July 1, 2008

Mr. Thomas E. Arizumi, P.E., Chief
Environmental Management Division
Department of Health
P.O. Box 3378
Honolulu, HI 96801-3378

Dear Mr. Arizumi:

SUBJECT: Kahu'aina Plantation Water Sources
FILE NO.: N/A

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore, all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://www.hawaii.gov/dlnr/cwrm.

Our comments related to water resources are checked off below.

☒ 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

☐ 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

☐ 3. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

Permits required by CWRM: Additional information and forms are available at www.hawaii.gov/dlnr/cwrm/forms.htm.

☒ 4. The proposed water supply source for the project is located in a designated ground-water management area, and a Water Use Permit is required prior to use of ground water.

☐ 5. A Well Construction Permit(s) is (are) required before the commencement of any well construction work.

☒ 6. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.
7. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

8. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

9. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a stream channel.

10. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.

11. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

12. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

13. We recommend that the report identify feasible alternative non-potable water resources, including reclaimed wastewater.

OTHER:
The construction of Wells 1 to 5 were all properly permitted, and all construction is complete. Pumps are installed in Wells 1 & 2, with permitting complete, but not installed in 3, 4, & 5, which will require permits. All wells have good fresh water, were tested at about 200 gpm, and are proposed to yield about 90 gpm each.

If there are any questions, please contact Denise Mills at 587-0251.

Sincerely,

KEN C. KAWAHARA, P.E.
Deputy Director

DM:ss
COMMISSION ON WATER RESOURCE MANAGEMENT

FROM: ROY
DATE: MAY 30 2008
SUSPENSE DATE: 9/16

TO: CHENG, C.  INIT: I  TO: KUNIMURA, I.  INIT: Q
CHING, F.  LEROUX, E.
CHONG, R.  NAKAMA, L.
DANBARA, S.  OHYE, M.
ENGLAND, D.  OSHIRO, K.
FUJII, N.  SAKODA, E.
HARDY, R.  SWANSON, S.
HOAGBIN, S.  TORRES, R.
ICE, C.  UYENO, D.
IMATA, R.  YODA, K.
KAWAHARA, K.  YOSHINAGA, M.
KIMURA, J.

FILE: 1221-08 09
(03/08)

According to this report 1221-08 09 serve non-potable needs - Cl are low 34-40.

- Liquid, can you glean out Mills report and put into library (scan would be good.) (done)

- File in well folder. Let's respond if wells 3, 4, 5 don't have permit. Done 07/26/08
DLNR - CHAIRPERSON'S OFFICE DEPARTMENT ROUTESLIP

DATE: 6/29/08
TO: CVRM

RECEIVED

08 MAY 30 A 9:01

ACTION APPROVED BY:

ACTION:

☐ Draft reply for my signature*
☐ Direct reply – copy to me*
☐ Investigate - reply to me*
☐ Update/comment – reply to me*
☐ For your information/files
☐ Distribute to office staff
☐ Other (see below comments)

*For tracking purposes, please refer to log number

COMMENTS/REMARKS:

__________________________________________________
May 22, 2008

Ms. Laura H. Thielen, Chairperson
Attn: Mr. Ken Kawahara, Deputy Director
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Ms. Thielen:

SUBJECT: PROPOSED SOURCES OF DRINKING WATER

Enclosed for your review and comments is a copy of the engineering report for the following sources:

Kahu‘aina Wells No. 1, 2, and 3
State Well No. 1221-08, 1221-09, and 1121-02
Waipake, Kilauea, Kauai, Hawaii

This report has been prepared pursuant to Hawaii Administrative Rules, Title 11, Chapter 20, Rules Relating to Potable Water Systems, Section 11-20-29.

The Department of Health will use your comments in determining the potential impacts that may result by the proposed project. Of primary interest to us are comments relevant to the water quality of the proposed source, such as potential sources of contamination. While all of your issues or concerns will be forwarded to the Applicant for further clarification, not all of them may have actual bearing on the processing or ultimate approval of this proposed source.

