dear Mr. Matsubara:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
LUC Docket No. A17-804/Hawaiian Memorial Life Plan, Ltd.
Hawaiian Memorial Park Cemetery Expansion Project
Archaeological Inventory Survey for Hawaiian Memorial Park
Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu
TMK: (1) 4-5-003:001

This letter provides the State Historic Preservation Division's (SHPD's) review of the revised archaeological inventory survey (AIS) report titled, *Archaeological Inventory Survey Report for Hawaiian Memorial Park, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu, TMK: (1) 4-5-003:001 (Thurman et al., March 2019).* The SHPD received the original draft AIS report with the LUC application on September 9, 2018 (Log No. 2018.02114). SHPD previously received a EIS preparation notice on January 7, 2018 (Log No. 2018.0044) and a draft EIS on September 7, 2018 (Log No. 2018.02103). Following an email request on March 29, 2019 for revisions to the AIS report (Susan Lebo [SHPD] to Trisha Kehaulani Watson [Honua Consulting]), SHPD received the revised AIS (Log No. 2019.00690) via email on April 1, 2019 (Rosanna Thurman to Susan Lebo).

The property is privately owned by Hawaiian Memorial Life Plan, Ltd. The project area is approximately 53.45 acres. The proposed project is to expand the existing Hawaiian Memorial Park Cemetery, involving specific construction activities within two distinct portions of the project area, a 14.5-acre proposed Cultural Preserve (CP) in the northeast portion of the project area and expansion of the cemetery in the remaining 38.95-acre portion of the project area. Proposed project improvements within the CP include clearing of vegetation, creation of walking trails, and installation of interpretive signage. Project construction outside the CP includes mass earth moving to level the existing hillside, creation of an access driveway, installation of a drainage system, and landscaping. There is also discussion of adding a Hawaiian burial interment area. Ground disturbance within the proposed CP would extend to 0.9 meters deep (3 ft.) for removal of existing trees and vegetation, approximately 0.6 meters deep (2 ft.) for pounding-in signage posts, and shallow grading to create walking trails. Ground disturbance outside of the CP will include mass earth moving, ranging from 6 to 30 meters deep (20-100 ft.) at higher elevations of the hillside to level the area. To the extent necessary, the excavated soil will be redistributed within the project area. Drainage installation will utilize low areas of the project area.

The AIS was conducted on behalf of Hawaiian Memorial Life Plan, Ltd. It involved a 100% coverage pedestrian survey of the project area and excavation of two test pits (TU 1 and TU 2) and an exploratory excavation within a single historic property, Site 50-80-10-8241, a historic charcoal kiln. The AIS fieldwork included re-locating and

further documenting 10 previously recorded sites and documenting 14 newly-identified sites. The previously identified sites include 8 within the CP: Kawa'ewa'e Heiau [Site 50-80-10-354], a historic charcoal kiln [Site 50-80-10-4683], traditional habitation complex [Site 50-80-10-4684], a traditional ceremonial stone enclosure [Site 50-80-10-6930], a traditional ceremonial area [Site 50-80-10-6931], a historic stone storage feature [Site 50-80-10-6932], a historic charcoal kiln [Site 50-80-10-6933], and a traditional agricultural complex [Site 50-80-10-7079]. Two previously identified sites were further documented outside the CP: a historic water retention terrace [Site 50-80-10-4680] and a traditional habitation complex [Site 50-80-10-4681].The newly-identified sites outside the CP include historic dairy roads [Site 50-80-14-8228], a historic road segment [Site 50-80-10-8229], a historic 'auwai [Site 50-80-14-8230], an 'auwai with associated terraces [Site 50-80-10-8232], agricultural terrace remnants [Sites 50-80-10-8233, -8234, and -8237], a historic water retention terrace [Site 50-80-10-8236], possible habitation sites [Sites 50-80-10-8235 and -8238], and an earthen pit [Site 50-80-10-8239]. Within the CP, the AIS recorded additional features of Kawa'ewa'e Heiau [Site -354]; expanded Site -7079 to include several terrace remnants and a stone mound; and recorded Site 50-80-10-8240, a terraced drainage 'auwai. Two newly-identified sites occur on the southern border of the proposed CP, including a terraced 'auwai [Site 50-80-10-8231] and a historic charcoal kiln [Site 50-80-10-8241]. Both will be included within the boundaries of the proposed CP.

The AIS results support a project effect determination of "Effect, with agreed upon mitigation commitments" pursuant to HAR 13-284-7(2). The agreed upon mitigation commitments are: data recovery, preservation, and archaeological monitoring. No further work is recommended for six sites [Sites -4680, -8228, -8232, -8236, - 8237] and for Feature A at Site -8233. They have been adequately documented. No further work is recommended for Site -8241, which will be included within the CP. Data recovery excavations are recommended for Site -8233 Feature B [modified outcrop], at Sites -8234, -8235, -8238, and -8239, and data recovery or preservation is recommended for Site -7079 [agricultural complex]. Preservation within the CP is recommended for Sites -354, - 4683, -4684, -6930, -6931, -6932, -6933, -8231, -8240, and -8241. Preservation outside the CP includes Sites -4681, -8230, and -8235.

The revisions adequately address the issues and concerns identified in our previous correspondence. This AIS report satisfies the requirements of HAR §13-276-5. **It is accepted.** Please send one hard copy of the document, clearly marked FINAL, along with a text-searchable PDF version, to the Kapolei SHPD office, attention SHPD Library.

Pursuant to HAR §13-284-3, Steps (1) through (4) of the historic preservation review process are complete. The SHPD concurs that the survey identification efforts were adequate, agrees with the significance assessments, agrees with the project effect determination, and accepts the agreed upon mitigation in the form of data recovery for four sites, as well as Feature B at Site -8233; data recovery or preservation of Site -7079; preservation of 10 sites within the CP and 3 sites outside the CP; and archaeological monitoring during project work.

As stipulated in HAR §13-284-7, when SHPD comments that a project will result in "effect with agreed upon mitigation commitments," then detailed mitigation plans shall be developed for SHPD review and acceptance, prior to project work commencing. **SHPD looks forward to** receiving a data recovery plan (DRP) meeting the requirements of HAR §13-278-3, a preservation plan (PP) meeting the requirements of HAR §13-277, and an archaeological monitoring plan (AMP) meeting the requirements of HAR §13-279-4.

SHPD will notify the LUC when the DRP, PP, and AMP have been reviewed accepted and the permit issuance process may proceed.

Please contact Dr. Susan A. Lebo, Archaeology Branch Chief, at Susan.A.Lebo@hawaii.gov or at (808) 692-8019 for any concerns regarding archaeological resources or this letter.

Aloha,
Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: Trisha Kehaulani Watson, Honua Consulting, watson@honuaconsulting.com
Rosanna Thurman, Honua Consulting and OASES, rosannathurman@gmail.com

Rosanna Runyon Thurman, M.A.

890 Puuikena Dr., Honolulu, HI 96821, (808) 927-9920 cell
rosannathurman@gmail.com

PROFILE A professional archaeologist with 12+ years experience in Hawai'i and central United States with a focus in oceanic archaeology, pre-contact economic and political organization, and community archaeology.

Education

2011-2014 **University of Hawai'i-Mānoa.** M.A. through the Applied Archaeology Program. GPA: 3.88. M.A. Paper: Archaeological Investigations at Maunawila Heiau.

2000-2004 **University Missouri-St. Louis, Pierre Laclede Honors College.** BA in Anthropology, Cum Laude. Thesis: A Possible Civil War Guerilla Battlesite in Blue Springs, Missouri.

Career Work Experience

2014-Present **Honua Consulting**. Principle Investigator. Supervise archaeological projects, consult with state officials and clients, write and revise reports, supervise lab work, hire and train field archaeologists. (September- Present)

2014-Present **Oceanic Archaeological Science and Educational Services (OASES).** Owner and Principal Investigator. Conduct archaeological fieldwork, lab analysis, research, report writing, and consultation with community and state officials. (March- Present)

2014-Present **TCP Hawai'i**. Contract Archaeologist. Conduct archaeological survey and field documentation. Work on O'ahu, Maui, and Big Island. (May- Present)

2013 **Bernice Pauahi Bishop Museum (BPBM).** Intern in the Archaeology Lab. Curation of artifacts from Wai'ahukini Rock Shelter (H8) on Hawai'i Island, analysis of shell midden from South Point (H1) on Hawai'i Island, data entry of museum collections, and assistance with museum events. (Aug.- Dec.)

2007-2013 **Cultural Surveys Hawai'i (CSH).** Field Archaeologist and Lab Supervisor. Completed inventory survey, data recovery, monitoring, report writing, client correspondence and meetings, and burial treatment. Conducted and trained lab analyses and handled out-sourcing of lab samples for the CSH office. Worked on O'ahu, Hawai'i, Kaua'i, Moloka'i, and Maui. (March- December)

2010-2011 **UH-Maui College.** Assistant Field Supervisor for Moku'ula Fieldschool, Lahaina, Maui. Taught college students and community volunteers stratigraphic documentation, hand drawn profile and plan maps, artifact cataloguing, and standard curation techniques. (Summer Programs, July- Aug.)

2006 **Missouri Department of Transportation (MoDot).** Historic Preservation Intern, Archaeology Department. Surface survey, excavation, archaeological monitoring, lab work, artifact cataloguing and curation, and water flotation. Extensive state-wide travel. (June- Dec.)

2005 **Illinois Transportation Archaeological Research Project (ITARP).** Areal (large-scale) excavation of a Woodland Period archaeological site. Drew grid, plan, profile and piece plot maps, photographed and recorded artifacts, and maintained daily field logs. Conducted lab work including washing, labeling, and curation of artifacts. (June- Oct.)

2004-2005 **Sailing Yacht "Show Me".** Paid Deckhand through Pacific Ocean on 65-foot vessel. Stood four-hour shifts steering and being lookout, assisted in all sailing duties in all weather conditions, washed dishes and performed general maintenance duties. Sailed from Ko'Olina, O'ahu, to Christmas Island and Palmyra in the Kiribati Islands, Manihiki and Suwarrow in the Cook Islands, and Tutuila, American Samoa (May-August 2004); Sailed from Sydney, Australia to Hobart, Tasmania, and Picton, New Zealand (Feb.- June 2005)

2004 **Saint Louis Art Museum**. Intern for Education and Outreach Department. Assisted with development and teaching of educational programs for schools and community groups, planned group member trips, catalogued pictures and slides, and performed secretarial duties. (Aug.- Dec.)

