

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Engineering Division
Honolulu, Hawaii 96813

March 27, 2015

Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

**Application for Geothermal Exploration Permit
Hualalai West Rift Zone, Hawaii
TMK: (3) 7-1-001:006, 7-2-002:001, 7-2-003:003, 7-2-004:004,
7-2-005:008, 7-2-007:001, 7-4-002:006, 7-4-002:017 & 18**

APPLICANT:

University of Hawaii, Hawaii Institute of Geophysics and Planetology
(c/o Nicole Lautze, Assistant Researcher)

BACKGROUND:

In accordance with Hawaii Administrative Rules Chapter 13-183, the University of Hawaii has submitted an application for a Geothermal Exploration Permit to conduct a non-invasive geophysical study of the West Rift Zone of Hualalai, just north of Kailua Kona on the Island of Hawaii.

The proposed exploration activities are for scientific data collection only. The University of Hawaii is proposing to use a standard exploration method called a magnetotelluric survey (MT). Full details about the survey method and the proposed activity are described in the application, attached as **Exhibit 1**.

The proposed project is part of an overall effort referred to as the "Geothermal Resources Exploration Plan for Hawaii" being undertaken by the applicant. The project is being supported by funding from both the U.S. Department of Energy and the Department of Land and Natural Resources. The initial focus of the project will be a MT-based assessment of the Hualalai area and is the first exploration permit application being submitted for this project.

The application has been reviewed by the State Historic Preservation Division and the Office of Conservation and Coastal Lands, who have provided comments noting specific requirements that shall be met by the applicant, prior to the commencement of the proposed survey. These comments are included as part of **Exhibit 2** and the conditions specified therein have been incorporated as part of the attached draft permit (see **Exhibit 3**).

ITEM L-2

The original application had identified additional areas for the project, but since the land use districts in those areas are classified as either Urban or Conservation lands, those particular areas of the project have been omitted from the final project application at the applicants request (see **Exhibit 5**).

LOCATION:

Tax Map Key	State Land	Owner	State Land Use
(3) 7-1-001:006	Yes	State	Agriculture
(3) 7-2-002:001		Kamehameha Schools	Agriculture*
(3) 7-2-003:003		Kamehameha Schools	Agriculture*
(3) 7-2-004:004	Yes	State	Agriculture*
(3) 7-2-005:008	Yes	State	Agriculture
(3) 7-2-007:001		GKK Makalei	Agriculture*
(3) 7-4-002:006		Queen Liliuokalani Trust	Agriculture
(3) 7-4-002:017		Palani Ranch	Agriculture
(3) 7-4-002:018		Palani Ranch	Agriculture

*Project is restricted to agriculture zoned areas only.

CHAPTER 343 – ENVIRONMENTAL ASSESSMENT:

In accordance with Hawaii Administrative Rule Section 11-200-8(A), the subject request is exempt from preparation of an environmental assessment pursuant to Exemption Class No. 5, “Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resources.” See **Exhibit 4**.

RECOMMENDATION:

That the Board of Land and Natural Resources approve the application for a Geothermal Exploration Permit submitted by the University of Hawaii for non-invasive exploration activities, in the area specified and authorize the Chairperson to issue the permit subject to the following conditions:

- (1) That the University of Hawaii comply with all applicable statutes, ordinances, rules and regulations of the Federal, State, and County governments; and

March 27, 2015

- (2) That the University of Hawaii shall submit evidence of compliance with all other terms and conditions as may be prescribed by the Chairperson prior to the commencement of any proposed work.

Respectfully submitted,



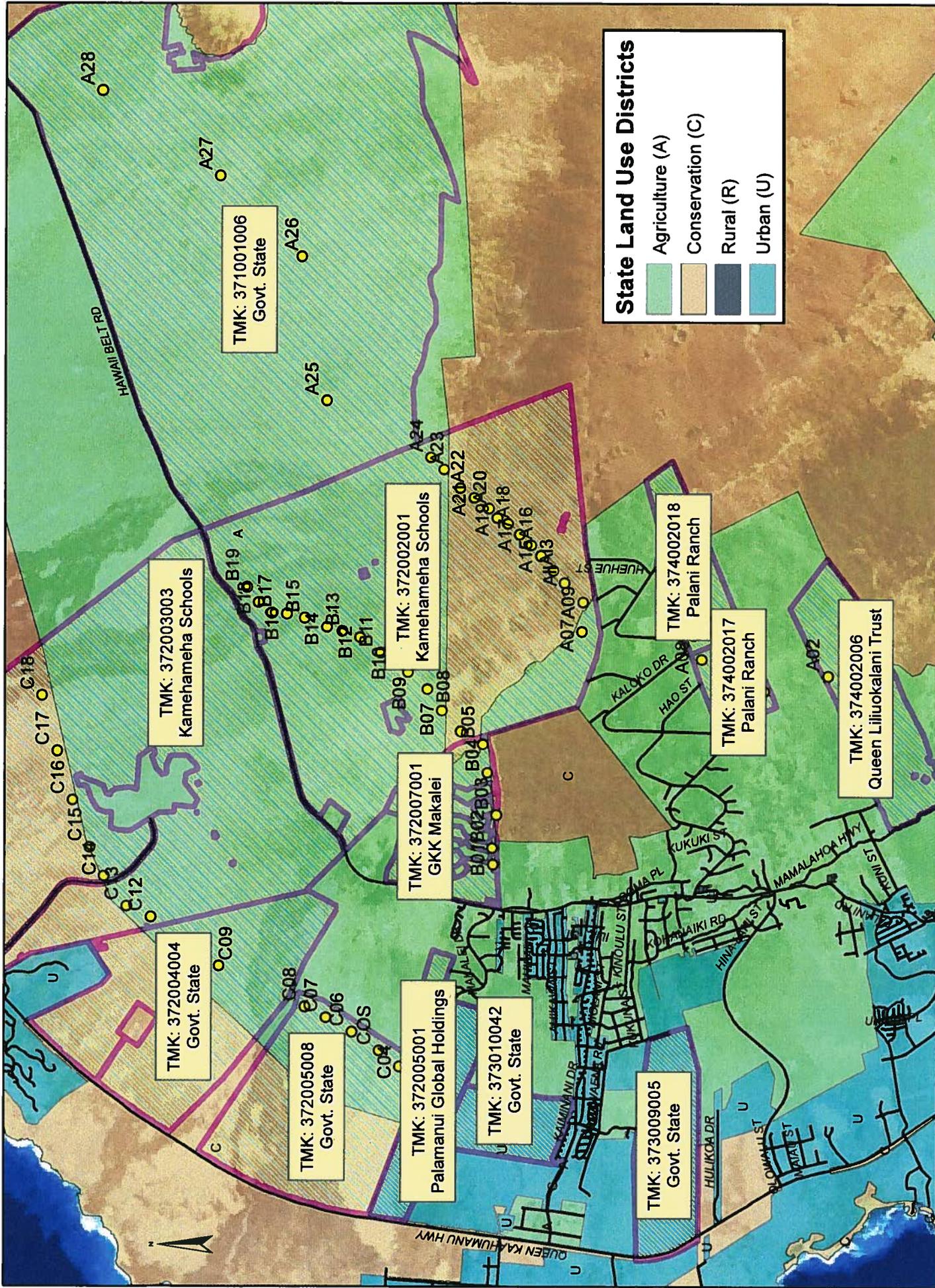
CHRIS T. TAKASHIGE
Acting Chief Engineer

Approved For Submittal:



CARTY S. CHANG
Interim Chairperson

Attachments



UH Hualalai Exploration Project Map



STATE OF HAWAII
 Department of Land and Natural Resources
 Engineering Division
Geothermal Exploration Permit Application



14 DEC 09 PM 03:13 ENGINEERING

Instructions:

For assistance consult Chapter 13-183, Hawaii Administrative Rules (HAR) or call the Division at (808) 587-0230. For updates to this form, please visit our website at <http://dlnr.hawaii.gov/eng/>. Please include all proposed activities in this permit.

(1) Applicant Information:

Name/Company: Nicole Lautze / Hawaii Institute of Geophysics and Planetology, University of Hawaii

Address: 1680 East West Road, POST 526B Honolulu HI 96825
Street City State Zip Code

Contact Person: Nicole Lautze, PhD

Contact Information: (808) 956-3945 nlautze@soest.hawaii.edu
Telephone Email

Land Owner: multiple

(2) Description of Exploration Activities:

Description of work: see attached.

(3) Description of Lands to be Explored:

Description of land: see attached.

(4) Location:

(Attached) Please attach map or maps, such as tax map key(s), available from federal or state resources, showing the lands to be entered or disturbed.

(5) Dates:

Please indicate the approximate time you wish to commence and cease exploration activities on the land.

Starting on: 10/01/2014 Ending by: 06/30/2015

(6) Bond Requirements:

(Attached) Please attach a statement agreeing to file a bond, meeting the requirements of Chapter 13-183-8, HAR within 20 calendar days after the notification of the application being approved. Unless waived, a bond must be issued before any work can commence.

Notes: Surety company bond in the amount of \$10,000 payable to the state conditioned upon compliance with all terms and conditions of the exploration permit. A blanket bond for \$50,000 can be filed with the State for any number of exploration permits.



STATE OF HAWAII
 Department of Land and Natural Resources
 Engineering Division
Geothermal Exploration Permit Application



(7) Land Owner:

(Attached) Please attach the details of each land owner whose land the proposed activities will be taken upon (this can be combined with section 8). To be included:

- Land Owners Name
- Company
- Address
- Contact Person
- Contact Information (Telephone / Email)

(8) Consent to use Land:

(Attached) Please attach a statement by the land owner (or lessee), which states that they have or have not consented to entry upon the land and a description of the efforts made and the reasons for not securing the consent.