Please submit your comments to the Safe Drinking Water Branch within 30 days from the date of this letter. You may also return the engineering report to this office if you do not need it for future reference.
If there are any questions, please call Jennifer Nikaido at 586-4258 of the Safe Drinking Water Branch, Engineering Section.

Sincerely,

FOR

THOMAS E. ARIZUMI, P.E., CHIEF
Environmental Management Division

JN: cb

Enclosures
MEMORANDUM

From: Denise Mills
To: File
Subject: Kahuaina Well Nos. 1, 2, and 3 (State Well Nos. 1221-08, 1221-09, and 1121-02)
Falko Partners, LLC

Report titled, Engineering Report for New Potable Water Sources Kahu‘aina Plantation, Waipake, Kilauea, Kauai, Hawaii – FINAL, has been catalogued in the CWRM library.

Report date: May 13, 2008
Prepared for: Falko Partners LLC
By: Austin, Tsutsumi & Associates, Inc., Honolulu
MEMORANDUM

From: Denise Mills
Date: July 1, 2008
To: File
Subject: Falko Partners, LLC
Kahu'aina Wells I through 5 (State Well Nos. 1121-02, 1121-03, 1121-04, 1121-05, 1221-08, 1221-09, and 1121-09)

Attached are:

- The main portion of the engineering report titled Engineering Report for New Potable Water Sources Kahu'aina Plantation, Waipake, Kilauea, Kauai, Hawaii – FINAL, with a summary of water quality and hydrogeological analyses performed for Falko Partners, LLC.
- Appendix A of this report, titled Hydrogeological Study of the Kahu'aina Plantation Source Wells, prepared by Mink & Yuen, Inc.

The full engineering report, with all appendices and laboratory data, is catalogued in the CWRM library.
ENGINEERING REPORT
FOR NEW POTABLE WATER SOURCES
KAHU‘AINA PLANTATION
Waipake, Kilauea, Kauai, Hawaii

FINAL

Prepared for
Falko Partners, LLC
P.O. Box 588
Kapaa, Hawaii 96746

Prepared by
Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
Honolulu • Wailuku, Hawaii

May 13, 2008
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A. GENERAL INFORMATION

1. Project Description, Location and Phasing

Falko Partners, LLC proposes to develop Kahu'aina Plantation, which will be comprised of 30 single-family agricultural lots on a 358-acre parcel. Kahu'aina Plantation is located in Waipake on the North Shore of the Island of Kauai, between Kilauea to the west and Moloaa to the east, and is bordered by Koolau Road to the south, and the Pacific Ocean to the north. (See Exhibit 1, Location Map.) The project site ranges in elevations from 300 feet mean sea level (msl) at Koolau Road, to 0 feet msl at the shoreline. (See Exhibit 2, Vicinity Map.)

Currently, State Well Nos. 1221-08 and 1221-09 (hereafter referred to as Well No. 1 and Well No. 2, respectively) have been drilled and are in operation for non-potable uses. In addition, a 109,000-gallon tank has been constructed as part of the existing water system. Since the water has been used only for non-potable purposes, DOH approval of the source water has not been necessary. Three additional wells, State Well Nos. 1121-02, 1121-03 and 1121-04 (hereafter referred to as Well No. 3, Well No. 4 and Well No. 5 ) have been drilled and tested, but they do not have a permanent pumps installed in the wells.

The Kahu'aina Plantation will utilize a dual potable/non-potable water system. The potable water system will primarily be serviced by Well Nos. 1 and
2. **Communities Served**

The Kahu’aina Plantation wells will service only the proposed Kahu’aina Plantation, which will consist of 30 single-family agricultural lots that will vary in size from approximately 1 to 5 acres. Well Nos. 1 and 2 will be the primary source of potable (domestic) water for the house lots. Well No. 3 can also be used as a potable source, but will primarily act as a backup source for Well Nos. 1 and 2. Well No. 3 will mostly be utilized for non-potable purposes. The potable and non-potable water systems will be completely separate, and the piping has been designed to prevent any contamination of the potable water.

Wells Nos. 4 and 5 will also provide non-potable (irrigation) water for the project. Irrigation water will be required for an existing 20-acre nursery that is used for cultivation of potted plants. A second nursery that will also be approximately 20-acres will be constructed on the western boundary of the parcel. Common landscaping areas, such as along the major roadways, will also be irrigated using the non-potable system. There will not be any commercial, industrial or recreational facilities associated with the development.