2000-2004 **University Missouri-St. Louis.** Student Teacher for the Center for Human Origins and Cultural Diversity (CHOCD) Program. Taught students, teachers and community groups of all ages the four sub-fields of anthropology using hands-on activities in the Human Origins and African Cultures Labs.

Honors, Awards, Grants, Memberships, Certifications

2019 OPSEC Awareness for Military, DoD Employees, and Contractors (Oct. 22)
2019 Anti-terrorism Awareness Training, Chiefs of Staff (Oct. 19)
2018 Mālama Mānoa Grant ($4000), Preservation Plan for Kāmanele Park, Mānoa
2017 Teaching Curation Certificate, Society for American Archaeology (Nov. 2)
2017 Section 106 Agreement Docs Cert., National Preservation Institute (Feb. 21-22)
2016 NAGPRA Essentials Certificate, National Preservation Institute (March 2)
2015 Traditional Cultural Places Cert., National Preservation Institute (Nov. 19-20)
2015-2017 Member of the National Association of Professional Women (NAPW)
2014 Ocean Education Fellowship Grant ($6000), Archaeology at Maunawila Heiau
2014 Mālama Ko'olauloa Grant ($2500), Cultural Sites & Community Education
2013 UH-Mānoa Kuleana Award for Stewardship
2013-2019 Society for American Archaeology member
2012-2013 UH-Mānoa Anthropology Dept. Graduate Scholastic Achievement Award
2009-2017 Hazwopper Training and Certification
2009-2012 First Aid and CPR Certification
2007-2019 Society for Hawaiian Archaeology member
2006 Environmental and Historic Preservation Training, MoDot (Sept.)
2004 Who's Who Among Colleges and Universities Award
2003-2004 Pierre Laclede Honors College, UM-St. Louis Scholarship

Academic Activities/Presentations/Events

2019 **Society for Hawaiian Archaeology Conference.** Created "Community Archaeology at Kamānele Park, Mānoa, O'ahu". Presented by Radha Martin.

2018 **Nā 'Ōpio o Maunawila Open House**. Ran artifact display and provided information on the Maunawila Heiau property. Funded by HILT. (July 14)

2018 **Lā 'Ohana Community Open House**. Ran artifact display and provided information on the Maunawila Heiau property. Funded by HILT. (Feb. 10)

2017-2018 **Mea Kūpuna: Community Artifact Analysis**. Held four training sessions on analysis of traditional Hawaiian and historic artifacts. Funded by HILT. (Oct. 14, 2017 [2 sessions], July 7, 2018 and July 18, 2018)

2017 **Maunawila Heiau Artifact Display and Educational Booth**. Ran artifact display, Hawaiian stamp myth boards, Can You Map Like an Archaeologist?, & Stratigraphy Challenge. Funded by HILT. (Events: Aloha Ko'olauloa April 15; Hau'ula Summer Fun July 13; Hau'ula Ho'olaulea July 22)

2016 **Conservation Service Team Leader Training**. Provided training on site preservation to support community stewardship. Funded by HILT. (April 23)

2015 **Society for Hawaiian Archaeology Conference.** Presented "Variability in Traditional Planting Strategies as Illustrated by the Kahalu'u (Kona) Field System". TCP Hawai'i Project. (Līhu'e, Kaua'i, Oct. 10)

2014 **Maunawila Heiau Blessing and Open House**. Provided a site tour and ran an educational booth with artifact display. (Oct. 25)

2014 **Society for Hawaiian Archaeology Conference.** Presented "Designing Archaeological Projects to Incorporate the Community: An Overview of Grant Projects Conducted in Hau'ula Ahupua'a, O'ahu". (Oct. 12)

2014 **Maunawila Heiau Docent Training**. Created a Scripted Tour in coordination with local teachers and community members, provided informative tours, and attended community meetings. (Tour Training Days: Sept. 27, Oct. 18)

2014 **North Shore Ocean Fest**. Ran an educational booth on Maunawila Heiau. Created an artifact display and Stratigraphy Challenge activity. Conducted in fulfillment of an Ocean Education Fellowship grant. (June 7)

2014 **Watershed Detectives After-School Program.** Taught 4th- 6th grade students about natural and cultural resources in Hau'ula Ahupua'a. Designed an Archaeological Detective Journal activity. Taught students at the Maunawila Heiau property (April 16 & 23) and Hau'ula Beach Park (June 18).

2013 **Kapi'olani Community College.** International Education Week Class Presentation. "Cultural Resource Management in Hawai'i". (Nov. 18)

2013 **Society for American Archaeology Conference**. "Archaeological Investigations and Community Involvement at Maunawila Heiau". (April 7)

2012-2015 **Brigham Young University-Hawai'i.** Provided educational site tours through the Maunawila Heiau property (2 classes per semester). Presented "Introduction to Hawaiian Archaeology" university presentation (Nov. 6, 2012).

2012 **Society for Hawaiian Archaeology Conference.** "Archaeological Investigations of a Traditional Hawaiian Site Complex: Systematic Documentation and Community Involvement at Maunawila Heiau". (Oct. 20)

2011 **Society for Hawaiian Archaeology Conference.** "Moku'ula: New Stratigraphic Sequence on the Filling of Moku'ula and Mokuhinia". (Oct 1)

2010 **Society for Hawaiian Archaeology Conference.** "Archaeological Investigations at the Royal Hawaiian Hotel in Downtown Waikīkī". (Oct. 17)

2010 **Cultural Surveys Hawai'i Company Meeting Presentation.** Out-Sourcing of Lab Samples for Analysis. Focus on charcoal identification, radiocarbon dating, energy dispersive x-ray fluorescence (EDXRF), and pollen analyses.

2004 **University of Missouri-St. Louis, Anthropology Department Symposium.** "Documenting Islands of the South Pacific".

2004 **University of Missouri-St. Louis, Classroom Guest Presenter.** Cultures of Oceania. "Documenting Islands of the South Pacific". Conducted by request of Jacquelyn Lewis-Harris, anthropology professor and director of CHOCD.

2003 **UM-St. Louis and Washington University.** Conducted lab analysis and artifact curation for Hidden Valley Rock Shelter located in Jefferson County, Missouri. Assisted and supervised by state archaeologists at Washington University Archaeology Lab. "Hidden Valley Rock Shelter" presentation and 10-page paper on findings, UM-St. Louis and Washington University Archives.

2002-2004 **University of Missouri-St. Louis, Center for Human Origins and Cultural Diversity Program (CHOCD).** Created "Exploring the Knowledge of Ancient Egypt" video documentary, curriculum, and learning station. Included three hands-on activities, reference pictures, timeline chart, and magnetic geography, architecture and resource maps. For use as a traveling program for 4^{th}-6^{th} grade classrooms as a curriculum unit. Reimbursed for expenses.

Volunteer Work

2015-2017 Volunteer at State Historic Preservation Division, Kapolei Office (occasional)
2014 Bernice Pauahi Bishop Museum Archaeology Lab, Catalogued Marine Shell and Artifacts from South Point, Big Island (January-June)
2013 Volunteer for Society for American Archaeology Conference (April 3-4)
2013 Volunteer Teaching Assistant for UH-Mānoa Physical Anthro. Lab (Spring)
2011 Archaeological volunteer for Ulupō Heiau Ho'ike (July 23)
2010 Volunteer at State Historic Preservation Division, Kapolei Office
2009-2012 Volunteer Worker for maintaining Waikalua Fishpond, Kane'ohe, O'ahu Is.
2007-2009 Hana Relay race participant, Valley Isle Road Runners non-profit event

Additional Skills

Computer Programs: Proficient in Word, Excel, PowerPoint, Adobe Illustrator, and Adobe Photoshop. Experience with Access, ArcGIS, AutoCAD, and OxCal

Field Mapping Techniques: Proficient with GPS (Hand-held and Survey Grade), Total Station, Theodolite, Plane Table, Tape and Compass, and Laser Distance Mapping

Additional Interests: Archaeological Lab Analyses, Community Education and Outreach, Museum Studies, Artifact Curation and Display, Historic Preservation

Sample of Publications and Projects Headed as Crew Chief and Report Author

Thurman, Rosanna and Catharine Thetford

2019 *End of Fieldwork Report for Kamānele Park, SIHP #50-80-14-8768, Waikīkī Ahupua'a, Kona (Honolulu) District, Island of O'ahu, TMK: [1] 2-9-003:006.* Oceanic Archaeological Science and Educational Services (OASES), Honolulu, Hawai'i.

Thurman, Rosanna, Kepā Maly and Trisha Kehaulani Watson

2019 *Archaeological Reconnaissance Survey and Preservation Plan for King Kamehameha III Summer Estate, Kaniakapūpū, SIHP #50-80-14-0409, N.R. #86002805, Honolulu Ahupua'a, Kona (Honolulu) District, Island of O'ahu, TMK: [1] 2-2-054:001.* Honua Consulting, Honolulu, Hawai'i.

Thurman, Rosanna and Trisha Kehaulani Watson

2018 *Archaeological Literature Review for Kaua'i Emergency Flood Repairs and Clean Up, Wai'oli, Waipā, Waikoko, Lumaha'i, Wainiha & Hā'ena Ahupua'a, Halele'a District, Island of Kaua'i, Various TMK.* Honua Consulting. Additional Report for Project: Monitoring Plan (Thurman and Watson 2018)

Thuman, Rosanna, Catharine Thetford, Arleen Garcia-Herbst, and Trisha Watson

2018 *Archaeological Inventory Survey for Hawaiian Memorial Park, Kāne'ohe Ahupua'a, Ko'olaupoko District, O'ahu.* Honua Consulting.

Thurman, Rosanna M.R., Bee Thao, and Trisha Kehaulani Watson

2018 *Draft Archaeological Monitoring Report for McKinley High School Synthetic Track and Field Project, Honolulu (Kewalo) Ahupua'a, Kona District, O'ahu.* Honua Consulting.

Thurman, Rosanna Runyon and Trisha Watson

2017 *Archaeological and Architectural Literature Review and Field Inspection Reports* for Federal Communication Commission (FCC) Wireless Telecommunications Service Facilities. 20+ Projects. Honua Consulting.