(9) Statement of Compliance:

By signing this application you agree to perform the work accordance with the rules established in Chapter 13-183, HAR, the State of Hawaii, as well as all Federal and County geothermal regulations.

Signed: Nicole Lautze Date: 12/8/14

Name (print): Nicole Lautze Company: University of Hawaii Manoa

Submitting Process:

The application will go through the DLNR review process and must be processed by the Board of Land and Natural Resources (BLNR). Once application is deemed complete; average processing time is within 60 days.

Please fill out the entire application and return with \$100 non-refundable application fee to: (payable to DLNR)

Chairperson, Board of Land and Natural Resources
 Department of Land and Natural Resources
 Engineering Division / Geothermal Program
 PO BOX 373
 Honolulu, Hawaii 96809

For assistance consult Chapter 13-183, HAR or call the Division at (808) 587-0230. For updates to this form, please visit our website at <http://dlnr.hawaii.gov/eng/>

(2) Description of Exploration Activities

We plan to conduct a magnetotelluric (MT) survey across the West Rift Zone of Hualalai Volcano. This project is funded by DLNR Engineering Division. MT is a noninvasive and passive geophysical method that highlights the electrical resistivity of subsurface rock. A detailed explanation of the method is provided below.

Detailed Description of Exploration Activities

Magnetotelluric Surveys and Geothermal Exploration

Current technology, called magnetotelluric surveys (usually referred to as MT), allows us to map the electrical conductivity of rocks at depths ranging from several hundred feet below the surface to as much as 20,000 feet below the surface. Because the electrical conductivity of geologic formations is the result of the type of rocks present, the presence (and salt content) of water in the rocks, and the temperature of the rock, the method can delineate geothermal areas, and distinguish between regions of fractured and intact basalts and dike intrusions. The MT method can also map groundwater aquifers, and distinguish between salt water and freshwater aquifers. With appropriately designed surveys, we can develop an image of the electrical conductivity similar to that shown in Figure 1 below; the warmer colors represent higher electrical conductivity whereas the cooler colors represent more electrically resistive rock formations.

The vast majority of developed geothermal systems in the world are located in regions where water can flow naturally through the heated rock formations. Being able to identify the subsurface heat source and fractured zones allows us to begin to address some of the problems of geothermal exploration and development. Geothermal areas without the necessary fractures or permeability have proven to be much more difficult to use for the production of the thermal resource. Having the ability to determine where water flow is occurring in the subsurface will allow us to drill more productive water and geothermal wells, thereby decreasing the cost of providing water and geothermal power, reducing the impacts on the environment, and reducing the disruption to the community, while providing both of these essential commodities.

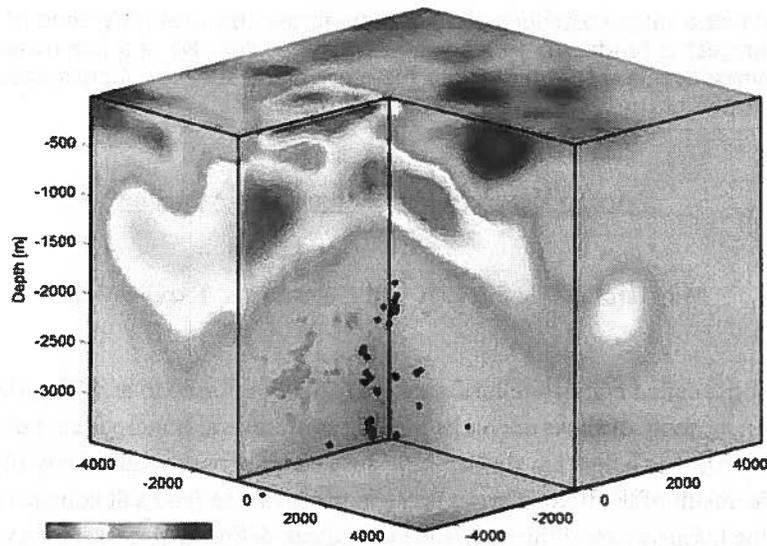


Figure 1. A computer-generated image of the electrical conductivity of subsurface rocks down to a depth of more than 10,000' below the ground surface. The blue and green colors represent more resistive formations where the rocks are not saturated with water while the warmer colors represent rocks where the pores are filled with liquid water and, as a result, are more electrically conductive.

Magnetotelluric Method

Magnetotelluric surveys are considered a passive, non-invasive geophysical investigation. The measurements are called passive because the instruments measure naturally occurring, very low frequency, electromagnetic waves that penetrate into the earth. The instruments don't generate any electrical signals or transmit any energy into the earth, they simply detect and record variations in the electrical voltage signals and radio waves that continuously pass into and out of the earth. The naturally occurring electromagnetic waves are similar to radio waves, but much lower power and frequency. They result from the telluric currents that flow within the earth. Analysis of the variations in the electrical voltage and electromagnetic wave energy will enable us to determine the electrical resistivity of the rocks and to identify groundwater flow occurring at varying depths in the subsurface. Those measurements will also allow us to infer something about the types of rocks that are present in the subsurface, the water present in those rocks (whether salt or fresh), and their temperatures.

In order to perform a magnetotelluric survey, we use two (in some cases, three) antennas and four specialized ground-contact electrodes with each connected to a data recording system. The data system continuously records the voltage difference between the pairs of electrodes and records the electromagnetic wave signals received by the antennas. The antennas consist of an iron rod that is wrapped with many thousands of turns of fine copper wire, all encased in a fiberglass tube. They are designed to collect incoming natural signals that, depending on their frequency, penetrate to varying depths in the ground. The electrodes consist of a metal wire suspended in a sodium chloride (table salt) solution contained in a plastic cup with a porous ceramic disk at the bottom for electrical contact to the ground.

A photo of the antennas and electrodes, along with the recording box and the cables used is shown in Figure 1. When placed at a field station, the equipment is laid out similar to that shown in Figure 2. The electrodes and the antennas are laid out in a north-south and east-west configuration with the electrodes being separated by a distance of 100 m to 200 m (330' to 660') and the antennas separated by about 20 m (66'). A photo of a typical data collection station is shown in Figure 3. The data acquisition unit is housed in a weatherproof box and is powered with a conventional car battery. Once configured and data collection initiated, we would cover the equipment with a tarp to further protect it from the weather and to reduce its visibility. Figure 4 shows the shallow trench in which the antenna coil is buried; Figure 5 shows the antenna after burial and ready to begin collecting data.

Figure 6 shows a typical electrode as it is placed in a shallow hole in the ground and prepared to collect data; for our surveys, we will place the electrode in a fabric bag that has been partially filled with hydrated bentonite clay to ensure good electrical contact with the ground. By using the fabric bag, we will be able to recover all the clay from the hole leaving nothing behind nothing at the survey sites. Each of the electrodes and antenna coils are connected to the data collection box using the wire cables shown in Figure 1. The need to bury the electrodes and antenna coils is because of their extreme sensitivity; any type of vibration from wind or rain

would produce electrical "noise" that would interfere with the signals we are trying to record. In areas where shallow trenching isn't feasible or is not acceptable, we can weigh down the antennas with sand bags to hold them in a stable configuration. Likewise, we will need to have the cables connecting the electrodes and antennas to the data acquisition box held in a stable configuration, and, in areas that are heavily vegetated, we may need to clear some vegetation to allow us to weight the entire length of the cables to the ground with sand bags or soil.

We have four sets of instruments allowing us to install up to four stations at one time. We expect to have each station in place for about three days to allow us to collect the data we need to perform our analysis. As an example, the measurement stations will be spaced at distances of 1600' to 3200' apart over the geologic structure we are surveying. Depending on the size of the area we are surveying, we may need to conduct measurements at as many as twenty to thirty locations; this means that we would need to relocate all four stations, five to seven times, at three-day intervals, in order to complete the survey. The field crew will restore each station site to its original condition, by filling in the electrode holes and the antenna trenches, as they remove the equipment.

For each area that we expect to survey, we will meet with the landowners or land manager to determine whether there are any sensitive areas, for example cultural features, sensitive plant or animal species, that we need to avoid or be particularly cautious about impacting. We can then plan the survey and site layout to avoid those sensitive areas of the property.



Figure 1. This shows the individual instruments that are used in the survey. The orange box is the data recording unit; the black tubes to the left of the recording unit are the antennas or coils; the gray cylinders to the lower right of the recording unit are the electrodes; the small diameter tubes to the right of the electrodes will not be used in these surveys. The blue and the black cables will connect the coils and the electrodes to the data recording unit, and the laptop computer at the upper left is used to download the data from the recording box but is not left at the field station.

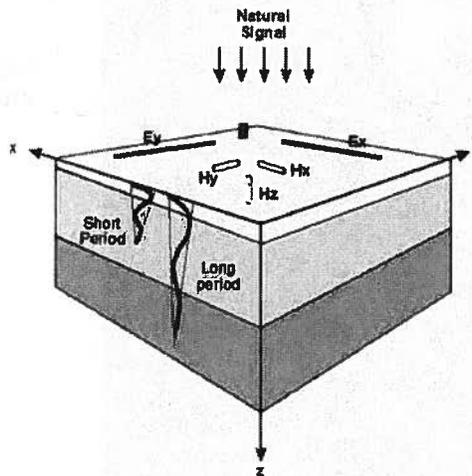


Figure 2. This shows how the instruments are laid out in the field. The electrodes, labeled as E_x and E_y , are set along a north-south and east-west alignment and are connected to the data acquisition unit; likewise, two of the coils (H_x and H_y) are laid out along a N-S and E-W alignment and a third coil (H_z), oriented in a vertical configuration, is sometimes used (the quality of the data from the vertical coil is often poor; we will have to conduct tests to determine whether we will use the vertical coil for our studies or not).