3. **Public Water System**

A public water system (PWS) number for the private water system has not yet been assigned by DOH.

4. **Conformance with Local Land Use Planning and Zoning Regulations**

Kahu’aïna Plantation is situated primarily on land classified by the state as Agricultural, with a small portion along the coastline classified as Conservation land. (See Exhibit 3, State Land Use.) The project area is classified by the County primarily as Agricultural, with land along Waipake Stream classified as Open.

The makai portion of the parcel is situated within a Special Management Area (SMA). (See Exhibit 4, General Site Plan.) However, the wells, tank and proposed house lots are all located mauka of the SMA on land classified as
B. PHYSICAL CHARACTERISTICS OF THE AREA

1. Site Plan

Exhibit 5 shows a site plan of the tank site, including Well Nos. 1 and 2. Exhibit 6 shows the site plan for Well No. 3.

2. Earthquake Consideration and Design Parameters

Based on the 1997 Uniform Building Code, the tank site and wells are located within Seismic Zone 1. Within Seismic Zone 1, a seismic factor (Z) equal to 0.075 is recommended for calculation of shear and lateral load imparted on structures during an earthquake.

3. Flood Problems

Flood zone information is based on a March 4, 1987 Flood Insurance Rate Map (FIRM) number 150002 0055 C published by the Federal Emergency Management Agency (FEMA). The tank site is located within Flood Zone X, which is an area determined to be outside of the 500-year flood plain. The wells are not located within a tsunami inundation zone.

Hirata & Associates, Inc. prepared a report, "Soils Investigation, Falko-Bowman Waipake Development, Pilaa, Kilauea, Hawaii", dated April 7, 2006. The report includes information obtained from field work conducted on February 6, 2006, where 17 borings with depths ranging from approximately 14 to 15.5 feet were drilled. The report states that the surface soil was classified as reddish brown clayey silt in a stiff condition with occasional medium stiff lenses. The clayey silt transitioned to a mottled reddish brown color at depths ranging from about 4 to 14 feet and extended to the maximum depths drilled. Laboratory testing on the clayey silt resulted in low to moderate expansions. Neither groundwater nor seepage water was encountered in the borings.

The soils investigation report prepared for the project site states that the surface soil was classified as reddish brown clayey silt in a stiff condition with occasional medium stiff lenses. The clayey silt transitioned to a mottled reddish brown color at depths ranging from about 4 to 14 feet and extended to the maximum depths drilled. Laboratory testing on the clayey silt resulted in low to moderate expansions.

Mink and Yuen, Inc. prepared a report titled, "Hydrogeological Study of the Kahu'aina Plantation Source Wells, Waipake, Hanalei, Kauai, Hawaii", (hereafter referred to as the Hydrogeological Study), which discusses the geology and groundwater conditions for the project. (See Appendix A for Hydrogeological Study.) Subsurface geology at the well sites is described in the driller's logs of the wells. (See Table 3 in Appendix A for a summary of the driller's logs.) The logs indicate that lavas, clays, and cinders were encountered.

5. **Slope of the Water Table**

The groundwater contours slope downward from Well Nos. 1, 2 and 3 toward the coast. The groundwater contour at Well Nos. 1 and 2 is approximately 4.7 feet msl, and approximately 4.65 feet msl near Well No. 3. The 4.6 feet msl groundwater contour passes near Well No. 5. (See Figure 4 in
Sustainable yield is defined as the amount of groundwater that can be forcibly extracted by pumping indefinitely without affecting either the quality of the pumped water or the rate of pumping. The Commission on Water Resource Management (CWRM) manages groundwater resources throughout the state. The Kahu'aina Wells are within the Kilauea Aquifer of the Lihue Sector as defined by CWRM. This aquifer system is connected hydraulically to other aquifer systems that comprise the Lihue Sector.