Thurman, Rosanna Runyon, Bee Thao, Catharine Thetford, and Trisha Watson

2017 *Archaeological Inventory Survey Report for Proposed New Naval Facility, U.S. Coast Guard: Air Station Barbers Point.* Honua Consulting. Additional Report for the project: Monitoring Plan (Thurman and Watson 2017)

Thurman, Rosanna Runyon, Bee Thao, Catharine Thetford, and Trisha Watson
2017 *Archaeological Monitoring Report for the Kalaniana'ole Highway Resurfacing Project, West Hind Drive to the Vicinity of Hanauma Bay Road, Waikīkī Ahupua'a, Kona District and Waimānalo Ahupua'a, Ko'olaupoko District, Island of O'ahu.* Honua Consulting, Honolulu, Hawai'i.

Thurman, Rosanna Runyon, Bee Thao, Catharine Thetford, and Trisha Watson
2016 *Archaeological Inventory Survey Report for 413 Seaside Avenue, Waikīkī Ahupua'a, Kona (Honolulu) District, Island of O'ahu TMK: [1] 2-6-021:056, 057, 062, 065.* Honua Consulting. Additional Reports for this Project: Burial Treatment Plan, Burial Site Component of a Data Recovery Plan, Monitoring Plan (Thurman and Watson 2016)

Thurman, Rosanna Runyon and Catharine Thetford
2016 *Archaeological Inventory Survey Report for Maunawila Heiau, SIHP #50-80-05-287, Hau'ula Ahupua'a, Ko'olauloa District, O'ahu.* OASES. Additional Reports for the project: Supplemental Archaeological Inventory Survey, Preservation Plan, Monitoring Plan (Thurman 2016, 2017)

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2010 *Archaeological Monitoring of Vegetation Clearing of Leleahina Heiau.* CSH.

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References

Trisha Kehaulani Watson, PhD Office: (808) 392-1617 watson@honuaconsulting.com
Owner and Senior Consultant, Honua Consulting
4348 Wai'alae Avenue #254, Honolulu, Hawai'i 96816
Fax: +1 888 392 4941, www.honuaconsulting.com

Dodge Watson, B.A. Office: (808) 392-1617 dodge@honuaconsulting.com
Director, Honua Consulting
4348 Wai'alae Avenue #254, Honolulu, Hawai'i 96816
Fax: +1 888 392 4941, www.honuaconsulting.com

Christopher Monahan, Ph.D. mookahan@gmail.com
Owner, TCP Hawai'i

Rebekah Walker, M. A. rebekah.walker@hilt.org
Maunawila Heiau Site Coordinator, Hawaiian Islands Land Trust

Jaquelyn Lewis-Harris Office: (314) 516-6023 Jahl@umsl.edu
Assistant Professor of Education and Director of Center for Human Origins & Cultural Diversity Program (CHOCD), University of Missouri-St. Louis and Visiting Professor at University of Hawai'i-Hilo (2012) and University of Hawai'i-West O'ahu (2014)

Hallett H. Hammatt, Ph.D. Office: (808) 262-9972 hhammatt@culturalsurveys.com
Owner, Cultural Surveys Hawai'i

James Bayman, Ph. D. Office: (808) 956-8511 jbayman@hawaii.edu
Professor, UH-Mānoa Anthropology Department

Testimony of
TRISHA KEHAULANI WATSON, J.D., PH.D
HONUA CONSULTING
SLUC Docket No. A17-804 Hawaiian Memorial Life Plan, Ltd.

In the Matter of the Petition of Hawaiian Memorial Life Plan, Ltd. To Amend the State Land Use District Boundary of Lands Situated at Kāne'ohe, O'ahu, Hawai'i
TMK: (1) 4-5-033: Portion of 001

My name is Trisha Kehaulani Watson and I am the owner of Honua Consulting, a firm with expertise in environmental and cultural assessments; community consultation and mediation; facilitation; and strategic planning. Honua Consulting has been a respected leader in environmental and cultural resource management for over a decade. My team and I prepared the archaeological inventory survey and cultural impact assessment for the Hawaiian Memorial Park Cemetery Expansion Project (included as Appendices J and K, respectively of the Final Environmental Impact Statement). I was responsible for the preparation of both these studies, but primarily led the drafting of the CIA. A copy of my curriculum vitae is enclosed.

Scope of Study

Honua Consulting was retained by HHF Planners to assess the impact of the proposed project to archaeological and cultural resources with the Petition Area. Our efforts resulted in the completion of an Archaeological Inventory Survey (AIS) and Cultural Impact Analysis (CIA). The area of potential effect (APE) for the AIS study considered the entire 53.45-acre Petition Area. The AIS involved background research on pertinent historic and archaeological information; a 100% pedestrian surface survey of the Petition Area; site documentation of all historic properties encountered; excavation of one site (SIHP # -8241); and consultation with individuals knowledgeable about the area history. The AIS has been finalized and accepted by the State Historic Preservation Division (SHPD) as documented in their April 8, 2019 acceptance letter included in Exhibit 1.

The CIA involved gathering of historic cultural information from archival sources and conducting interviews with cultural descendants, lineal descendants, or other knowledgeable cultural practitioners. The methodology used to prepare the CIA follows the analytical framework established in *Ka Pa'akai O Ka 'Āina v. Land Use Commission*, 2000 (*Ka Pa'akai*).

Our work supporting the AIS and CIA allowed our team to identify potential impacts to historic properties and cultural resources, and develop reasonable mitigation measures to minimize potential impacts. I will briefly summarize the findings from the CIA. Honua Consulting's principal investigator, Rosanna Thurman, has provided testimony regarding the AIS.

I. CULTURAL IMPACT ANALYSIS RESULTS

The CIA for the project broadly covers the Kāne'ohe ahupua'a and focuses on areas near or adjacent to the Petition Area. The CIA identified tangible and intangible cultural resources of this area. The methodology used to assess project impacts on cultural resources follows the analytical framework established in *Ka Pa'akai O Ka 'Āina v. Land Use Commission* (2000). CIA research efforts identified a number of cultural resources associated with the Petition Area that include intangible resources, historic sites, natural resources, and traditional and customary native Hawaiian practices. The following discussion summarizes resources identified, project impacts, and recommended mitigative measures.

Interviews and Consultations

Interviews occurred with lineal and cultural descendants, and recognized cultural experts with ties to the Kāne'ohe ahupua'a and to the Petition Area. In particular, the interview process focused on identifying and speaking with cultural practitioners, specifically Kumu Hula, who accessed or have knowledge about area resources. These individuals were identified through community member recommendations and expertise along with the body of individuals consulted as part of a 2008 CIA prepared by Cultural Surveys Hawaii (CSH) as part of a Final EIS that covered an earlier proposal for this cemetery expansion.

New Interviews

Efforts were taken to interview individuals that were unable to be consulted for the prior 2008 CIA, with a focus on Native Hawaiian cultural masters. The primary focus was to identify and interview cultural practitioners, specifically Kumu Hula, who accessed or have knowledge regarding area resources.

Eleven individuals were interviewed for this current CIA. Of these individuals, one individual interviewed for the 2008 CIA was re-interviewed. Two individuals unable to be interviewed for the 2008 CIA were interviewed. An advertisement was also placed in the State Office of Hawaiian Affairs (OHA) *Ka Wai Ola* February 2018 newspaper requesting information about possible resources in the Petition Area.

Intangible Resources

Intangible resources associated with the Petition Area include mo'olelo (legends), 'ōlelo no'eau (wise sayings), and mele (chants). Mo'olelo associated with the Petition Area include those associated with the demigod Kamapua'a, who is connected to the Windward O'ahu. Specific mo'olelo associate Kamapua'a with Kawa'ewa'e Heiau, where the demigod's father 'Olopana attempts and fails to sacrifice Kamapua'a. Three 'ōlelo no'eau were identified that were related

to the broader Kāne'ohe area and place names within the ahupua'a. Three mele were also identified that were associated with broader Kāne'ohe and Ko'olau regions.

Historic Sites

Many historic sites identified in the Petition Area have been destroyed or degraded by prior agricultural activities, development initiatives, or invasive plant growth. Kawa'ewa'e Heiau is considered the most prominent of these sites. The site was a luakini heiau, which were heiau dedicated to human sacrifice and prayers by ruling chiefs. The heiau was noted in prior archaeological studies of the Petition Area to be in a degraded condition with few features recognizable. A hōlua slide was reported to be located near Kawa'ewa'e Heiau. Early archaeological investigations were able to locate the site. However, later archaeological research noted the slide was destroyed by attempts to cultivate pineapple in the Petition Area.

Natural Resources

Culturally significant flora and fauna are associated with the Petition Area. Vegetation in the Petition Area is a mixture of invasive, endemic, indigenous, and Polynesian introduced plant species. Of the 95 plant species identified, 13 were culturally significant to native Hawaiians. Of these species, laua'e, pala'a, tī, kukui, and palapalai are important to highlight given their usage by cultural practitioners for hula practices. In particular, laua'e fern are used in the process of perfuming kappa and are commonly included in lei.
Many believe the fern species identified in the Petition Area, *Phymatosorus grossus*, is the species referred to in mo'olelo. However, evidence suggests *P. grossus* was introduced to Hawai'i in the early 20th century. The name "laua'e" originally referred to *Microsorum spectrum*, an endemic species similar in size and scent to *P.grossus*. *M. Spectrum* is likely the species mo'olelo refer to. Laua'e possesses cultural significance to native Hawaiians, despite confusion about the associated plant species.

The majority of faunal species identified in the Petition Area are not culturally significant. The only native faunal species identified was the Pacific Golden-Plover (*Pluvialis fulva*), known as the Kōlea. This indigenous migratory shorebird plays an important role in many native Hawaiian myths and was believed to be messengers of the gods and divine chiefs.

Traditional and Customary Native Hawaiian Practices

Traditional and customary native Hawaiian practices currently occurring in the Petition Area include maintenance of Kawa'ewa'e Heiau and the surrounding area along with gathering of culturally significant plants associated with hula practices. The heiau currently requires extensive clearing given the widespread growth of invasive flora. Community members would be interested in assisting with heiau maintenance if the site was cleared of invasive trees and brush. Ko'olaupoko Civic Club members also expressed concerns about accessibility to the heiau for kūpuna.

Various cultural practitioners noted the Petition Area is a valued source of hula related plants including Laua'e and the Pala'a fern as well as plants with traditional medicinal value. One interviewee noted that Laua'e found in the Petition Area are especially valued because of the high quality of their color and scent. Other cultural practitioners mentioned accessing the Petition Area to gather culturally significant plants from Līpalu Street.