Figure 3. The data collection station consists of the data recorder, housed in a weatherproof box, along with a standard car battery to provide power for the recording system. We typically cover the station with a tarp to provide further protection from the weather and to make the station less visible.



Figure 4. Showing the shallow trench used to bury the antenna coil.

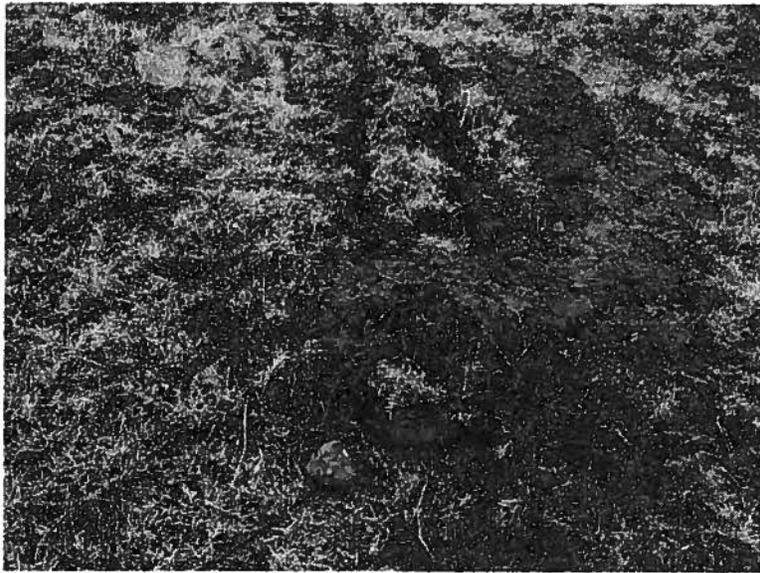


Figure 5. The antenna coil buried at the field site: once the coil is aligned and leveled in the trench, it is then covered with soil from the trench to stabilize it for the duration of the data recording interval; after the coil is recovered, we refill the trench with its original soil.



Figure 6. This is an image of a typical installation of an electrode for this type of survey. The mud at the bottom of the hole is a slurry of soil and bentonite clay that has been hydrated with fresh water to allow for good contact with the ground. For our surveys, we will place the electrode into a fabric bag with hydrated bentonite clay; the bag will be placed in the hole with some water and, at the end of the data collection interval, we will remove the bagged electrode and all the bentonite clay and refill the shallow hole with its original soil.

(3) Description of Lands to be Explored:

Table 1 "Hualalai West Rift Zone MT Survey points" identifies the latitude, longitude, TMK and landowner of each proposed survey site. Three sub-parallel survey lines are proposed, and identified as A, B, and C; the survey points within each line are labeled as such (e.g. A01, A02, B10, C13, etc.). Table 1 is followed by a map showing the proposed sites.

Table 1 Hualalai West Rift Zone MT Survey points

ID	LAT	LONG	TMK Parcel	Owner
B06	190682	2184992	372002001	Kamehameha Schools
B07	190872	2185227	372002001	Kamehameha Schools
B08	191034	2185400	372002001	Kamehameha Schools
B09	191216	2185664	372002001	Kamehameha Schools
B10	191384	2185908	372002001	Kamehameha Schools
B11	191507	2186272	372002001	Kamehameha Schools
B12	191578	2186465	372002001	Kamehameha Schools
B13	191610	2186775	372002001	Kamehameha Schools
B14	191695	2187026	372002001	Kamehameha Schools
B15	191891	2187344	372002001	Kamehameha Schools
B16	192074	2187598	372002001	Kamehameha Schools
B17	192291	2187832	372002001	Kamehameha Schools
B18	192506	2188013	372002001	Kamehameha Schools
B19	192700	2188267	372002001	Kamehameha Schools
A07	192474	2182892	372002001	Kamehameha Schools
A09	192853	2182830	372002001	Kamehameha Schools
A11	193162	2183146	372002001	Kamehameha Schools
A13	193353	2183358	372002001	Kamehameha Schools
A15	193564	2183601	372002001	Kamehameha Schools
A16	193727	2183787	372002001	Kamehameha Schools
A17	193913	2183961	372002001	Kamehameha Schools
A18	194114	2184141	372002001	Kamehameha Schools
A19	194289	2184235	372002001	Kamehameha Schools
A20	194432	2184395	372002001	Kamehameha Schools
A21	194675	2184575	372002001	Kamehameha Schools
A22	194901	2184736	372002001	Kamehameha Schools
A23	195172	2185051	372002001	Kamehameha Schools
A24	195395	2185252	372002001	Kamehameha Schools
C12	187804	2190134	372003003	Kamehameha Schools
C13	188074	2190596	372003003	Kamehameha Schools
C14	188633	2190882	372003003	Kamehameha Schools
C15	189082	2191120	372003003	Kamehameha Schools
C16	189694	2191386	372003003	Kamehameha Schools
C17	190283	2191582	372003003	Kamehameha Schools
C18	191053	2191815	372003003	Kamehameha Schools
B01	188765	2184598	372007001	Makalei
B02	189110	2184584	372007001	Makalei
B03	189576	2184553	372007001	Makalei
B04	190020	2184595	372007001	Makalei
B05	190449	2184778	372007001	Makalei

C03	184992	2185641	372005001	Palamanui
A03	191390	2179974	374002017	Palani Ranch
A04	191990	2180650	374002017	Palani Ranch
A05	192358	2181176	374002017	Palani Ranch
A06	192040	2181011	374002018	Palani Ranch
A08	192569	2181371	374002018	Palani Ranch
A10	192910	2181422	374002018	Palani Ranch
A12	193183	2181540	374002018	Palani Ranch
A14	193524	2181605	374002018	Palani Ranch
A01	190745	2177784	374002006	Queen Liliuokalani Trust
A02	191317	2178906	374002006	Queen Liliuokalani Trust
A25	196884	2186770	371001006	State - Pu'u Wa'awa'a
A26	198679	2186957	371001006	State - Pu'u Wa'awa'a
A27	200064	2188251	371001006	State - Pu'u Wa'awa'a
A28	201255	2190585	371001006	State - Pu'u Wa'awa'a
C09	187090	2188803	372004004	State
C10	187164	2189186	372004004	State
C11	187384	2189496	372004004	State
C04	185561	2186246	372005008	State
C05	185774	2186681	372005008	State
C06	186008	2187035	372005008	State
C07	186336	2187471	372005008	State
C08	186480	2187889	372005008	State
C01	184659	2181900	373009005	State
C02	184621	2184498	373010042	State

(6) Bond Requirements

The following statement of Self Insurance issued by the State of Hawaii to the DLNR Engineering Division via the University of Hawaii Office of Risk Management is intended serve as a waiver to the bond requirement.



OFFICE OF THE COMPTROLLER
HONOLULU, HAWAII

DAVID M. SEKI
COMPTROLLER
STATE OF HAWAII
HONOLULU, HAWAII

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

RISK-15-221

November 7, 2014

TO: State of Hawaii Department of Land and Natural Resources
Engineering Division/Geothermal Program
P. O. Box 373
Honolulu, Hawaii 96809

STATEMENT OF SELF-INSURANCE
AND
LIABILITY OF THE STATE OF HAWAII

The State of Hawaii, as a sovereignty, chooses to be self-insured for the liability exposure identified below.

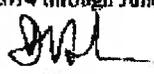
The State of Hawaii shall be liable, subject to the applicable provisions of Chapter 661, Hawaii Revised Statutes (Actions By and Against the State) and Chapter 662, Hawaii Revised Statutes (State Tort Liability Act), for all claims and demands for property damage, loss, personal injury or death on the premise and during the activity identified below caused by the negligent or wrongful act or omission of any officer or employee of the State while acting within the scope of the office of employment, or persons acting for the State in an official capacity, temporarily, whether with or without compensation. "State agency" includes the legislative, judicial and executive departments, boards and commissions of the State, but excludes any independent contractor with the State.

Identification of the Premise

Transect Across Hualalai Volcano's Western Rift System (Vicinity of Kona, Hawaii)

Identification of Activity

University of Hawaii Institute of Geophysics and Planetology
"Continuation of Magnetotelluric and Gravity Surveys on Hawaii Island"
October 1, 2014 through June 30, 2015


DEAN H. SEKI
Comptroller


TRACY S. KITACKA
Risk Management Officer

C. UH - Office of Risk Management

(7) Land Owner

KAMEHEMEHA SCHOOLS

Mililani Browning
rebrowni@ksbe.edu
P.O. Box 495
Paauilo, HI 96776
808-776-7522

Contact:

TMK (3) 7-2-003:003

Jay Uyeda- Director of Development Hualalai
Development Co.
Patrick Fitzgerald
Hualalai PIA-Kona, LLC
juyeda@hualalairesort.com
PO box 1119
Kailua-Kona, HI 96745
808-895-7099

TMK (3) 7-2-002:001

Franklin Botehlo – Ranch Manager
P.O. Box 495
Paauilo, HI 96776
808-325-6141

QUEEN LILUOKALANI TRUST

TMK (3) 7-4-002:006

LeeAnn Crabbe
LeeAnn@onipaa.org

Contact:

Mana Purdy - Manager
mana@onipaa.org
75-1000 Henry Street, Suite 207
Kailua-Kona, HI 96740
808-895-7578