The aquifer system encompasses approximately 19 square miles, and extends from the Pacific Ocean on the North to Mount Namahana in the South. Kilauea Town is on the western boundary of the aquifer, and the eastern boundary extends from near Moloaa Bay along Moloaa and Kaluoa Streams to Puu Keakea. (See Exhibit 11, Kilauea Aquifer.) The southern portion of the aquifer is underlying land classified as Conservation by the State, in which the Moloaa Forest Reserve is located. The majority of the land is classified as Agricultural, with a small portion classified as Urban, which includes Kilauea Town. (Refer to Exhibit 3.)

The private water system is intended to serve the potable and non-potable requirements for the Kahu'aina Plantation. The State CWRM has estimated the sustainable yield of groundwater from the Kilauea Aquifer to be 17 million gallons per day (mgd). The actual amount of groundwater currently being extracted from the aquifer is approximately 1 mgd, which is much less than the sustainable yield.

If future Well Nos. 4 and 5, as well as Well Nos. 1, 2 and 3, are operated concurrently, then the maximum draft from these five wells would be 500 gpm, or approximately 720,000 gpd, which should have little or no impact on the integrity of the aquifer or any of the existing wells pumping from the aquifer. Interference among Well Nos. 1 through 5 should be minimal, if it occurs at all, under typical operating conditions. The low drawdown in the wells associated with the constant rate pumping tests indicates that adjacent wells should not be affected by pumping in the Kahu'aina Plantation wells.
## Table 1. Summary of Detected Water Quality Components

<table>
<thead>
<tr>
<th>Water Quality Parameters</th>
<th>MCL</th>
<th>2005 Test Results</th>
<th>2006 Test Results</th>
<th>2007 Test Results</th>
<th>Units</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Well No. 1</td>
<td>Well No. 2</td>
<td>Well No. 3</td>
<td>Well No. 1</td>
</tr>
<tr>
<td>Alkalinity</td>
<td>NR</td>
<td>72.9</td>
<td>72.5</td>
<td>62</td>
<td>78</td>
</tr>
<tr>
<td>Barium</td>
<td>2000</td>
<td>ND</td>
<td>12</td>
<td>9.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Calcium</td>
<td>NR</td>
<td>37</td>
<td>32</td>
<td>33</td>
<td>38</td>
</tr>
<tr>
<td>Chromium</td>
<td>100</td>
<td>5.6</td>
<td>5.1</td>
<td>4.6</td>
<td>5.3</td>
</tr>
<tr>
<td>Lead</td>
<td>15(1)</td>
<td>1.1</td>
<td>ND</td>
<td>2</td>
<td>ND</td>
</tr>
<tr>
<td>Fluoride</td>
<td>4.0</td>
<td>0.06</td>
<td>0.05</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Nitrate as Nitrogen</td>
<td>10</td>
<td>0.64</td>
<td>0.63</td>
<td>0.22</td>
<td>0.3</td>
</tr>
<tr>
<td>Total Trihalomethanes</td>
<td>80</td>
<td>ND</td>
<td>ND</td>
<td>0.8</td>
<td>ND</td>
</tr>
<tr>
<td>Toluene</td>
<td>1000</td>
<td>ND</td>
<td>ND</td>
<td>0.6</td>
<td>ND</td>
</tr>
<tr>
<td>Copper</td>
<td>1300</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>pH (2)</td>
<td>NR</td>
<td>8.5</td>
<td>8.5</td>
<td>7.52</td>
<td>7.0</td>
</tr>
<tr>
<td>Conductivity</td>
<td>NR</td>
<td>689</td>
<td>649</td>
<td>743</td>
<td>751</td>
</tr>
<tr>
<td>Turbidity</td>
<td>NR(3)</td>
<td>0.35</td>
<td>0.25</td>
<td>0.55</td>
<td>1.32</td>
</tr>
<tr>
<td>Total Coliform</td>
<td>(4)</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>NT</td>
<td>2.0(5)</td>
</tr>
</tbody>
</table>

1. Lead is regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. The action level for lead is 15 µg/l.

2. pH was measured in the field. The pH tested by MWH Laboratories is invalid due to the length of time between the sample date and the measurement.