Project Effects on Traditional and Customary Native Hawaiian Practices

Overall, culturally significant resources and practices within the Petition Area would be enhanced by the project due to the establishment of the Cultural Preserve supporting cultural practices, cultural landscape restoration, and maintenance and management of resources and historic sites. The Cultural Preserve would be managed under a Preservation Plan developed jointly by the Ko'olaupoko Hawaiian Civic Club and the Petitioner that would provide for the long-term maintenance and preservation of resources, which is a beneficial effect.

Some practitioners were concerned that grading plans for the cemetery's expansion would impact flora such as Laua'e and Pala'ā because of the extensive cut and fill improvements. However, the Cultural Preserve has similar flora and would provide significant opportunities to improve Laua'e and Pala'ā habitat, by providing an area where such resources can be grown and managed in a more accessible and effective manner by the Ko'olaupoko Hawaiian Civic Club and associated practitioners. Leaving conditions as they are now may result in a greater threat to the existing flora due to unrestricted growth of invasive vegetation, erosion, along with threats posed from unauthorized recreational activities and trespassers. Landscaping plans can also allow seeds or cuttings from extant endemic plants to be collected and grown or replanted within the Cultural Preserve as part of cultural landscape restoration.

Interviews with practitioners identified no traditional and customary practices associated with fauna in the Petition Area that would potentially be impacted by the project. Fauna present are alien species and deleterious to native ecosystems and their dependent species (e.g. feral pigs, rats). Kōlea present in the Petition Area would not be impacted by the project as the area would continue to provide potential habitat for this species. Grassed landscaped areas that would be established would provide a more suitable foraging habitat for this species and would not provide suitable habitat for Kōlea predators.

Numerous native Hawai'ians expressed concerns about the potential impact to Kawa'ewa'e Heiau and surrounding historic sites. The final AIS determined the project would have an overall positive and beneficial impact on previous and newly identified sites in the Petition Area through establishment of the Cultural Preserve. A total of 10 sites, including Kawa'ewa'e Heiau, would be located in the Preserve. These sites would benefit from cultural landscape restoration, historic site restoration, and cultural practices. The Preservation Plan developed would ensure proper management and maintenance of associated sites. Several sites that would be impacted by grading activities were determined under the final AIS to 1) require no further work or 2) be

included in a data recovery program to mitigate project impacts. As a result, adverse impacts to these sites are not anticipated.

Establishment of the Cultural Preserve would benefit associated historic sites including Kawa'ewa'e Heiau, and would facilitate heiau restoration and management under a Preservation Plan. The area designated for the Preserve has been used for generations by Kumu Hula. Laua'e, Pala'ā, Tī, Kūkui, Palapalai, and other hula plants grow in this area. Kumu Hula access the area, care for the area and its resources, and use the resources for cultural practices. They also teach these practices to their students. In this manner, the area is important for perpetuating cultural practices. Establishing the Preserve allows continuation of cultural practices under the Preservation Plan, positively impacting these practices.

It is further critical to include the property in the petition area and rezone the area from conservation to urban so Hawaiian practitioners would be able to conduct traditional practices, including burial practices, in the cultural preserve. This is an express wish by the Hawaiian practitioners, and this was also expressed during the Planning Committee hearings, during which Loea Hula Kawaikapu Hewett testimonies about the cultural practices in the area. It was expressly explained and understood by the Council that the amendment to the Sustainable Communities Plan was to allow for the entire preserve and expansion was to be rezoned into the urban district. It was due to this amendment and opportunity to rezone that the condition of the conservation easement was included in the action.

Some individuals consulted voiced concerns regarding trespassers in the area. As a result, the Petitioner is considering erecting a fence around the Petition Area perimeter to keep out trespassers that could harm area cultural resources. Practitioners would have access to the Preserve via the main HMP entrance and an access path planned from the expanded cemetery internal roads. This access would potentially provide a more convenient and accessible path to the Preserve and heiau. Another option is to allow continued access from the end of Līpalu Street. However, heiau access would not be improved because that area would remain and serve as a buffer from the cemetery. Thus, this access may be a more difficult (slope) and inconvenient (unimproved) route for long-term practitioner use.

Therefore, under the *Ka Pa'akai* analysis conducted as part of the CIA, the project would not adversely impact traditional and customary native Hawaiian rights. The rights of native Hawaiian cultural practitioners would be preserved and protected by avoiding development in any areas identified through the interviews or research as areas utilized for traditional or customary practices. Additionally, the Petitioner is taking the additional step of placing lands and resources used for traditional or customary practices into a Cultural Preserve and conservation easement. This would ensure the protection of these resources in perpetuity. The Petitioner has further agreed to continue to work with practitioners to ensure safe, regular access to the lands and resources for cultural practice.

Proposed Mitigative Measures

The proposed Cultural Preserve has been expanded and redesigned throughout the project development process. This has occurred to ensure the most significant historic sites, culturally significant resources, and traditional and customary practices would not be impacted by project improvements. The following measures are related to the Preserve and would minimize impacts to associated historic sites, cultural resources, and traditional and customary practices:

1. Establish the proposed Cultural Preserve and support development of a preservation and management plan that includes participation by cultural advisory groups, the Ko'olaupoko Hawaiian Civic Club, and the Petitioner to foster appropriate cultural management of the preserve.
2. Follow recommendations for all historic sites presented in the final AIS.
3. Continue to allow cultural practitioners to access the Cultural Preserve under the management guidelines established by the future Preservation Plan.
    a. Create safe access for kūpuna and practitioners to the heiau while limiting access from trespassers who could potentially degrade and harm the site and resources.
    b. A managed (gated and restricted) access can continue from Līpalu Street. However, a proposed new pathway through the expanded cemetery can be evaluated by the Ko'olaupoko Hawaiian Civic Club with the Petitioner to determine if it would be a better and more convenient alternative.
4. The Preservation Plan should address the following:
    a. Allow community members and organizations to engage in regular maintenance of Kawa'ewa'e Heiau and the surrounding cultural landscape and historic sites.
    b. Work with the community to develop educational and interpretive programs.
    c. Work with practitioners to protect culturally significant hula and medicinal plants.
5. Allow for restoration of the cultural landscape including but not limited to 'auwai and historic terraces. The 'auwai associated with the well and seep (Honua 3 site) could be included in restoration and management activities.

EXHIBIT 1

DAVID Y. IGE
GOVERNOR OF
HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE
MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES
ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE
COMMISSION LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD., STE 555
KAPOLEI, HI 96707

April 8, 2019

IN REPLY REFER TO:
Log No. 2018.02114
2019.00690
Doc. No. 1904SL01
Archaeology

Daniel E. Orodenker
Executive Officer
Land Use Commission
Department of Business, Economic Development & Tourism
State of Hawaii
235 S. Beretania Street, # 406
Honolulu, HI 96813

Dear Mr. Matsubara:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
LUC Docket No. A17-804/Hawaiian Memorial Life Plan, Ltd.
Hawaiian Memorial Park Cemetery Expansion Project
Archaeological Inventory Survey for Hawaiian Memorial Park
Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu
TMK: (1) 4-5-003:001

This letter provides the State Historic Preservation Division's (SHPD's) review of the revised archaeological inventory survey (AIS) report titled, *Archaeological Inventory Survey Report for Hawaiian Memorial Park, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu, TMK: (1) 4-5-003:001 (Thurman et al., March 2019).* The SHPD received the original draft AIS report with the LUC application on September 9, 2018 (Log No. 2018.02114). SHPD previously received a EIS preparation notice on January 7, 2018 (Log No. 2018.0044) and a draft EIS on September 7, 2018 (Log No. 2018.02103). Following an email request on March 29, 2019 for revisions to the AIS report (Susan Lebo [SHPD] to Trisha Kehaulani Watson [Honua Consulting]), SHPD received the revised AIS (Log No. 2019.00690) via email on April 1, 2019 (Rosanna Thurman to Susan Lebo).

The property is privately owned by Hawaiian Memorial Life Plan, Ltd. The project area is approximately 53.45 acres. The proposed project is to expand the existing Hawaiian Memorial Park Cemetery, involving specific construction activities within two distinct portions of the project area, a 14.5-acre proposed Cultural Preserve (CP) in the northeast portion of the project area and expansion of the cemetery in the remaining 38.95-acre portion of the project area. Proposed project improvements within the CP include clearing of vegetation, creation of walking trails, and installation of interpretive signage. Project construction outside the CP includes mass earth moving to level the existing hillside, creation of an access driveway, installation of a drainage system, and landscaping. There is also discussion of adding a Hawaiian burial interment area. Ground disturbance within the proposed CP would extend to 0.9 meters deep (3 ft.) for removal of existing trees and vegetation, approximately 0.6 meters deep (2 ft.) for pounding-in signage posts, and shallow grading to create walking trails. Ground disturbance outside of the CP will include mass earth moving, ranging from 6 to 30 meters deep (20-100 ft.) at higher elevations of the hillside to level the area. To the extent necessary, the excavated soil will be redistributed within the project area. Drainage installation will utilize low areas of the project area.

The AIS was conducted on behalf of Hawaiian Memorial Life Plan, Ltd. It involved a 100% coverage pedestrian survey of the project area and excavation of two test pits (TU 1 and TU 2) and an exploratory excavation within a single historic property, Site 50-80-10-8241, a historic charcoal kiln. The AIS fieldwork included re-locating and

further documenting 10 previously recorded sites and documenting 14 newly-identified sites. The previously identified sites include 8 within the CP: Kawa'ewa'e Heiau [Site 50-80-10-354], a historic charcoal kiln [Site 50-80-10-4683], traditional habitation complex [Site 50-80-10-4684], a traditional ceremonial stone enclosure [Site 50-80-10-6930], a traditional ceremonial area [Site 50-80-10-6931], a historic stone storage feature [Site 50-80-10-6932], a historic charcoal kiln [Site 50-80-10-6933], and a traditional agricultural complex [Site 50-80-10-7079]. Two previously identified sites were further documented outside the CP: a historic water retention terrace [Site 50-80-10-4680] and a traditional habitation complex [Site 50-80-10-4681].The newly-identified sites outside the CP include historic dairy roads [Site 50-80-14-8228], a historic road segment [Site 50-80-10-8229], a historic 'auwai [Site 50-80-14-8230], an 'auwai with associated terraces [Site 50-80-10-8232], agricultural terrace remnants [Sites 50-80-10-8233, -8234, and -8237], a historic water retention terrace [Site 50-80-10-8236], possible habitation sites [Sites 50-80-10-8235 and -8238], and an earthen pit [Site 50-80-10-8239]. Within the CP, the AIS recorded additional features of Kawa'ewa'e Heiau [Site -354]; expanded Site -7079 to include several terrace remnants and a stone mound; and recorded Site 50-80-10-8240, a terraced drainage 'auwai. Two newly-identified sites occur on the southern border of the proposed CP, including a terraced 'auwai [Site 50-80-10-8231] and a historic charcoal kiln [Site 50-80-10-8241]. Both will be included within the boundaries of the proposed CP.