MAKALEI PROPERTIES

TMK (3) 7-2-007:001

B. Joseph Leininger-RLF Makalei Properties, LLC
Contact:
Jim McCully

jim@mccullyworks.com

40 Kamehameha Ave.

Hilo HI 96720

808-933-7000

Or

Chris McPartlan

Chris.mcpartlan@rlholdings.com

Research Analyst at Resource Land Holdings

1530 16th Street, Suite 300

Denver, CO 80202

720-723-2850

PALAMANUI

TMK (3) 7-2-005:001

Norman Stuard

Norm.stuard@huntcompanies.com

68-1087 Ke Kailani Drive

Kamuela, HI 967443

808-2238-0900

PALANI RANCH

TMK (3) 7-4-002:017

TMK (3) 7-4-002:018

Britt Craven

bcraven@lanihau.net

PO Box 9032

Kailua-Kona, HI 96745

808-329-5858

**STATE OF HAWAII DIVISION OF FORESTRY AND
WILDLIFE**

TMK (3) 7-1-001:006

Steve Bergfeld

Steven.T.Bergfeld@hawaii.gov

19 East Kawili Street

Hilo HI 96720

808-974-4221

LAND DIVISION -- HAWAII ISLAND DISTRICT

OFFICE -- HILO

DEPARTMENT OF LAND AND NATURAL

RESOURCES

TMK (3) 7-2-004:004

TMK (3) 7-2-005:008

TMK (3) 7-3-009:005

TMK (3) 7-3-010:042

Gordon Heit

Gordon.c.heit@hawaii.gov

75 Aupuni Street, Room 204

Hilo, HI 96720

808-961-9592

(8) Consent to Use Land

Following are statements by landowners or lessees, indicating their consent to entry upon the lands identified in (3) Description of Lands to be Explored. These landowners/lessees include:

**Kamehemeha Schools and lessees: Franklin Botehlo and Hualalai
PIA-Kona, LLC**

Makalei Properties

Palamanui

Palani Ranch

Queen Liliuokalani Trust

State of Hawaii Division of Forestry and Wildlife - Puu Waa Waa

State of Hawaii Land Division – Hawaii Island District

University of
Hawai'i
M Ā N O A

Hawai'i Institute of Geophysics and Planetology
School of Ocean and Earth Sciences and Technology
1680 East-West Rd., Honolulu, HI 96822
Telephone (808) 221-2135 FAX (808) 956-6322

October 02, 2014

Memo To: Mark Brady
Engineering Division
DLNR

From: Nicole Lautze
Hawaii Institute of Geophysics

Subject: Request for a permit to access Kamehameha Schools Property for the purpose of conducting geophysical surveys

The message below was received from Mililani Browning, contact for the Kamehameha Schools properties on September 12, 2014. In corresponding with her, we were informed that Kamehameha Schools does not provide any more formal access agreement than what is provided below. As shown, we have received approval from Kamehameha schools to access their parcels for our geophysical study.

We have contacted both lessees: Franklin Botelho and Jay Uyeda, to arrange access for our geophysical survey. The relevant TMK numbers are 372002001 and 372003003 and are also listed in the table 'HualalaiParcelsTable.pdf'. Copies of their right of entry agreements follow.

On 9/12/2014 1:37 PM, Mililani Browning wrote:

The study has been approved for the parcels you requested, those leased to PIA (managed by KS employee Jeff Mau) and those leased to Hualālai Ranch (ranch manager, Franklin Botelho). I've listed how to request access under the respective TMKs below. It is at the discretion of the lessee to grant access but please feel free to mention that KS has approved this study.

TMK -372-003-003 (Area below the Mamalahoa Highway)

This area is under the management of Jeff Mau and is currently leased. Jeff has asked that you folks contact the Hualālai Development Company Director of Development, Jay Uyeda, directly to request access. His contact is juyeda@hualalairesort.com or 808-895-7099 (cell)/ 808-325-8191 (office).

TMK - 372-002-001

This area is also leased. Please contact Franklin Botelho directly at 808-325-6141. He is the ranch manager for this parcel and any access will need to be arranged through him. I spoke with him briefly last October to prep him that you folks might be calling.

Mahalo,
mill

Dr. Don Thomas
Center for the Study of Active Volcanoes
University of Hawaii at Hilo
200 W. Kawili St.
Hilo, HI 96720

Dear Dr. Thomas:

I am in receipt of your request for access to our Hualalai Ranch land parcel (72-3375 Hawaii Belt Road, Kailua-Kona 96740) for the purpose of conducting geophysical surveys. Specifically, you have requested access in order to perform magnetotelluric survey measurements to map the subsurface electrical characteristics of the west flank of Hualalai that will be used in an evaluation of any prospective geothermal activity that may lie within the Hualalai West Rift Zone. The parcels that are of interest to you for the survey are TMK (3)7-2-002:001.

By way of this letter, we grant you limited access to this parcel for the purposes of conducting the requested measurements and will coordinate with you a mutually agreeable time in the future to specify the location of your equipment on this parcel and to arrange timing and access for performing these measurements.

As part of our agreement to provide access, you have also agreed to provide us with copies of your findings as they become available as well as copies of your raw data so that we may use it as needed in any future studies of our property for groundwater or geothermal evaluations.

We look forward to working with you on your research investigations. Please contact me at your convenience should you need additional information or clarification on the above.

Signature: 

Date: 10-31-14

Franklin Botelho
Hualalai Ranch

RIGHT OF ENTRY AGREEMENT

This RIGHT OF ENTRY AGREEMENT ("Agreement"), made this 2 day of October, 2014, by and between Hualalai PIA-Kona, LLC, whose mailing address is PO Box 1119, Kailua-Kona, HI 96745 referred to as "**Grantor**"; and the Hawaii Geothermal Assessment Project, whose mailing address is: Center for the Study of Active Volcanoes, UH-Hilo, 200 W. Kawili St., Hilo, HI, 96720, hereinafter referred to as "**Grantee**".

A. Grantor is the present owner of certain agricultural zoned parcels of land on the Island of Hawaii identified as Tax Map Key No. (3) 7-2-003:003, consisting of 7486 acres, and more particularly described on Exhibit "A" attached hereto incorporated herein ("**Property**");

B. The Hawaii Geothermal Assessment Project, housed within the Center for the Study of Active Volcanoes at the University of Hawaii at Hilo, has requested a right of entry for its employees, and research partners (collectively, its "**Agents**") to enter onto the Property for purposes of conducting passive (non-invasive) geophysical research using the magnetotelluric survey method applying industry-standard methods. The purposes of the research surveys are described in Exhibit "B", attached, and the field protocols to be followed are described in Exhibit "C".

In consideration of the foregoing and the covenants contained herein, it is agreed as follows:

1. GRANT. Grantor hereby grants to the Hawaii Geothermal Assessment Project and its Agents the right to enter into and upon the Property for the purpose of non-invasive geophysical exploration for a period of 180 days from the date of this Agreement. Work is expected to be completed no more than 90 days after commencement. The Hawaii Geothermal Assessment Project will provide reasonable notice of entry to Grantor from time to time. All costs, expenses, liabilities, or charges incurred in or related to such surveys shall be the sole cost and expense of and shall be paid solely by the Hawaii Geothermal Assessment Project.

2. INSURANCE. The Hawaii Geothermal Project hereby agrees that all staff performing geophysical surveys will be employees of the University of Hawaii, the Research Corporation of the University of Hawaii, and, as such, will be covered by their respective institutions' workman's compensation and liability insurance for the duration of the surveys performed on Grantor's property.

3. DISTURBANCE OF LAND. Access to the land will be via existing roads or trails already present on the land; where vehicular access is not possible, equipment will be transported to and from the survey sites manually. During the geophysical surveys there may need to be some minor disturbance of the land and vegetation during installation of the detection instrumentation as described in Exhibit "C". Disturbance to the land surface associated with installation and retrieval of the survey instruments will, to the extent possible, be restored to original condition. Neither instruments nor field supplies will be left at the survey locations after retrieval of the equipment at the conclusion of the field measurements.

4. DATA DISPOSITION. As it is collected, and as it is analyzed, the raw digital data, along with the latitude and longitude of the survey site locations, will be provided to the Grantor for any use in third party analysis of the data desired. It is anticipated that Grantee and Agent's completion of the analysis of the field data and subsequent interpretation may take up to one year after the completion of the field surveys; upon completion of the data analysis and interpretation, the results of that work will be provided to the Grantor. Grantor acknowledges that preliminary results of the analysis of the data will be provided to Grantor with the understanding that continuing data interpretation and modeling may modify the conclusions drawn substantially from those arrived at during the course of data evaluation. Because the research is being funded by the State of Hawaii, the Grantee is expected to publish the results of its research in one or more scientific journals, and to provide the raw field data to the funding agency (Department of Land and Natural Resources) for public release after a six month embargo interval that, upon request, can be extended to one year; during the embargo interval, Grantee will treat all data as confidential and proprietary and will release the data to third parties only upon written direction of the Grantor. Grantee proposes to publish summaries of the results obtained no sooner than one year after the initiation of the surveys; detailed scientific results would be published no sooner than two years after the initiation of the field surveys. In all cases, the results and copies of the scientific journal articles will be provided to the Grantor prior to publication during the four year duration of the embargo interval.

5. COUNTERPARTS/FAX SIGNATURES. Grantor and the Hawaii Geothermal Assessment Project agree that this Agreement may be executed in counterparts, each of which shall be deemed an original, and the counterparts shall together constitute one and the same instrument, binding all parties notwithstanding that all of the parties are not signatory to the same counterparts. Duplicate, unexecuted and unacknowledged pages of the counterparts may be discarded and the remaining pages assembled as one document. The submission of a party's signature transmitted by facsimile (or similar electronic transmission facility) shall be considered as an "original" signature for purposes of this Agreement, provided the party transmitting the facsimile shall immediately transmit by mail or by other delivery service the original signature page which shall then be substituted for the facsimile signature page in the original and duplicate originals of the Agreement.

6. PARTIES. The covenants contained in this Agreement shall inure to the benefit of, and be binding upon, the parties and their successors and permitted assigns.