3. Turbidity is regulated by DOH for surface water sources only.

4. The MCL is based on the presence or absence of total coliforms in a sample. When fewer than forty samples per month are collected for a system, the system is in compliance with the MCL for total coliforms if no more than one sample collected during a month is total coliform-positive.

5. Total coliform detected in 5/15/07 sample only. Other samples taken on 10/4/05, 6/12/07 and 6/13/07 were <1.

NR: Not Regulated by DOH
ND: Non-detectable
NT: Not Tested
THMs, including the practice of well disinfection through shock chlorination and septic system effluent.

- Copper – naturally occurring in rock, soil, plants, animals, water, sediment, and air. Copper compounds are also used as agricultural pesticides. (Note: All living organisms need copper to survive; therefore, trace amounts of copper in our diet is necessary for good health.)

- Toluene – The largest chemical use for toluene is the production of benzene and urethane. Toluene can leach into groundwater from spills on land that can occur during the storage, transport or disposal of fuels and oils.

- Total Coliform – The total coliform detected in the water was most likely from the sampling spigot, not from the well water itself. There was no total coliform detected in other samples taken on October 4, 2005 and on June 12 and 13, 2007.
of November, 2006, the septic tank had not been installed. Within 1,000 feet of Well No. 3, there are six installed septic tanks, and 3 tanks for which approval has been granted. (See Exhibit 12 for Septic Tanks in Vicinity.)

The source of THMs detected in Well 2 was most likely the result of disinfection of the well water with chlorine prior to sampling of the water. During normal operation of the wells, THMs are not expected to be present.

3. Distance to Proposed Well

The water table is approximately 285 to 286 feet below the ground surface for Well Nos. 1, 2 and 3. Therefore, any surface contaminants, such as agricultural chemicals and animal wastes, would need to travel over 280 feet through the ground to reach the groundwater. Subsurface waste from leaching fields would need to travel nearly as far. The more than 280-foot depth to water provides filtering of contaminants during the vertical travel time down to groundwater. Some contaminants may still potentially reach the groundwater, as possibly indicated by the nitrate measured in the wells and trace amounts of other chemicals. However, the levels of the constituents are well below the maximum contaminant level. Therefore, significant contamination of the well water from these contaminants is not anticipated.

4. Method of Disposal

The potential sources of contamination within the neighboring area of Well Nos. 1, 2 and 3 are currently and previously applied agricultural chemicals, animal wastes, and leaching field effluent. The agricultural chemicals and animal waste are primarily surface sources, and are not expected to significantly contaminate the well water. Effluent from the nearby septic tank leaching fields would be a subsurface source.

The source of the nitrate detected in the well water from both wells could potentially be from these existing sources. However, as mentioned above, the exact source of contamination cannot be determined.
water quality analysis indicate that the well water meets all drinking water regulations.

Direct contamination of the wells will be prevented by the grouted annulus and well seal at the top of the wells. The depth to the water table is approximately 285 feet at the wells, which further lessens the possibility of contamination.

9. Control Measures

Control measures to prevent contamination of the well are designed into the wells. The top 290 feet of annulus for Well No. 1, the top 262 feet of annulus for Well No. 2, and the top 255 feet for Well No. 3 has been cement grouted. Well No. 1 has 390 feet of solid casing that extends to an approximate elevation of (-)100.7 feet msl. Well No. 2 has 277 feet of solid casing that extends to an approximate elevation of 12 feet msl. Well No. 3 has 320 feet of solid casing that extends to an approximate elevation of (-)30 feet msl. These control measures will prevent surface drainage or contaminated groundwater from entering the well.
F. PROFESSIONAL ENGINEER CERTIFICATION

This Engineering Report (ER) for Kahu'aina Plantation Well No. 1, Well No. 2 and Well No. 3 has been prepared by Austin, Tsutsumi & Associates, Inc. (ATA) pursuant to the State of Hawaii Department of Health (DOH) Public Health Regulation, Chapter 20 of Title 11, Hawaii Administrative Rules (HAR), "Potable Water Systems", and in accordance with DOH's "Guidelines for Preparation of Engineering Reports for New Potable Water Sources", dated September 12, 2007. This ER was prepared by, or under the supervision of Lisa L. Appelgate, whose "Professional Engineer's Statement" is included in Appendix E.
EXHIBITS
APPENDIX A