The AIS results support a project effect determination of "Effect, with agreed upon mitigation commitments" pursuant to HAR 13-284-7(2). The agreed upon mitigation commitments are: data recovery, preservation, and archaeological monitoring. No further work is recommended for six sites [Sites -4680, -8228, -8232, -8236, - 8237] and for Feature A at Site -8233. They have been adequately documented. No further work is recommended for Site -8241, which will be included within the CP. Data recovery excavations are recommended for Site -8233 Feature B [modified outcrop], at Sites -8234, -8235, -8238, and -8239, and data recovery or preservation is recommended for Site -7079 [agricultural complex]. Preservation within the CP is recommended for Sites -354, - 4683, -4684, -6930, -6931, -6932, -6933, -8231, -8240, and -8241. Preservation outside the CP includes Sites -4681, -8230, and -8235.

The revisions adequately address the issues and concerns identified in our previous correspondence. This AIS report satisfies the requirements of HAR §13-276-5. **It is accepted**. Please send one hard copy of the document, clearly marked FINAL, along with a text-searchable PDF version, to the Kapolei SHPD office, attention SHPD Library.

Pursuant to HAR §13-284-3, Steps (1) through (4) of the historic preservation review process are complete. The SHPD concurs that the survey identification efforts were adequate, agrees with the significance assessments, agrees with the project effect determination, and accepts the agreed upon mitigation in the form of data recovery for four sites, as well as Feature B at Site -8233; data recovery or preservation of Site -7079; preservation of 10 sites within the CP and 3 sites outside the CP; and archaeological monitoring during project work.

As stipulated in HAR §13-284-7, when SHPD comments that a project will result in "effect with agreed upon mitigation commitments," then detailed mitigation plans shall be developed for SHPD review and acceptance, prior to project work commencing. **SHPD looks forward to** receiving a data recovery plan (DRP) meeting the requirements of HAR §13-278-3, a preservation plan (PP) meeting the requirements of HAR §13-277, and an archaeological monitoring plan (AMP) meeting the requirements of HAR §13-279-4.

SHPD will notify the LUC when the DRP, PP, and AMP have been reviewed accepted and the permit issuance process may proceed.

Please contact Dr. Susan A. Lebo, Archaeology Branch Chief, at Susan.A.Lebo@hawaii.gov or at (808) 692-8019 for any concerns regarding archaeological resources or this letter.

Aloha,
Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: Trisha Kehaulani Watson, Honua Consulting, watson@honuaconsulting.com
Rosanna Thurman, Honua Consulting and OASES, rosannathurman@gmail.com

Trisha Kehaulani Watson, JD, PhD

4348 Wai'alae Ave. #254, Honolulu, Hawai'i 96816 • (808) 392-1617

watson@honuaconsulting.com

Education

University of Hawai'i at Mānoa (Honolulu, HI)

Doctor of Philosophy in American Studies, December 2008 (comprehensive exams passed with honors)
Dissertation: "Ho'i Hou iā Papahānaumoku: Indigenous Epistemologies and the Ecocolonization of Wai'anae, Hawai'i"
Mark Helbling, Paul Hooper, William Chapman, Carlos Andrade and Jon Osorio, Advisors.

University of Hawai'i at Mānoa, William S. Richardson School of Law (Honolulu, HI)

Juris Doctor, May 2003
Environmental Law Certificate, May 2003

Washington State University (Pullman, WA)

Master of Arts in American Studies, December 2002
Thesis: "The Changing Face of Environmental Racism: Why the Current Model of Environmental Justice Fails" T.V. Reed, Noel Sturgeon, and Cornell Clayton, Advisors.

University of Hawai'i at Mānoa (Honolulu, HI)

Bachelor of Arts in American Studies, August 1999 (awarded with distinction)
Bachelor of Arts in Sociology, August 1999 (awarded with distinction)

Kapi'olani Community College (Honolulu, HI)

Punahou School (Honolulu, HI)

High School Diploma, June 1994

Teaching Experience

Sea Education Alliance / Hawai'i Pacific University (2014-Current)

Affiliate Faculty, Natural and Computational Sciences
Adjunct Faculty
Marine Resource Management 4100: Culture and Sustainability, Summer 2015
Marine Resource Management 2100: Social Ecological and Cultural Dimensions, Summer 2015
Contract Faculty
Marine Resource Management 4100: Culture and Sustainability, Summer 2014
Marine Resource Management 2100: Social Ecological and Cultural Dimensions, Summer 2014

University of Hawaii at Mānoa (2005-Current)

Affiliate Faculty, Zoology
Lecturer
Women's Studies 360: Asian and Pacific Women in Hawai'i, Spring 2008
American Studies 320: American Environments, Summer 2007 (qualified Environmental Studies elective, HAP qualified course, writing intensive)
Women's Studies 699: Feminist Pedagogies, Spring 2007

Women's Studies 440: Feminist Methods, Spring 2007
Women's Studies 360: Asian and Pacific Women in Hawai'i, Spring 2007 (cross listed with Ethnic Studies 365)
History 485: History of 20th Century Hawai'i, Spring 2007
History 284: History of Hawai'i, Spring 2007
History 484: Hawaiian Kingdom, Fall 2006
History 284: History of Hawai'i, Fall 2006
American Studies 212: Contemporary American Global Issues, Fall 2005

University of Hawai'i Outreach College (2005-2007)

Lecturer

Women's Studies 438: Gender and Environmental Philosophy, Summer 2007 (cross listed with Philosophy 438)
American Studies 320: American Environments, Summer 2006 (qualified Environmental Studies elective, HAP qualified course, writing intensive)
American Studies 320: American Environments, Spring 2006 (qualified Environmental Studies elective, HAP qualified course, writing intensive)
How to Start a Non-Profit Organization, Fall 2005
American Studies 212: Contemporary American Global Issues, Fall 2005
American Studies 212: Contemporary American Global Issues, Summer 2005

Washington State University (2000)

Graduate Assistant

Graduate Assistant, Washington State University, English 100, Spring 2000
Teaching Assistant, Washington State University, Political Science 300: The American Constitution, Spring 2000

Experience

Honua Consulting (2003-Current)

Owner and President

Duties: Manage and operate consulting firm; manage Federal, State and City contracts; Certified Under-Utilized Disadvantaged Business Enterprise; Permitted Archaeological Consulting company; consult organizations regarding development of programs, non-profit status and grant writing; provide facilitation, outreach, and consultation on community input, research services, educational services, environmental and cultural assessments; historic preservation compliance; oversee resource management on large scale initiatives and advise on community engagement on complex and sensitive projects.

School of Ocean and Earth Science and Technology (2010-2011)

Adjunct Faculty

University of Hawai'i (2008-2009)

Staff, Office of the Vice President for Research

Duties: Environmental compliance. Work on permitting and compliance issues as related to research activities. Assist in the completion and submission of environmental assessments and serve as a liaison between the University and government agencies, including the State Legislature.

University of Hawai'i, Mānoa (2007- 2008)

Staff, Office of the Vice Chancellor for Research and Graduate Education

Duties: Grant writing; program creation and management; advise on matters related to the Native Hawaiian community; work with the legislature on issues related to the University's research activities; serve as a liaison between the University and Native Hawaiian groups; advocate for research and education development.

Kāko'o 'Ōiwi (2006-2008)

Executive Director

Duties: Start up and administer a non-profit organization dedicated to support of traditional Native Hawaiian cultural, spiritual practices, education and health. Maintain legal and financial compliance of the organization. Run all training and employment elements of the organization.

University of Hawai'i (2006)

Graduate Research Assistant, Kamakakūokalani Center for Hawaiian Studies

Duties: Assist director in the administrative needs and functioning of the Center. Conduct research. Organize events. Assist in public relations. Create and manage symposia on relevant community issues for the center.

Hawai'i Council for the Humanities (2005)

Project Director, "We the People" Program

Duties: Serve as director for the "We the People" Program in accordance with standards developed by the National Endowment for the Humanities.

University of Hawai'i, William S. Richardson School of Law (2005)

Financial Aid Counselor

Duties: Counsel law students on financial aid and scholarship opportunities; assist in the admission of incoming students; develop scholarship advising program and database.

Jouxson- Meyers and del Castillo, LLLC (2003-2004)

Legal Consultant

Duties: Assist with administrative petitions and litigation in the areas of health and employment law.

Hawai'i Coalition for Health (2003-2004)

Legal Consultant and Website Manager

Duties: Assist with administrative petitions and litigation in the areas of health and employment law; manage webpage content and newsletters; lobby.

University of Hawai'i, William S. Richardson School of Law (2001-2002)

Research Assistant (Professor Hazel Beh)

Duties: Research and writing for courses and projects relating to higher education law, contract law and construction law.

Native Hawaiian Legal Corporation (2002)

Law Clerk

Duties: Trial preparation, motion writing, assistance with on-going litigation, research and writing relating to Native Hawaiian rights and land use.

Center for Computer Assisted Legal Instruction (2002)

Research Assistant/Computer Programmer

Duties: Create an online tutorial for law students on the subject of contract remedies.

University of Hawai'i, William S. Richardson School of Law (2002-2006)

Research Assistant (Professor Virginia Hench)

Duties: Research and writing on criminal law and Hawai'i's Territorial Era.

Social Welfare Evaluation and Research Unit (2002)

Research Assistant
Duties: Primary research data collection and analysis (including interviewing and statistical analysis), secondary research and writing for a research/evaluation project studying domestic violence intervention.

Equal Employment Opportunity Commission (2001-2002)
Law Intern
Duties: In-take, review complaints and conduct investigations into employment discrimination. Assist in on-going litigation.

Judge Helen Gillmor, District Court of Hawai'i (2001)
Extern
Duties: Research, writing and drafting.

Papers, Technical Reports, Publications, Guest Lectures and Interviews (Selected)

Cross, R. Doornbos, S. Cooney, R., Wong, P., Mead, A., Watson-Sproat, T. K., Lindeman, K., Kanagavel, A., Parvathy, S., Tomasini, S., Varghese, A., (forthcoming), Guidance for Integrating Indigenous and Local Knowledge (ILK) in Red List Assessments, International Union for the Conservation of Nature, Sustainable Use and Livelihoods Specialist Group, Gland, Switzerland.