7. UNIVERSITY RESPONSIBILITY. The University of Hawaii (University) shall be responsible for damage and injury caused by the University's officers and employees in the course and scope of their employment to the extent that the University's liability for such damage or injury has been determined by a court or otherwise agreed to by the University.

The University shall pay for such damage and injury to the extent permitted by law and provided that funds are appropriated, allotted, and otherwise properly made available for that purpose. In each instance in this Agreement where the University is obligated to assume responsibility or liability of any type or nature, including, without limitation, any obligation to perform, be responsible for failure to perform, or pay monies, such obligation shall be subject to and limited by the provisions of this paragraph (University Responsibility).

Notwithstanding anything to the contrary contained in this Agreement, Grantor (Hualalai PIA-Kona, LLC) acknowledges that the University can only be held responsible for the actions of the

University's officers and employees and the Grantor (Hualalai PIA-Kona, LLC) shall not hold the University responsible for any actions or omissions of any other person or entity, including, without limitation, any person or entity who (except for the University's officers and employees) could be deemed to be University's agents, representatives, students, invitees, or contractors. In each instance in this Agreement where the University is obligated to assume responsibility for the actions or omissions of any persons or entities other than the University's officers and employees, such obligations shall be deemed null and void and such contrary University responsibility obligations or provisions shall be deemed to be superseded by this provision, and of no force or effect. The Grantor (Hualalai PIA-Kona, LLC) acknowledges that this provision shall not constitute or be interpreted to be any type of indemnification, defense, or hold harmless obligation of the University.

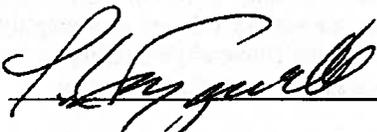
The University of Hawaii, as an agency of the State of Hawaii, chooses to be self-insured and shall provide the Grantor (Hualalai PIA-Kona, LLC), with a Statement of Self-Insurance and Liability of the State of Hawaii, issued by the Department of Accounting and General Services, Risk Management Office.

8. ENTIRE AGREEMENT. This Agreement is the sole and only agreement between the parties with respect to the subject matter hereof and all prior oral or written representations, correspondence, letters of intent and agreements, relating to the subject matter hereof are merged into and superseded by this Agreement and shall be of no force or effect except as indicated otherwise in this Agreement. Any modifications of this Agreement must be in writing and signed by the parties hereto.

9. TRUSTEE NOT PERSONALLY LIABLE. This Agreement has been approved or executed by _____ in his/her fiduciary capacity as _____ <trustee> _____, and not in his individual capacity. No personal liability or obligation under this instrument shall be imposed or assessed against said Trustee in his individual capacity.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

GRANTOR:

By: 
Name: Patrick Fitzgerald
Title: President and CEO

Grantee:

Center for the Study of Active Volcanoes
University of Hawaii at Hilo

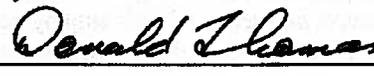
By: 
Name: Donald Thomas
Title: Director

EXHIBIT A

PROPERTY DESCRIPTIONS

Tax Map of the subject properties

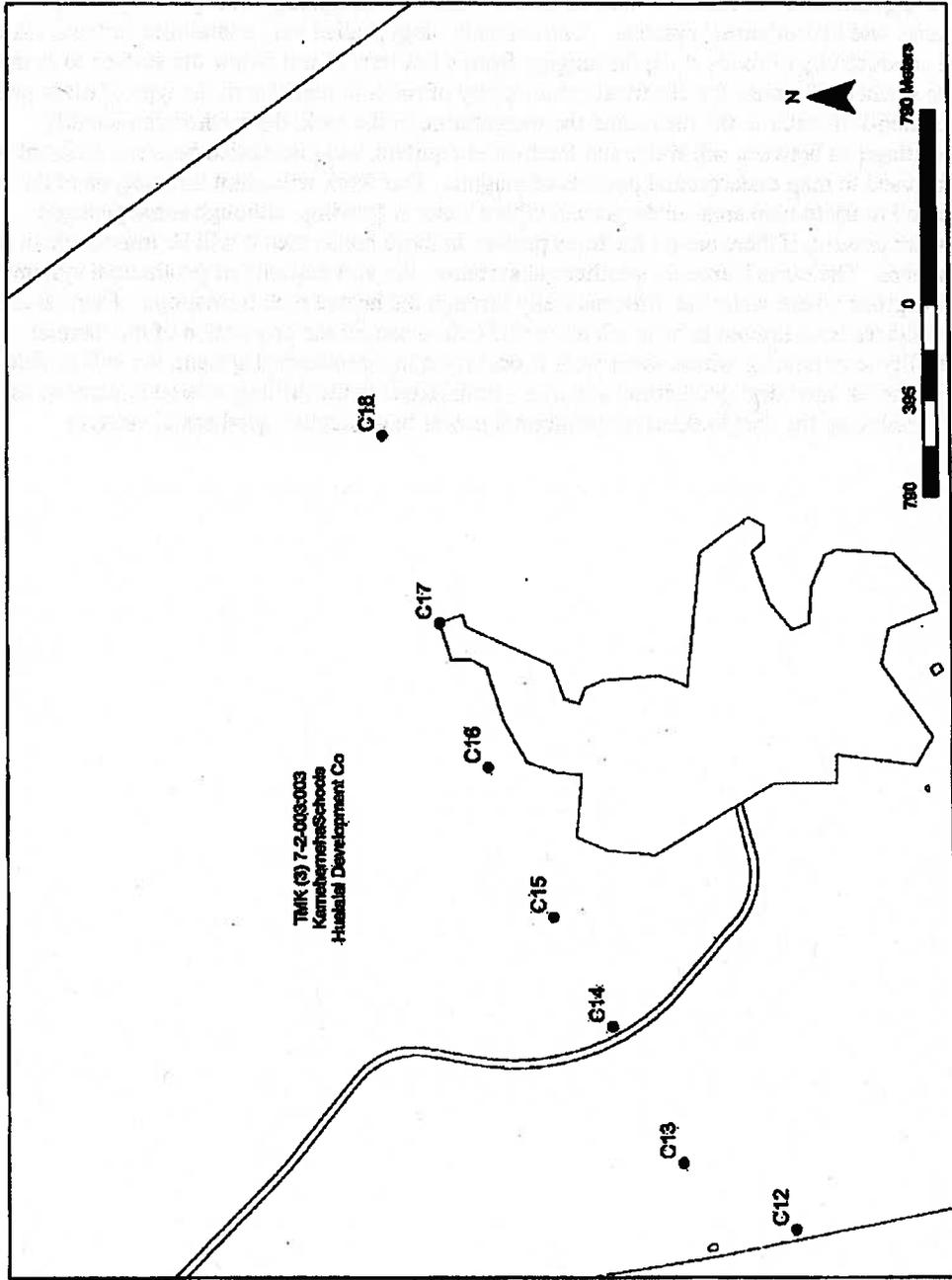


Exhibit B
Purpose of the Project

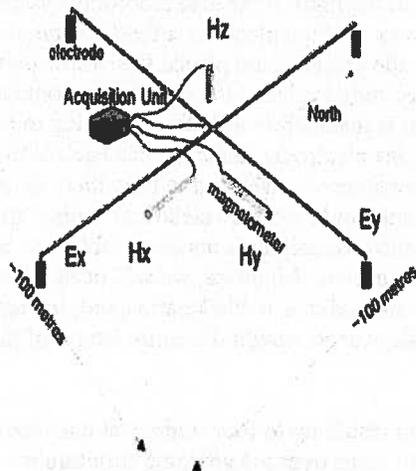
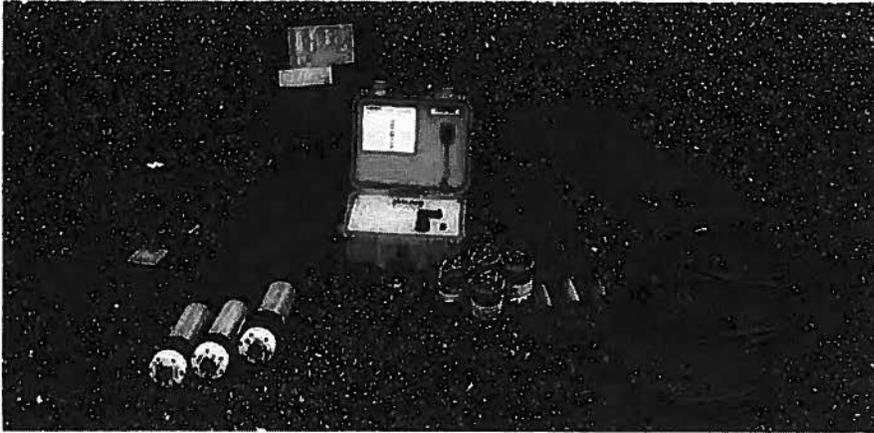
The request for access to your property is for the purposes of conducting research that will lead to a better understanding of Hawaii's geothermal resources as well as a better method of mapping underground geologic structures, water resources, and hydrothermal systems. Current technology, called magnetotelluric surveys, allows us to map the electrical conductivity of rocks at depths ranging from a few tens of feet below the surface to as much as 20,000 feet below the surface. Because the electrical conductivity of rocks is sensitive to the type of rocks present, the presence (and salt content) of water in the rocks, and the temperature of the rock, the method can identify groundwater aquifers, distinguish between salt water and freshwater aquifers, and distinguish between different types of rocks and can even be used to map underground pockets of magma. Our work will adapt the analysis of the data collected using this method to try to map areas underground where water is flowing: although some geologic formations may have water present, if there are no fractures present in those rocks, then it will be impossible to access the groundwater that is there. The same is true for geothermal systems: the vast majority of geothermal systems in the world are located in regions where water can flow naturally through the heated rock formations. Thermal areas without the necessary fractures have proven to be much more difficult to use for the production of the thermal resource. Having the ability to determine where water flow is occurring in a geothermal system, we will be able avoid drilling exploration holes into "dry" geothermal systems - both reducing the drilling-related impacts of use of a geothermal resource and reducing the cost to develop geothermal power in productive geothermal systems.