HYDROGEOLOGICAL STUDY OF THE
KAHU'AINA PLANTATION SOURCE WELLS
WAIPAKE, HANALEI, KAUAI, HAWAII
Hydrogeological Study of the Kahu‘aina Plantation 
Source Wells, Waipake, Hanalei, Kauai, Hawaii

Prepared For:
Falko Partners, LLC 
6191 Haua‘la Road 
Kealia, Hawaii 96751

Prepared By:
Mink and Yuen, Inc. 
1670 Kalakaua Avenue, Suite 605 
Honolulu, Hawaii 
July 2007
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1. Introduction

The report that follows will discuss the hydrogeology of the Kahu‘aina Plantation property. Information collected from the Kahu‘aina Plantation wells in addition to other wells drilled in the area will provide the information essential to preparing the Preliminary Engineering Report required by the State Department of Health Safe Drinking Water Branch and to helping Kahu‘aina Plantation maximize the groundwater resource at their site.

Falko Partners have drilled five wells for future domestic and agricultural uses. The wells are located on 365 acres parcel consisting of 15 lots (TMK: 5-1-03:06, 09, 10, 11, 13, 17, 18, 22-29). Two of the wells, Well Nos. 1 and 2 (State Well Nos. 1221-08 and 1221-09), are each outfitted with 90 gallons per minute (gpm) pump. These wells in use since 2003 are hooked up to a 109,000 gallon glass-fused-to-steel reservoir that provides water for a nursery and for limited diversified agriculture. The wells are approximately 100 feet apart.

Well Nos. 3, 4, and 5 (State Well Nos. 1121-03, 03, 04, respectively) are drilled and are located approximately 900 feet northwest of the two original wells. See Figure 1.

Aquifer tests for all of the wells have been completed. US EPA environmental samples collected for Well Nos. 1 and 2 are complete.
2. **Climate and Rainfall**

The location of the Kahu'aina Plantation property on the northeast coast of Kauai allows for precipitation from the trade wind flow as well as occasional kona storms affecting the entire island. Orographic precipitation may occur with localized rainfall associated with moist trade winds interacting with the Anahola and Makaleha Mountains inland of the site.

Several rain gages associated with the former Kilauea Sugar Company are located above and below the site. These gages bracket the long-term rainfall averages (State of Hawaii, Report R42, 1973). These gages are identified using their State Key Nos. as 1141 (inland gage above the site) and 1143 (below the site). Both gages were established in 1936 and provided data at least to 1973. Giambelluca and others (1986) compiled the long-term rainfall data for the state. They calculated that the long-term unadjusted annual average rainfall averages were 64.1 inches and 56.5 inches for gages 1141 and 1143, respectively.

The wettest month is January with a long-term unadjusted annual average of 8.1 inches and 7.8 inches for gages 1141 and 1143, respectively. The driest month for both gages is June, with gage 1141 averaging 2.3 inches and gage 1143 averaging 2.0 inches.

3. **Geology**

The geologic evolution of the island of Kauai has been discussed in detail by Macdonald and others (1960). The names of the rock units described in that report have been updated by Langenheim and Clague (1987). These names will be used throughout this report.
The Koloa Volcanics have weathered to form the Lihue Series soil group (NRCS, 2005). The property contains two members of this group: 1) LhB or Lihue Silty Clay found on slopes between 0 and 8 percent (0 and 5 degree), and 2) LhC or Lihue Silty Clay found on slopes between 8 to 15 percent (5 to 9 degrees). These soils are well drained and occur from sea level to 800 feet above sea level (ft., msl), where rainfall amounts are between 40 and 60 inches per year. Both types show moderate to rapid permeability and slow runoff capability. The erosion hazard is slight (NRCS, 2005). A small valley that bifurcates the property is listed as rRR on the soils map (NRCS, 2005; Foote and others, 1972). The map unit rRR is identified as “rough broken land” and defined as “very steep land broken by numerous intermittent drainage channels” (Foote and others, 1972, p. 119).
equilibrium water level is 17 mgd. The actual amount of reported groundwater extraction from the aquifer system for 2006 was less than 1 mgd (CWRM data).