Moore, M, Dano, N., Perls, D., and Watson T. K. (June 2017) Indigenous and Traditional Farming Communities and Social Movements in the Fight for the Future of Food. From the Source: Water, Culture, and Equity. Sustainable Agriculture & Food Systems Funders. SAFSF 15th Annual Forum, Gainesville, Florida.

Thao B., Thurman R. and Watson T.K., (January 2017) Archaeological Monitoring Report for the Middle Street Reconstruction Project, North King Street to Kamehameha Highway, Federal-aid Project No. STP-7415 (001), Kalihi Ahupua'a, Kona (Honolulu) District, Island of O'ahu TMK: [1] 1-2-016:006, 007, 029 and 1-2-018:003, 009, 010, 011 Prepared for Goodfellow Bros. Inc. and Hawai'i Department of Transportation (HDOT) Honua Consulting, Honolulu, Hawai'i.

Watson, T., Noshirwani, M., Burlando, C., Seagle, Mead, A., Hamzah, A. (eds) (September 2016) From Solutions to Resolutions: A New Social Compact for Just and Effectives Conservation of Biocultural Diversity, Policy Matters, International Union for the Conservation of Nature Commission on Environmental, Economic and Social Policy, Gland, Switzerland.

Watson T. (2016) Successfully Implementing Indigenous Policy Within Western Frameworks: The Case of Traditional Hawaiian Fishponds in Hawai'i. From Solutions to Resolutions: A New Social Compact for Just and Effectives Conservation of Biocultural Diversity, Policy Matters, Watson, T., Noshirwani, M., Burlando, C., Seagle, Mead, A., Hamzah, A. (eds) International Union for the Conservation of Nature Commission on Environmental, Economic and Social Policy, Gland, Switzerland.

Watson, T. and Michael Cain. (2016). Ho'āla Loko I'a: Permit Application Guidebook. Prepared for Conservation International, National Ocean and Atmospheric Administration, Office of Hawaiian Affairs, Kamehameha Schools, and State of Hawaii Department of Land and Natural Resources. State of Hawai'i Department of Land and Natural Resources, Honolulu, Hawai'i.

Watson, T., (2016). Hawaiian Maritime Cultural Landscapes: Integrating Knowledge Systems, Protecting Heritage Areas. Proceedings from Maritime Cultural Landscape Symposium: Maritime Cultural Landscapes and Implications for the National Register. National Park Service: Washington, DC.

Thao B., Thurman R. and Watson T.K., (October 2016) Archaeological Monitoring Report for the Meleana Place Drainage Improvements Project, Nu'uanu Ahupua'a, Kona (Honolulu) District, Island of O'ahu TMK: [1] 1-9-03:000, Prepared for The City and County of Honolulu. Honua Consulting Honolulu, Hawai'i.

Thao B., Thurman R. and Watson T.K., (2016). Burial Treatment Plan for SIHP #50-80-14-7930, 413 Seaside Avenue, Waikīkī Ahupua'a, Kona (Honolulu) District, Island of O'ahu TMK: [1] 2-6-021:056, 057, 062, 065 Prepared for Cooper Enterprises, Inc. Honua Consulting Honolulu, Hawai'i.

Thao B., Thurman R. and Watson T.K., (2016). Archaeological Inventory Survey Report for 413 Seaside Avenue, Waikīkī Ahupua'a, Kona (Honolulu) District, Island of O'ahu TMK: [1] 2-6-021:056, 057, 062, 065 Prepared for Cooper Enterprises, Inc. Honua Consulting Honolulu, Hawai'i

Thao B., Thurman R. and Watson T.K., (2016). Archaeological Inventory Survey Report for 413 Seaside Avenue, Waikīkī Ahupua'a, Kona (Honolulu) District, Island of O'ahu TMK: [1] 2-6-021:056, 057, 062, 065 Prepared for Cooper Enterprises, Inc. Honua Consulting Honolulu, Hawai'i

Watson, T., (2015) Maritime Cultural Landscapes in Hawai'i. Invited Speaker at Maritime Cultural Landscape Symposium Organized by the National Park Service, Madison, Wisconsin.

Maritime Cultural Landscapes and Implications for the National Register. (2015). Invited Participant with National Policy Makers, Madison, Wisconsin.

Ball, D., Van Tilburg, H, Watson, T. K., Faria, K., Hoomanawanui, K., Ho-Lastiama, I, Ritte W., Maly, K., Nahoopii, Horcajo, K. Kaupiko K. (Forthcoming). Chartering Native Hawaiian Cultural Landscapes Analysis Guide. U.S. Department of Interior, Bureau of Ocean and Energy Management. Pacific OCS Region, Camarillo, CA

Watson, T. K., Hoomanawanui, K., Thurman, R., and Thao, B. (Forthcoming). Na 'Ikena I Kai (Seaward Viewsheds): Inventory of Terrestrial Properties for Assessment of Marine Viewsheds on the Main Eight Hawaiian Islands. U.S. Department of Interior, Bureau of Ocean and Energy Management. Pacific OCS Region, Camarillo, CA

Chandler, W., E. Douce., K. Shugart-Schmidt., T. Watson, M. Sproat, F. Rosenstiel, K. Yentes, X. Escovar-Fadul, and T. Laubenstein. (2015). Enhancing the future of the Hawaiian monk seal: recommendations for the NOAA recovery program. Marine Conservation Institute. Seattle, WA.

U.S. Department of Commerce. National Oceanic and Atmospheric Administration. Office of National Marine Sanctuaries. (2015). Hawaiian Islands Humpback Whale National Marine Sanctuary Draft Management Plan/Draft Environmental Impact Statement. Silver Spring, MD. (Contributing Writer.)

Crawhall, N. (2015) 'Social and economic influences shaping protected area', in G. L. Worboys, N. Lockwood, A. Kothari, S. Feary and I. Pulsford (eds) Protected Area Governance and Management, pp. 117-144, ANU Press, Canerra. (Contributing Writer.)

Wynne, Kate. (2015) Guide to Marine Mammals and Turtles of the U.S. Pacific. Alaska Sea Grant, Fairbanks, AK. (Cultural and Language Consultant.)

Maly, K., Watson, T., Osorio, J., (2014). E 'Ike Hou Iā Lāna'i (To See Lāna'i Once Again): A Case Study on Culture and Education in an Island Community. Lāna'i Culture and Heritage Center / IUCN (International Union

for Conservation of Nature), in Post-2015 Dialogues on Culture and Development, (2015), United National Education, Scientific and Cultural Organization (UNESCO), the United Nations Population Fund (UNFPA) and United Nations Development Program (UNDP), New York, NY.

Maly, K., Watson, T., Osorio, J. (2014). Marine Protected Areas in the Pacific: Embracing Cultural Tradition as a Means of Increasing Conservation Efficacy, in cited in Post-2015 Dialogues on Culture and Development, (2015. United National Education, Scientific and Cultural Organization (UNESCO), the United Nations Population Fund (UNFPA) and United Nations Development Program (UNDP), New York, NY.

Sekhran, N., Borrero, R., Ferreira, B., Watson, T., Coppenger, E., (2014). Promoting Local Knowledge in the Small Island Developing States (SIDS), Third International Conference on Small Island Developing States (SIDS) – "The Sustainable Development of SIDS Through Genuine and Durable Partnerships," United Nations, Apia, Samoa.

Watson, T.K. (2014). Proceedings from the United Nations Conferences on Small Islands Developing States: Towards Pacific Underwater Cultural Heritage Partnership, UNESCO, Samoa.

Watson, T.K., Ailā, W., Maly, K. Ratunabuabua, M. (2014). Kānehūnāmoku: Indigenous Cultural Landscapes and Biocultural Resources in Hawai'i and the Pacific. Papers and Proceedings from *the Asia-Pacific Conference on Underwater Cultural Heritage.* UNESCO. Honolulu, HI.

Watson, T.K. (2014). Indigenous Cultural Landscapes and Biocultural Resources in Hawai'i and the Pacific. *Asia-Pacific Conference on Underwater Cultural Heritage.* UNESCO. Honolulu, HI.

Watson, T. and Sproat, M. (2014). Contribution to indigenous message on water. Indigenous World Forum on Water and Peace. Canada.

Watson, T.K. Hilo, R. Wong, H. Osorio, J. (2013). Studying Place: Challenges for Native Hawaiians in Professional Cultural Resource Management. *Society for Hawaiian Archaeology Annual Conference.* Hawai'i.

Watson, T.K., Hilo, R. Osorio, J. Faria, K. Randolph, C., Sproat, M., Wong, H. (2013). Cultural Impact Assessment for Non-Contiguous Potential Boundary Areas on Hawai'i Island, Maui, Moloka'i, Lana'i, O'ahu, Kaua'i and Ni'ihau prepared in conjunction with the Draft Environmental Impact Statement and Draft Management Plan Review for the Hawaiian Islands Humpback Whale National Marine Sanctuary. Department of Land and Natural Resources. Honolulu, Hawai'i.

Watson, T.K., Hilo, R. Osorio, J. Iona, W., Randolph, C., Sproat, M., Wong, H. (2013). Report in partial compliance of the National Historic Preservation Action Section 106 Process prepared in conjunction with the Draft Environmental Impact Statement for Spinner Dolphin Human Interaction. Prepared for the National Ocean and Atmospheric Administration. Honolulu, Hawai'i.

Watson, T.K., Hilo, R. Osorio, J. Dancil, K. Cie, D., Courbis, S. Randolph, C., Sproat, M., Wong, H., Asuncion, B., Cain, M., Lemmo, S. (2014). Statewide Programmatic General Permit and Programmatic Agreement for the restoration, repair, maintenance and reconstruction of traditional Hawaiian fishpond systems across Hawai'i. Prepared for the Department of Land and Natural Resources and Conservation International. Honolulu, Hawai'i.

Watson, T. Reti, I. Huffer, E., Galuvao, E. (2013). He Pūko'a Kani 'Āina: Linkages between Cultural and Conservation in Pacific Marine Protected Areas, Prepared for the International Union of the Conservation of Nature, Secretariat of the Pacific and the Secretariat of the Pacific Regional Environment Programme, Suva, Fiji.

Sagarin, R., Watson, T.K., Chen, R., Garza, C., Mesnick, S., Moseman-Valtieera, S. (2013). How Leadership, Diversity and Innovation in Marine Science Promotes Healthy Oceans and Informs the Blue Economy. Presentation for the Society for Advancement of Chicanos / Hispanics and Native Americans in Science. San Antonio, Texas.