Exhibit C
Description of
Magnetotelluric Surveys

Magnetotelluric surveys are considered a passive, non-invasive geophysical investigation. The measurements are called passive because the instruments measure naturally occurring, very low frequency, radio waves that penetrate into the earth. The instruments don't generate any electrical signals or transmit any energy into the earth, they simply detect and record variations in the electrical voltage signals and radio waves that continuously pass into and out of the earth. Analysis of the variations in the electrical voltage and radio wave energy will enable us to determine the electrical resistivity of the rocks at varying depths below the ground surface and to identify water flow occurring through the ground at varying depths. Those measurements will allow us to infer something about the types of rocks that are present below the ground surface, the water present in those rocks (whether salt or fresh), and the temperatures below the ground surface.

In order to perform a magnetotelluric survey, we use two (in some cases, three) antennas and four specialized contact electrodes with each connected to a data recording system that measures the voltage difference between the pairs of electrodes and records the radio wave signals received by the antennas. The antennas consist of an iron rod that is wrapped with many thousands of turns of fine copper wire, all encased in a fiberglass tube; the electrodes consist of a metal wire suspended in a sodium chloride (table salt) solution contained in a plastic cup with a porous ceramic disk at the bottom for electrical contact to the ground. A photo of the antennas and electrodes, along with the recording box and the cables used is shown on the next page: the orange box is the data recording system; the cylindrical tubes to the left of the box are the antennas; the short cylinders standing at the front right of the data recording system are the electrodes; the smaller diameter cylindrical tubes, to the right of the data recording system in the image, are for shallower measurements and won't be used in our survey. When placed at a field station, the equipment is laid out similar to that shown in the drawing on the next page: the antennas are placed in shallow trenches, about six inches deep, in the ground and are covered with soil; each electrode is placed inside of a bag containing wet bentonite clay (to ensure good electrical contact with the ground) that is installed in a shallow hole dug to a depth of about twelve inches into the ground; and the cables are strung from the electrodes and antennas back to the data collection system. Because of the extreme sensitivity of the electrodes and antennas, we need to bury them in order to hold them in a fixed location and avoid vibration from wind or rain that would produce electrical "noise" that would interfere with the signals we are trying to record. In areas where shallow trenching is not acceptable, we can weigh down the antennas with sand bags to hold them in a stable configuration. Likewise, we will need to have the cables connecting the electrodes and antennas to the data collection system held in a stable location and, in areas that are heavily vegetated, we may need to clear some vegetation to allow us to weight the entire length of the cables to the ground with sand bags or soil.

We have four sets of these devices that will allow us to install up to four stations at one time; the measurement stations would be spaced at distances of 1600' to 3200' apart over the geologic structure we are surveying. We expect to have each station in place for about three days to collect data we need to perform our analysis. Depending on the size of the area we are surveying,



we may need to conduct measurements at as many as 24 locations; this means that we would need to relocate the 4-station set five to six times, at three-day intervals, in order to complete the survey. As the instruments for each station are removed, the electrode holes and antenna trenches will be filled in, the cables and data box recovered, and then relocated to a new survey station. The field crew will be instructed to restore each station site to its original condition as they remove the equipment.

NEIL ABERCROMBIE
GOVERNOR



Dean H. Seld
Comptroller
Maria F. Ziefinski
Deputy Comptroller

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

RISK 13.443

DATE: 22nd October 2014
TO: Patrick Fitzgerald
Hualalai PIA-Kona, LLC
P. O. Box 1119
Kailua-Kona, HI 96745

STATEMENT OF SELF-INSURANCE
AND
LIABILITY OF THE-STATE OF HAWAII

The State of Hawaii, as a sovereignty, chooses to be self-insured for the liability exposure identified below.

The State of Hawaii shall be liable, subject to the applicable provisions of Chapter 661, Hawaii Revised Statutes (Actions By and Against the State) and Chapter 662, Hawaii Revised Statutes (State Tort Liability Act), for all claims and demands for property damage, loss, personal injury or death on the premise and during the activity identified below caused by the negligent or wrongful act or omission of any officer or employee of the State while acting within the scope of the office of employment, or persons acting for the State in an official capacity, temporarily, whether with or without compensation. "State agency" includes the legislative, judicial and executive departments, boards and commissions of the State, but excludes any independent contractor with the State.

Identification of the Premise

TMK PARCEL NUMBERS

Identification of Activity

University of Hawaii at Manoa School of Ocean and Earth Science and Technology,
Center for the Study of Active Volcanoes State-Wide Geothermal Surveys

DATE

Handwritten signature of the Comptroller, Dean H. Seld.

SIGNATURE

Comptroller

Handwritten signature of the Risk Management Officer.

SIGNATURE

Risk Management Officer

C: UH -Office of Risk Management

September 12, 2014

Dr. Donald Thomas
Center for the Study of Active Volcanoes
University of Hawaii at Hilo
200 W. Kawili St.
Hilo, HI 96720

Dear Dr. Thomas:

I am in receipt of your request for access to our Makalei Golf Club land parcel for the purpose of conducting geophysical surveys. Specifically, you have requested access in order to perform magnetotelluric survey measurements to map the subsurface electrical characteristics of the west flank of Hualalai that will be used in an evaluation of any prospective geothermal activity that may lie within the Hualalai West Rift Zone. The parcel that is of interest to you for the survey is TMK 72007001, having the address 72-3890 Hawaii Belt Road.

By way of this letter, we grant you limited access to this parcel for the purposes of conducting the requested measurements and will have our staff coordinate with you at a mutually agreeable time in the future to specify the location of your equipment on this parcel and to arrange access for performing these measurements.

As part of our agreement to provide access, you have also agreed to provide us with copies of your findings as they become available as well as copies of your raw data so that we may use it as needed in any future studies of our property for groundwater or geothermal evaluations.

We look forward to working with you on your research investigations. Please contact me at your convenience should you need additional information or clarification on the above.

With best regards,


B. Joseph Leininger
Authorized Representative
RLF Makalei Properties, LLC

An Equal Opportunity/Affirmative Action Institution



August 1, 2014

Dr. Donald Thomas
Center for the Study of Active Volcanoes
University of Hawaii at Hilo
200 W. Kawili St.
Hilo, HI 96720

Dear Dr. Thomas:

I am in receipt of your request for access to our Palamanui project for the purpose of conducting geophysical surveys. Specifically, you have requested access in order to perform magnetotelluric survey measurements to map the subsurface electrical characteristics of the west flank of Hualalai that will be used in an evaluation of any prospective geothermal activity that may lie within the Hualalai West Rift Zone. The parcel that is of interest to you for the survey is TMK 372005001 having the address 72-3977 Queen Kaahumanu Highway.

By way of this letter, we grant you limited access to this parcel for the purposes of conducting the requested measurements and will have our staff coordinate with you at a mutually agreeable time in the future to specify the location of your equipment on this parcel and to arrange access for performing these measurements.

As part of our agreement to provide access, you have also agreed to provide us with copies of your findings as they become available as well as copies of your raw data so that we may use it as needed in any future studies of our property for groundwater or geothermal evaluations.

We look forward to working with you on your research investigations. Please contact me at your convenience should you need additional information or clarification on the above.

With best regards,

Norman Sward – General Manager
Palamanui LLC

Palani Ranch Company Inc.

PO Box 9032

Kailua-Kona, Hawaii 96745

Tel: (808) 329-5858 • Cell: (808) 895-3788

Dr. Donald Thomas
Center for the Study of Active Volcanoes
University of Hawaii at Hilo
200 W. Kawili St.
Hilo, HI 96720

Dear Dr. Thomas:

I am in receipt of your request for access to our Palani Ranch land parcels in Kona for the purpose of conducting geophysical surveys. Specifically, you have requested access in order to perform magnetotelluric survey measurements to map the subsurface electrical characteristics of the west flank of Hualalai that will be used in an evaluation of any prospective geothermal activity that may lie within the Hualalai West Rift Zone. The parcels that are of interest to you for the survey are TMK 374002017 and TMK 374002018 located south of the Kaloko Mauka subdivision.

By way of this letter, we grant you limited access to this parcel for the purposes of conducting the requested measurements and will have or staff coordinate with you a mutually agreeable time in the future to specify the location of your equipment on this parcel and to arrange timing and access for performing these measurements.

As part of our agreement to provide access, you have also agreed to provide us with copies of your findings as they become available as well as copies of your raw data so that we may use it as needed in any future studies of our property for groundwater or geothermal evaluations.

We look forward to working with you on your research investigations. Please contact me at your convenience should you need additional information or clarification on the above.

Regards,



Britt Craven
President
Palani Ranch Company, Inc.

Dr. Don Thomas
Center for the Study of Active Volcanoes
University of Hawaii at Hilo
200 W. Kawili St.
Hilo, HI 96720

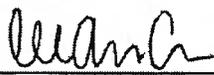
Dear Dr. Thomas:

I am in receipt of your request for access to our Queen Lili'uokalani Trust land parcel in Kona for the purpose of conducting geophysical surveys. Specifically, you have requested access in order to perform magnetotelluric survey measurements to map the subsurface electrical characteristics of the west flank of Hualalai that will be used in an evaluation of any prospective geothermal activity that may lie within the Hualalai West Rift Zone. The parcels that are of interest to you for the survey are TMK (3)7-4-002:006.

By way of this letter, we grant you limited access to this parcel for the purposes of conducting the requested measurements and will coordinate with you a mutually agreeable time in the future to specify the location of your equipment on this parcel and to arrange timing and access for performing these measurements.

As part of our agreement to provide access, you have also agreed to provide us with copies of your findings as they become available as well as copies of your raw data so that we may use it as needed in any future studies of our property for groundwater or geothermal evaluations.

We look forward to working with you on your research investigations. Please contact me at your convenience should you need additional information or clarification on the above.

Signature:  Date: October 27, 2014

Name: LeeAnn Crabbe Title: Vice President

Queen Lili'uokalani Trust

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



**STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES**

DIVISION OF FORESTRY AND WILDLIFE
19 EAST KAWILI STREET
HILO, HAWAII 96720
PH: (808)974-4221 FAX: 808)974-4226

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

JESSE SOUKI
First Deputy

WILLIAM M. TANI
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
KAUOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

August 29, 2014

PERMIT FOR ACCESS, COLLECTING AND RESEARCH

****Permit must be in Permittee's possession at all times while
on the property.****

PERMISSION IS GRANTED TO: Nicole Lautze, Principal Investigator (Research Faculty, Hawaii Institute of Geophysics and Planetology, University of Hawai'i at Mānoa), as well as researchers Donald Thomas, Erin Wallin, Cody Winchester, Lenae Johnson, Josh Fuentes.

FOR THE FOLLOWING PURPOSE: To conduct a series of non-invasive geophysical surveys as part of a geothermal exploration project that is funded by the Department of Land and Natural Resources, Engineering Division, as described in the memo to Steve Bergfeld dated August 14, 2014, and the attached description and methods: "Purpose of the Magnetotelluric Survey Program," and "Description of Magnetotelluric Surveys."

LOCATION(S): Pu'u Wa'awa'a Forest Reserve, TMK (3) 7-1-001:006, at four sites, A25, A26, A27, A28, UTM Zone 5, locations (below), or other/different locations if needed as determined by Nicole Lautze in cooperation with DOFAW.

STN	Northing	Easting
A25	196883	2186769
A26	198678	2186957
A27	200064	2188251
A28	201254	2190584

FOR THE PERIOD: Tuesday, September 2nd 2014 to Tuesday, September 1st, 2015

SPECIAL CONDITIONS:

1. The investigators will do an initial site visit with DOFAW staff to the four sites listed above (and any additional needed) to make sure no native and or threatened and endangered plants or animals occur in, or will be affected by the proposed project areas.
2. Hunting, open fires and littering are prohibited. No overnight camping except as specified in this permit or attached documents, or as approved in advance by DOFAW.
3. Motor vehicles shall be used only on established roadways.
4. Vehicles shall be parked so as not to block traffic on access roads. Be aware of fire hazards, do not park over tall grass and always carry a certified fire extinguisher and 5 gallons of water in vehicle(s) in case of fire.
5. All trash, recycling, excess food, and other items brought in and used by the Permittees shall be removed by the end of the event.

6. Permit is not transferable.
7. Leave all gates you pass through as you found them. Keep all gates closed that lead into or out of any fenced (and ungulate-free) conservation exclosures. A \$60 key deposit is required for any keys checked out. Keys can be checked out by the Pu'u Wa'awa'a Coordinator.
8. Activities conducted under this permit will be limited to those described in the request filed with the Division of Forestry and Wildlife office in Hilo, Hawaii, and attached to this permit.
9. Clean shoes, clothing and vehicles before entering the forest reserve to keep from bringing new alien species into the forest. Except as authorized in the request filed with the Division of Forestry and Wildlife office in Hilo, the removal, injury, killing, or any unnecessary disturbance of native flora and fauna, game species and introduced birds is prohibited.
10. Permittees must notify The Division of Forestry and Wildlife of the location of any threatened or endangered plants, birds, bats, or insects encountered in the event area.
11. Provision of Chapters 183, 185, and 195, Hawaii Revised Statutes, 1985, as amended, and any other laws applicable thereto, and all rules and regulations of the Department of Land and Natural Resources shall be strictly observed. Infractions or misconducts will constitute grounds for revocation of this permit and criminal prosecution. Any person whose permit has been revoked shall not be eligible to apply for another permit until the expiration of two years from the date of revocation.
12. The Permittee waives any and all claims he may have against the State of Hawaii and its respective officers, agents and employees, and agrees to hold harmless and indemnify the State of Hawaii and its respective officers, agents and employees, from any suits, actions and claims arising out of or in any way connected with the activities allowed under this permit.

Permittees acknowledge and agree to the standard provisions stated on the attached permit as well as special conditions above.

Nicole Lautze
Permittee (Print name)

Nicole Lautze
Permittee (Signature)

Sept 4, 2014
Date

APPROVED BY: Steven Bergfeld
Steven Bergfeld
Hawaii Branch Manager
Division of Forestry and Wildlife

9/3/14
Date of Issue

cc: DOCARE

University of
Hawai'i
M Ā N O A

Hawai'i Institute of Geophysics and Planetology
School of Ocean and Earth Sciences and Technology
1680 East-West Rd., Honolulu, HI 96822
Telephone (808) 221-2135 FAX (808) 956-6322

October 02, 2014

Memo To: Mark Brady
Engineering Division
DLNR

From: Nicole Lautze
Hawaii Institute of Geophysics

Subject: Request for a permit to access State land parcels for the purpose of conducting geophysical surveys

Permission to access additional State lands is pending. The relevant parcels are identified as: TMK (3) 7-2-004:004, TMK (3) 7-2-005:008, TMK (3) 7-3-009:005, TMK (3) 7-3-010:042.

The request is currently with Gordon Heit, DLNR. In verbal communication with Gordon (September 18, 2014) he suggested that he is fully occupied with the lava flow heading toward Pahoa and is unable to work constructively until a later time. We would like to proceed with a conditional approval that in order to access these lands permission must be presented prior.

Gordon Heit
LAND DIVISION – HAWAII'I ISLAND DISTRICT OFFICE – HILO
DEPARTMENT OF LAND AND NATURAL RESOURCES

Gordon.c.heit@hawaii.gov
75 Aupuni Street, Room 204
Hilo, HI 96720
808-961-9592

DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

WILLIAM J. AILA, JR.
CHAIRPERSON
14 DEC 19 2014

JESSE K. SOUKI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF:OCCL:LY

CORR: HA 15-104

MEMORANDUM

TO: Carty Change, Chief Engineer
Engineering Division

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: Request for Comments Regarding Geothermal Exploration Permit

TMKs: (3) 7-1-001:006, 7-2-002:001, 7-2-003:003, 7-2-004:004, 7-2-005:001 & 008, 7-2-007:001, 7-3-009:005, 7-3-010:042, and 7-4-002:006, 017 & 018,

LOCATION: West Rift Zone of Hualālai, Island of Hawaii

Based on the information provided, it appears that the portions of the project within the following TMKs are located within the State Conservation District: (3) 7-2-002:001 (Resource subzone), 7-2-003:003 (General Subzone), 7-2-004:004 (General Subzone) and 7-2-007:001 (Resource Subzone). Based on Figure 1 included in the application packet, approximately 45 stations may be located within the Conservation District.

As the installation of the ground-contact electrodes and antennas will involve minor ground disturbance, a Site Plan Approval (SPA) will be required prior to any work done within the Conservation District pursuant to Hawai'i Administrative Rules (HAR) 13-5-22, P-1 DATA COLLECTION, (B-1) *Basic data collection, research, education and resource evaluation that results in minor disturbance to natural resources of land (e.g., corings, excavations, etc.)*. All of the applicable survey sites may be applied for under one (1) SPA. Please have the applicant contact us directly should they wish to apply for an SPA.

EXHIBIT 2

DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555

CARTY S. CHANG
ACTING CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
FIRST DEPUTY
WILLIAM M. TAM
INTERIM 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

January 26, 2015

MEMORANDUM

To: Carty Chang
Engineering Division
PO Box 621
Honolulu, HI 96809

LOG NO: 2015.5694
DOC NO: 1501MV18
Archaeology

FROM: Mike Vitousek, Acting Lead Archaeologist Hawaii Island Section

A handwritten signature in black ink that reads "Mike Vitousek".

SUBJECT: Chapter 6E-8 and 6E-42 Historic Preservation Review –
Geothermal Exploration Permit, West Rift Zone of Hualalai
Multiple Ahupua‘a, North Kona District, Island of Hawai‘i
TMK: (3) 7-1-001:006, 7-2-002:001, 7-2-003:003, 7-2-004:004, 7-2-005:001 & :008, 7-2-
007:001, 7-3-009:005, 7-3-010:042, 7-4-002:006, :017, & :018

Thank you for the opportunity to review the subject permit that was received by our office on December 18, 2014. We apologize for the delayed review and thank you for your patience. According to the application, the permit involves the magnetotelluric survey and geothermal exploration of the western flank of Hualalai Volcano on both public and private properties. According to the description the proposed project is minimally invasive with no proposed drilling. The project does however require small amounts of ground disturbance to bury the required instruments. The level of ground disturbance depicted in figures 4, 5, and 6 have the potential to impact historic properties if any are present in the project area. The application states that the applicant "will meet with the landowners or land managers to determine whether there are any sensitive areas, for example cultural features" that need to be avoided. SHPD has reviewed the proposed parcels and determined that no adequate archeological survey, which meets the standards of HAR 13-276, exists for the majority of these parcels. In addition, certain parcels, such as (3) 7-2-007:001, have been subjected to an AIS (Haun 2006) and multiple historic properties including burial sites have been recorded. Multiple historic properties have been identified throughout the subject parcels, and likely an even greater number remain undocumented. There is a distinct possibility that historic properties could be impacted by the proposed project. Therefore, we request that the proposed test sites are subject to an archaeological field inspection by a qualified archaeologist and a field inspection report is submitted to SHPD for review prior to the commencement of project activities. If historic properties are identified, in the proposed project area then an Archaeological Inventory survey that meets the standards of HAR 13-276 should be prepared. We look forward to the opportunity to review a field inspection report or AIS Report.