Tom, A., Pack, A., Ritte W., Watson, T.K., Ailā, W. (2013). Expressing Aloha 'Āina by Embracing Cultural Heritage and Place Based Knowledge in Contemporary Ecosystem Based Management, *Hawaii Conservation Conference*. Hawaii.

Watson, T.K. (2013). Aloha 'Āina: A Framework for Biocultural Resource Management in Hawai'i's Anthroprogenic Ecosystems, *World Indigenous Network Conference*, Darwin, Australia. http://www.youtube.com/watch?v=nJHM1HbX7wQ&list=PLbJuyQsQQEsF39qeyXEIo6Mr6wI_mGjqL

Watson, T.K. and Sproat M.K. (2013). Culture and Conservation. Ocean Awareness Training Workshop. Honolulu, Hawai'i.

Watson, T.K. (2012). Aloha Honua. Biocultural Conservation Leadership Training, Leadership Kaua'i.

Watson, T.K. (2012). National Marine Sanctuary Advisory Council Summit 2012, Santa Cruz, California.

Watson, T.K. (2012). Cultural Sensitivity Training, Annual Marine Mammal Responses Meeting.

Promoting a New Conservation Ethic Based on Respect for Indigenous Peoples. (2012). Presentation at IUCN World Conservation Congress, CEESP Steering Committee, Conservation International, CEESP Theme on Governance, Equity and Rights, CEESP North America and Caribbean Region, Ministere de l'amenagement du Senegal, Jeju, Korea.

Sustainable marine and coastal resource management in the Asia-Pacific in the context of international conservation targets. (2012). Presentation at the IUCN World Conservation Congress, United Nations University, Birdlife International, Sophia University (Japan), Center for Regional Sustainability Initiatives (CRESI), University of Victoria (Canada), North Australia Indigenous Land and Sea Management Alliance (NAILSMA), Ministry of Environment (Japan), Jeju, Korea.

Advocating for Indigenous Rights: From Local Indigenous Communities to Global Action. (2012). Presentation at the IUCN World Conservation Congress, Congress Forum: Knowledge Café, Jeju, Korea.

The world, an island; An island, the world: Applying Island Knowledges to World Environmental Challenges. (2012). Poster Presentation at the IUCN World Conservation Congress IUCN, Congress Forum, Jeju, Korea.

Watson, T.K. (2012). Aloha 'Āina: A Framework for Biocultural Resource Management in Hawaii's Anthroprogenic Ecosystems. Workshop Proceedings from a Technical Expert Workshop, Hawaiian Islands Humpback Whale National Marine Sanctuary. Hawaii.

Tom, A., Ailā, W., Pack, A., Watson, T.K., Ritte, W. (2012). 20 years of the Hawaiian Islands Humpback Whale National Marine Sanctuary, *Hawai'i Conservation Conference*.

Kittinger, J. N., T. M. Bambico, T. K. Watson, and E. W. Glazier. (2012). Sociocultural significance of the endangered Hawaiian monk seal and the human dimensions of conservation planning. Endangered Species Research 17:139-156. DOI: 10.3354/esr00423

Watson, TK, Asuncion, B, Frazier, K, Osorio J. (2012) Mālama iā Na Kai 'Ewalu: Aloha 'Āina Management Recommendations for the Hawaiian Islands Humpback Whale National Marine Sanctuary, Written for and approved by the Hawaiian Islands Humpback Whale National Marine Sanctuary Advisory Council,

Watson, T.K. (2011) Aloha 'Āina: Integrating Indigenous Epistemology into Conservation Science, Society of Conservation Biology, *International Congress for Conservation Biology.*

Watson, T.K., Schofield, TD, Look, D. (2011) Culture and Community: How the Integration of Cultural Protocols in Stranding Activities Can Positively Benefit Programs, Workshop on Science and Conservation of Hawaiian Odontocetes, *Biennial Conference on the Biology of Marine Mammals*, Society for Marine Mammalogy, Tampa, Florida.

Watson, T.K. (2011) Nā Hulu o Ka Moana Nui a Kane: Impacts of Terrestrial Disease on Hawaiian Monk Seals. Poster Session, *The Wildlife Society Annual Conference*, Waikoloa, Hawai'i.

Watson, T.K. (2011) Nā Kai 'Ewalu: Integrating Traditional Ecological Knowledge with Marine Conservation, Ocean Awareness Training, Waikīkī, Hawai'i,

Watson, T.K. (2011) Integrating Traditional Ecological Knowledge and Western Science, National Parks Service Panel, Waikīkī, Hawai'i.

Watson, T.K. (2011) Integrating Traditional Ecological Knowledge into Marine Mammal Recovery Programs, Guest Speaker, National Parks Service, Waikīkī, Hawai'i.

Watson, T.K. (2011) Communicating Ocean Sciences Educator Training, Hilo, Hawai'i.

Spooner D, and Watson T.K. (2011) Nānā I Na Kānāwai O Kēia Pae 'Āina: Look To The Laws Of This Land. *Threatened Island Nations Conference*, Columbia Law School, New York.

Watson, T.K. (2011) Interviewer and Coordinator of Kūpuna (Elders) Interviews, Storycorps, Hawai'i.

Watson, T.K. (2011) Nā Kai 'Ewalu: Integrating Traditional Ecological Knowledge with Marine Conservation. Ocean Awareness Training, Hawai'i,

Watson, T.K. (2011) National Historic Preservation Action Section 106 Community Training, Prince Kūhiō Hawaiian Civic Club,

Watson, T.K. (2011) Space, Place and the Production of Knowledge Forum. *Knowledge Conference,* University of Hawai'i, Mānoa.

Kittinger J.N., Schofield D, Walters J.S., Watson T.K. (2011) Culture, Conservation and Conflict: Assessing the Human Dimensions of Hawaiian Monk Seal Recovery. *Aquatic Mammals,* Western Illinois University, Macomb, IL. 37(3), 386-396.

Watson, T.K. (2011) The Cultural Significance of the Hawaiian Monk Seal. National Marine Ocean Service, Pacific Islands Regional Office, Sanctuary Speaker Series. Hawaii.

Watson, T.K. (2011) Nā Kapu Kai. Sharing Power Conference, IUCN CEESP, Whakatane, Aotearoa.

Watson, T.K. (2011) Hawaiian Monk Seals in Native Hawaiian Culture. Hanauma Bay Education Center Theater, UH Sea Grant Hanauma Bay Education Program.

Watson, T.K. (2010) Nā Mea Hulu: Hawaiian Monk Seal. Nā ʻŌiwi ʻŌlino (People Seeking Wisdom), Honolulu, Hawai'i, Available at http://www.naoiwiolino.com/?p=1331

Watson, T.K. (2010) Tax Workshop for Hawaiian Serving Nonprofit Organizations. Featured Speaker, *Association of Hawaiian Civic Clubs Annual Convention*, Keauhou , Hawai'i.

Watson, T.K. (2010) Update on the Hawai'i Capital National Heritage Area, The Business of the Arts, Hawai'i Public Radio, Honolulu, Hawai'i.

Watson, T.K. (2010) The Economic Advantages of Cultural Heritage Tourism in Hawai'i, Best Practices in Professional Development, American Society of Association Executives Hawai'i, Honolulu, Hawai'i.

Watson, T.K. (2010) Is the Akaka Bill Fair for Hawaiians? Town Hall Panel at the Democratic Party of Hawai'i Conference with Gov. John Waihe'e, Hon. Walter Heen and Sen. Brickwood Galuteria, Honolulu, Hawai'i.

Watson, T.K. (2010) Ho'oulu Lāhui Aloha: Ho'ailona and the Coming of the Seals. Aired on March 4, 2010 and March 11, 2010.

Watson, T.K. (2009) Native Peoples, Native Homelands Climate Change Workshop, Invited Workshop Attendee. NASA/NOAA, Mystic Lake, Minnesota.

Watson, T.K. (2009) Ho'oulu Lāhui Aloha No. 134: Taro Security and Purity Task Force. Originally broadcast March 5, 2009.

Watson, T.K. (2009) Monk Seals and Fisheries Need Attention, Education and Cooperation. Balearic Islands, The Monachus Guardian.

Watson, T.K. (2009) Native Hawaiians: Cultural Navigation in a Sea of Change. Plenary Session, Hawai'i: 50th Anniversary of Statehood

Messing R, Watson T.K., (2008) "Response to Holland et al. Biocontrol in Hawai'i: More Bureaucracy is not the Answer," Proceedings of the Hawaiian Entomological Society 40

Watson, T.K. (2008) Review: Na Kua'āina: Living Hawaiian Culture Honolulu, *Journal of Hawaiian History* University of Hawai'i Press. Hawaii.

Watson, T.K. (2007) A History of Women in Hawai'i. Keynote Address at Schofield Barracks Gender Equity Day Celebration. Hawaii.

Watson, T.K. (2007) All Things Considered Interview on the Ali'i Trusts, NPR News.

Watson, T.K. (2007, January). 20th Century Hawai'i, Speaking Engagement at the SHAPS Winter Institute, University of Hawaii, Mānoa.

Watson, T.K. (2006) We Will Not be Silent: "Speaking Hawaiian" Against Colonized Discourses. Presented at *the Ku'i Ka Lono Native Hawaiian Education Conference* with Jonathan Osorio, Laiana Wong and Kalehua Krug, Honolulu, Hawai'i.

Watson, T.K. (2006) Ka 'Āina Ho'oulu 'Ike (The Land Inspires Knowledge): 'Āina (Land) Based Critical Pedagogy in Post-Secondary Institutions. Presented at *the Ku'i Ka Lono Native Hawaiian Education Conference*, Honolulu, Hawai'i.

Watson, T.K. (2006) Non-Profit Organizations in Hawai'i: Considerations for Native Hawaiian Organizations. Presented at *the Council for Native Hawaiian Advancement Annual Conference*, Honolulu, Hawai'i.

Watson, T.K. (2007) Civil Rights and Wrongs in Educational Discrimination: the Misuse of §1981 in Doe v. Kamehameha. *Pauahi Publications.* Hūlili Honolulu.

Watson, T.K. (2004) Ecosystem Recovery and Liability in Enchanted Lake. Guest Lecturer in Environmental Law Clinic, University of Hawai'i at Mānoa.