Please contact Mike Vitousek at (808) 652-1510 or Michael.Vitousek@Hawaii.gov if you have any questions or concerns regarding this letter.

CC: mark.a.brady@hawaii.gov

DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

ENGINEERING DIVISION
POST OFFICE BOX 373
HONOLULU, HAWAII 96809

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

JESSE K. SOUKI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

DEPT OF LAND &
NATURAL RESOURCES

14 DEC 17 AM 53

RECEIVED
STATE PARKS DIV

MEMORANDUM

- TO: **DLNR Agencies:**
- Div. of Aquatic Resources
 - Div. of Boating & Ocean Recreation
 - Div. of Forestry & Wildlife
 - Div. of State Parks
 - Commission on Water Resource Management
 - Office of Conservation & Coastal Lands
 - Land Division
 - Historic Preservation

FROM: Carty Chang, Chief Engineer
Engineering Division

SUBJECT: Geothermal Exploration Permit, West Rift Zone of Hualalai

LOCATION: Hawaii, TMKs: (3) 7-2-002:001, (3) 7-2-003:003, (3) 7-2-007:001,
(3) 7-2-005:001, (3) 7-4-002:017, (3) 7-4-002:018, (3) 7-4-002:006,
(3) 7-1-001:006, (3) 7-2-004:004, (3) 7-2-005:008, (3) 7-3-009:005,
(3) 7-3-010:042

Transmitted for your review and comment is the attached application for a non-invasive geothermal exploration permit. The applicant is the University of Hawaii, and they wish to do an investigation on the West Rift Zone of Hualalai Volcano, just north of Kailua Kona on Hawaii.

Please provide any comments by January 16, 2015, if no response is received by this date, we will assume your division has no comments. If you have any questions please contact Mark Brady of my staff at 587-0273 or mark.a.brady@hawaii.gov.

Attachment: UH Permit Application

- We have no objections
- We have no comments
- Comments are attached

Signed:

Print name: Daniel S. Quini

Date: 12/23/14

14 DEC 24 PM 02:42 ENGINEERING

DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

ENGINEERING DIVISION
POST OFFICE BOX 373
HONOLULU, HAWAII 96809

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
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JESSE K. SOUKI
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AQUATIC RESOURCES
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

MEMORANDUM

From: ~~TO:~~

DLNR Agencies:

- Div. of Aquatic Resources
- Div. of Boating & Ocean Recreation
- Div. of Forestry & Wildlife
- Div. of State Parks
- Commission on Water Resource Management
- Office of Conservation & Coastal Lands
- Land Division
- Historic Preservation

TO:

~~FROM:~~ Carty Chang, Chief Engineer
Engineering Division

~~SUBJECT:~~ Geothermal Exploration Permit, West Rift Zone of Hualalai

~~LOCATION:~~ Hawaii, TMKs: (3) 7-2-002:001, (3) 7-2-003:003, (3) 7-2-007:001,
(3) 7-2-005:001, (3) 7-4-002:017, (3) 7-4-002:018, (3) 7-4-002:006,
(3) 7-1-001:006, (3) 7-2-004:004, (3) 7-2-005:008, (3) 7-3-009:005,
(3) 7-3-010:042

Transmitted for your review and comment is the attached application for a non-invasive geothermal exploration permit. The applicant is the University of Hawaii, and they wish to do an investigation on the West Rift Zone of Hualalai Volcano, just north of Kailua Kona on Hawaii.

Please provide any comments by January 16, 2015, if no response is received by this date, we will assume your division has no comments. If you have any questions please contact Mark Brady of my staff at 587-0273 or mark.a.brady@hawaii.gov.

Attachment: UH Permit Application

- We have no objections ** our permit was issued for PWN Forest Reserve - good to 9/1/15*
- We have no comments
- Comments are attached

Signed:

Print name: LISA HADWAY

Date: 12/23/14

4 DEC 26 PM 11:29 ENGINEERING

DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

CARTY S. CHANG
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DANIEL S. QUINN
INTERIM FIRST DEPUTY

W. ROY HARDY
ACTING 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
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STATE PARKS

Geothermal Exploration Permit (H-01)
Hualalai West Rift Zone, Hawaii

To: Hawaii Institute of Geophysics and Planetology
University of Hawaii
1680 East West Road, POST 526B
Honolulu, Hawaii 96825

Your application dated December 8, 2014, for a permit to explore the West Rift Zone of Hualalai using a non-invasive and passive geophysical methodology is approved.

Exploration activity: Magnetotelluric (geophysics)
Locations (TMK): (3) 7-1-001:006, (3) 7-2-002:001, (3) 7-2-003:003
(3) 7-2-004:004, (3) 7-2-005:001, (3) 7-2-005:008
(3) 7-2-007:001, (3) 7-3-009:005, (3) 7-3-010:042
(3) 7-4-002:006, (3) 7-4-002:017, (3) 7-4-002:018

Approval is granted in accordance with the Department of Land and Natural Resources' (Department's) Administrative Rules, Chapter 13-183, Hawaii Administrative Rules (HAR), and subject to the following conditions:

- (1) All work shall be performed in accordance with the permission and terms of the occupiers of the land, the exploration program submitted with your application, the Department's Administrative Rules Chapter 13-183, HAR, and all other applicable Federal, State, and County laws, ordinances or rules;
- (2) The permittee, its successors and assigns, shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury and death arising from any act or omission of the applicant, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit;
- (3) The permittee shall observe and comply with all valid requirements of County, State and Federal authorities and regulations to the land and permittee's operations including but not limited to, all water and air pollution control laws and those relating to the environment;

EXHIBIT 3

- (4) The permittee shall notify the Department, in writing, of the start date of field operations at least 48 hours in advance;
- (5) If changes to the proposed exploration program are contemplated, the permittee shall obtain the Chairperson's approval prior to implementing such changes;
- (6) The permittee shall submit to the Chairperson a completion report within 6 months after the expiration of the permit. The report shall include at a minimum
 - a. Project summary. Report shall describe pertinent work done for the project.
 - b. Project history. Report shall include a daily summary of the field activities undertaken during the project.
 - c. Data. Report shall include all the data gathered by the project and any interpretations made of the data.
- (7) This permit shall expire 365 days from the date of issuance.
- (8) The Permittee shall submit to the Chairperson a notice that all requirements outlined by the State Historic Preservation Division (SHPD), by SHPD prior to commencement of any activities in this permit.
- (9) The Permittee shall submit to the Chairperson a notice that all requirements outlined by the Office of Conservation and Coastal Lands (OCCL), by OCCL prior to the commencement of any activities in the following TMK: (3) 7-2-003:001, (3) 7-2-003:003, (3) 7-2-004:004, (3) 7-2-007:001
- (10) The Permittee shall submit to the Chairperson a notice of permission from Land Division, by Land Division prior to the commencement of any activities in the following TMK: (3) 7-2-004:004, (3) 7-2-005:008, (3) 7-3-009:005, (3) 7-3-010:042.

Carty S. Chang, Interim Chairperson
Department of Land and Natural Resources

Date of Issuance

c: Land Board Member
Hawaii County Planning Department
Department of Business, Economic Development and Tourism/Strategic Industries Division
Eric Tanaka, Engineering Division, Hilo

DAVID Y. IGE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

CARTY S. CHANG
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DANIEL S. QUINN
INTERIM FIRST DEPUTY

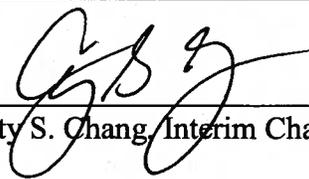
W. ROY HARDY
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

EXEMPTION NOTIFICATION

Regarding the preparation of an environmental assessment pursuant to Chapter 343, HRS and Chapter 11-200, HAR

Project Title:	Application for Geothermal Exploration Permit – Hualalai West Rift Zone, Hawaii
Project Location:	West Rift Zone of Hualalai, Hawaii TMK: (3) 7-1-001:006, (3) 7-2-002:001, (3) 7-2-003:003, (3) 7-2-004:004, (3) 7-2-005:008, (3) 7-2-007:001, (3) 7-4-002:006, (3) 7-4-002:017, (3) 7-4-002:018
Project Description:	The project consists of non-invasive geophysical investigation for basic data collection.
Chapter 343 Trigger(s):	Use of State Funds
Exemption Class & Description:	Exemption Class No. 5 of the Department of Land and Natural Resources, as review and concurred upon by the Environmental council on May 17, 2012, that states “Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource.”
Recommendation:	It is anticipated this project will have minimal or no significant effect on the environment and is presumed to be exempt from the preparation of an environmental assessment.


Carty S. Chang, Interim Chairperson

3/19/15
Date

University of
Hawai'i
M Ā N O A

Hawai'i Institute of Geophysics and Planetology
School of Ocean and Earth Sciences and Technology
1680 East-West Rd., Honolulu, HI 96822
Telephone (808) 221-2135 FAX (808) 956-6322

March 18, 2015

Memo To: Mark Brady
Engineering Division
DLNR

From: Nicole Lautze  (for Nicole Lautze)

Subject: Withdrawal of all measurement sites located in Urban and Conservation land use designations

We are in receipt of your communication informing us that an Environmental Assessment would be required in order to conduct geothermal exploration surveys on Urban or Conservation zoned lands. As we have neither the staff nor fiscal resources needed to conduct an Environmental Assessment on the Urban and Conservation Lands, we would like to withdraw all sites located within those land use designations from the project design and will stipulate that no measurements will be made on those lands.

Thank you.

EXHIBIT 5