Watson, T.K. (2004) Nā Lewa: A Media Analysis of Native Hawaiian Diaspora. Presented at the East-West Center Cultural Studies Speaker Series, Honolulu, HI.

Watson, T.K. (2003) Environmental Racism on the Leeward Coast. Guest Lecturer in Political Science 682: Indigenous Politics, University of Hawai'i at Mānoa.

Watson, T.K. (2002) Preservation of the Land, Preservation of the People: Broadening the Environmental Justice Model to Protect Multicultural Societies. Presented at *1st Annual Student Equity, Excellence and Diversity Conference Showcasing Diversity*, Honolulu, HI.

Watson, T.K. (2002) The Law and the Land: Environmental Injustice in Hawai'i. Presented at *the 13th Annual School of Hawaiian and Asian Pacific Studies Graduate Conference*, Honolulu, HI.

Watson, T.K. (2002) Environmental Racism. Presented at *the 19th Annual Public Interest Environmental Law Conference,* Eugene, OR.

Trainings / Certifications

National Preservation Institute, National Historic Preservation Act Section 106 Documents Workshop (2017)
National Preservation Institute, Traditional Cultural Properties Working (2017)
Hawai'i Sunshine Law Training Certification (2015)
Convention on Biological Diversity, Traditional Knowledge Training (2014)
World Intellectual Property Organization (WIPO) Traditional Knowledge Training (2014)
E200 Emerging Leadership Training, Small Business Association (2013)
Strategic Application of NEPA in Hawai'i (2012)
Coastal Marine Spatial Planning (2011)
Advanced Training in Historic Preservation, Advisory Council on Historic Preservation (2011)
Native Peoples, Native Homelands Climate Change Workshop, NASA/NOAA (2009)
Ocean Awareness Training, National Marine Ocean Service (2008)
Website Development (2005)

Ph.D. Committees

Linda Kosen, PhD Integrative Conservation and Anthropology (University of Georgia, Athens)
Sean Macduff, PhD Zoology (University of Hawai'i, Mānoa)

Fellowships, Grants and Scholarships

Post-Juris Doctorate Fellowship from the Center for Excellence in Native Hawaiian Law (awarded 2006)
University of Hawai'i Graduate Fellowship (awarded 2005)
Danny Kalekini Kahala Hilton Scholarship (awarded 2004)
Liko A'e Scholarship (2004-2006)
Kuali'i Pauahi Foundation Scholarship (awarded since 2000-2006)
Native Hawaiian Leadership Project (awarded since 2001-2006)
Advocates for Public Interest Law Grant (awarded 2002)
Honu Grant (awarded 2002)
William S. Richardson Scholarship (awarded 2001)
Grant to attend ALI-ABA Environmental Law Conference (awarded 2001)

Honors and Awards

American Saving Bank and Pacific Business News Young Community Leader of the Year (2014)
Pacific Business News, Women to Watch (2014)
Small Business Administration, Emerging Business Leader Class (2013)
Hawai'i Jaycee's Young Community Leader of the Year (2013)
Volunteer of the Year (Hawaiian Islands Humpback Whale National Marine Sanctuary), National Marine Sanctuary Foundation (2013)
PhD Qualifying Examinations Passed with Distinction (2005)
CALI Excellence for the Future Award (awarded in 2002 for receiving the highest grade in Non-Profit Corporations)
Rush, Moore, Craven, Morry and Beh Award (awarded 2000)
CALI Excellence for the Future Award (awarded in 2000 for receiving the highest grade in Torts)
CALI Excellence for the Future Award (awarded in 2000 for receiving the highest grade in Civil Procedure)
CALI Excellence for the Future Award (awarded in 2001 for receiving the highest grade in Civil Rights)
Outstanding T.A. Award Nominee, Washington State University (2000)

Professional Memberships and Service (Selected)

'Āina Momona (Vice President since 2017)
State of Hawai'i, Department of Land and Natural Resources, Water Security Advisory Council (2017)
Kalihi Pālama Culture & Arts Society, Inc. (dba Queen Lili'ūokalani Keiki Hula Competition and Malia Craver Kahiko Hula Competition) (Board Member since 2016, President since 2017)
Lāna'i Culture & Heritage Center (Board Member since 2016)
Association of Hawaiian Civic Clubs (Finance Chair since 2017)
Hawai'i Maoli (Board Member 2016-2017)
Marine Protected Area Federal Advisory Commission (Appointed 2014)
IUCN Ocean Core Member (2013-2016)
IUCN World Parks Planning Committee (2013-2014)
World Commission of Protected Areas, Steering Committee Member (2013-2016)
Commission on Environment, Economics and Social Policy (2013-2016)
IUCN Theme on Indigenous Peoples, Local Communities, Equity and Protected Areas (Co-Chair, 2013-2016)
Cultural Heritage Resource Working Group, Marine Protected Area Federal Advisory Council (2012-2013)
Lai Hipp Estate (Director 2011-2015)

Ka Waianu o Hāloa, Hawaiian Culture Focused Charter School (serving Ke'anae and Wailuanui, Maui), Founding Board Member (2011-2013)
IUCN World Conservation Congress 2016, Hawai'i Bid Team and Steering Committee Member, Chair, Pacific Islands Subcommittee (2009-2016, Host Committee Member 2016)
Trustee Compensation Advisory Committee, Lunalilo Trust (2011)
Cultural Impact Assessment Advisory Council (Office of Environmental Quality and Control) (2010)
Smithsonian Institute (Member 2010-2015)
IUCN Commission on Environment, Economic and Social Policy (Steering Committee Member 2010-2016)
Maui Native Hawaiian Chamber of Commerce, Maui Chamber Foundation (Board Member since 2011)
Young Business Council Hawai'i (Member 2010-2012)
Native Hawaiian Bar Association (Member since 2010-2011)
Native Hawaiian Education Council (O'ahu Council, Kona District Chair, 2009-2012)
Hawai'i Restoration and Conservation Initiative (Executive Committee, 2009)
Hālau Wānana: Center of Higher Learning (Oversight Board Member / 2nd Vice Chair, External Affairs 2009)
Hawaiian Islands Humpback Whale National Marine Sanctuary Advisory Council (Native Hawaiian Community Member, since 2010, Native Hawaiian Community Alternate Member, 2009, Member of Research and Conservation Committee and Change Solutions Working Group, Chair, Native Hawaiian Working Group)
Native Hawaiian Chamber of Commerce (2007-2009)
'Ahahui Ka'ahumanu (Lifetime Member since 2008)
Daughters of Hawai'i (Sustaining Member since 2007)
Hawaiian Civic Club of Honolulu (Member since 2007, Board Member since 2009, Annual Convention Delegate since 2008, Member of Native Rights, Boards and Trusts and Legislative Affairs sub-committees)
Cultural Advisory Working Group for the Papahānaumokuākea Marine Sanctuary (Member since 2006)
Friends of 'Iolani Palace / 'Aha 'Iolani (Member since 2006)
Hawaiian Culture Advisory Board for the State Art Museum (Member 2007)
Onipa'a Na Hui Kalo (Member since 2007)
Hūlili: Multidisciplinary Research on Hawaiian Well-Being (Editorial Board Member 2007-2011)
Kāko'o 'Ōiwi (Vice-President, Board of Directors, 2006-2008)
He 'Ohe (Vice-President, Board of Directors, 2005)
Papahana Kuaola (Secretary/Treasurer, Board of Directors, 2005)
KAHEA: The Hawaiian-Environmental Alliance (Member, Board of Directors, 2005-2008)
University of Hawai'i Enrollment Management Task Force (Member 2004-2005)
Hawai'i American Studies Association (Officer 2004-2005)
Kūali'i Council, University of Hawai'i at Mānoa (Member 2004-2005)
University of Hawai'i Arts and Sciences Advisory Council (Member 2004-2005)
University of Hawai'i Commission on Diversity (Member 2003)
University of Hawai'i Financial Aid Committee (Member 2003)
University of Hawai'i Council on Program Reviews (Council Member 2003-2006)
University of Hawai'i Student Conduct Committee (Member 2003-2005)
Graduate Student Organization (Executive Council Member 2003-2004)
American Trial Lawyers Association (Director of Student Chapter 2001-2003)
Advocates for Public Interest Law (Board Member 2002-2003)
English National Honor Society (Member since 2000)
Graduate and Professional Student Association (Senator 1999-2000)

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAI'I

In the Matter of the Petition of	)	DOCKET NO. A17-804
	)	
HAWAIIAN MEMORIAL LIFE PLAN, LTD.	)	HAWAIIAN MEMORIAL LIFE
	)	PLAN, LTD.
To Amend The Conservation Land Use	)	
District Boundary Into The Urban Land Use	)	
District For Approximately 53.449 Acres Of	)	
Land At Kāne'ohe, Island of Oahu, State of	)	
Hawai'i, Tax Map Key: (1) 4-5-033: por. 001	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that a file-marked of the foregoing document was duly served upon the following **AS INDICATED BELOW** on December 23, 2019.

DAWN TAKEUCHI-APUNA, ESQ. — HAND DELIVERY
Deputy Attorney General
Department of the Attorney General
425 Queen Street
Honolulu, Hawai'i 96813

MARY ALICE EVANS, DIRECTOR — HAND DELIVERY
Office of Planning, State of Hawai'i
235 South Beretania Street
Room 600, Leiopapa A Kamehameha Bldg.
Honolulu, Hawai'i 96813

KATHY K. SOKUGAWA, ACTING DIRECTOR — HAND DELIVERY
City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

PLANNING COMMISSION City and County of Honolulu 650 South King Street, 7th Floor Honolulu, Hawai`i 96813	HAND DELIVERY
PAUL S. AOKI, ESQ. Acting Corporation Counsel City and County of Honolulu Department of Corporation Counsel 530 South King Street, Room 110 Honolulu, Hawai`i 96813	HAND DELIVERY
HUI O PIKOILOA, an unincorporated Association, LIANNE CHING, BETTYE HARRIS, RICHARD MCCREEDY, JULIANE MCCREEDY, JESSE REAVIS, and GRANT YOSHIMORI c/o 45-464 Lipalu Street Kaneohe, Hawai`i 96744	CERTIFIED MAIL RETURN RECEIPT REQUESTED

DATED: Honolulu, Hawai`i, December 23, 2019.

Of Counsel:
MATSUBARA, KOTAKE & TABATA
A Law Corporation

BENJAMIN M. MATSUBARA
CURTIS T. TABATA
Attorneys for Petitioner
HAWAIIAN MEMORIAL LIFE
PLAN, LTD.