Though the basaltic lava flows associated with the Napali Member occur at some depth below the Kahu’aina Plantation site, the Kahu’aina Plantation Well Nos. 1 - 5 develop groundwater from an aquifer within the Koloa Volcanics that overlies the Napali Member. This aquifer, in turn, is recharged by infiltration from rainfall directly over the Koloa Volcanics, and by groundwater leakage from the Napali basalts that are in geologic contact with the Koloa rocks. The Koloa lavas have formed a capping layer over the underlying Napali basalts causing basal groundwater in the Napali lava flows to discharge upward into permeable zones within the Koloa Volcanics.

Permeability in the Koloa Volcanics is largely restricted to layers of clinker between massive lava flows. As noted above, the Koloa Volcanics were erupted much later than the shield-building basaltic lava flows of Napali age, and therefore, filled in pre-existing valleys and other depressions to produce thick ponded lavas flows. Associated with the ponded lavas are pyroclastics deposits. These deposits have weathered to clay or have weathered but retain the appearance of cinder.

Perched groundwater aquifers are found in the Koloa Volcanics and are associated with the massive flows and weathered cinder. The perched aquifers generally lie above the main zone of saturation and are drained by shallow streams. The larger water-bearing aquifers within the Koloa Volcanics are found in the layers of rubble and clinkers between lava flows. The number of clinker layers penetrated by a well will greatly enhance the production of the well. Perched aquifers are not in contact with underlying seawater as are basal aquifers normally associated with the Napali basalts. Basal groundwater in the
Figure 3: Location map of wells shown in Table 1
b. Subsurface Geology

The Kahu'aina Plantation wells were drilled entirely in Koloa Volcanics. The subsurface geology is described by driller's logs providing some information regarding the relative hardness of the lava flows, amount of weathering, color of the lavas, and sometimes, changes in water level encountered during drilling. Table 2 is a summary of the driller’s logs for the Kahu'aina Plantation wells.

Table 3

<table>
<thead>
<tr>
<th>Well No. 1 1221-08</th>
<th>Well No. 2 1221-09</th>
<th>Well No. 3 1121-02</th>
<th>Well No. 4 1121-03</th>
<th>Well No. 5 1121-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-95' Red clay</td>
<td>0-44' Red clay</td>
<td>0-41' Red clay</td>
<td>0-39' Red clay</td>
<td>0-26' Red clay</td>
</tr>
<tr>
<td>125' - 135' Cinders making 40 gpm water</td>
<td>55' - 76' Sequence of brown clay and black lava</td>
<td>96' - 114' Weathered rock</td>
<td>95' - 113' Weathered rock</td>
<td>65' - 91' Weathered rock</td>
</tr>
<tr>
<td>135' - 197' Sequence of red and brown clay</td>
<td>76' - 136' Sequence of red and brown clay some lava</td>
<td>114' - 145' Soft cinders</td>
<td>113' - 148' Soft cinders</td>
<td>91' - 141' Red clay cinders</td>
</tr>
<tr>
<td>197' - 230' Black lava</td>
<td>136' - 180' Sequence of black, green, and red lava</td>
<td>145' - 200' Red clay</td>
<td>148' - 202' Red clay</td>
<td>141' - 191' Red clay, weathered rock</td>
</tr>
<tr>
<td>250' - 380' Sequence of red and black lava flows</td>
<td>198' - 346' Sequence of black and red lava flows</td>
<td>250' - 262' Hard blue rock</td>
<td>248' - 259' Hard blue rock</td>
<td>241' - 266' Hard blue rock</td>
</tr>
<tr>
<td>382' cavity</td>
<td>346' - 348' cavity</td>
<td>262' - 287' Sequence of fractured blue weathered rock and weathered rock</td>
<td>259' - 275' Sequence of fractured blue weathered rock and weathered rock</td>
<td>266' - 291' Hard red cinders</td>
</tr>
<tr>
<td>382' - 485' Sequence of black, blue, and red lava flows. Broken lava at 440' - 455'</td>
<td>348' - 440' Sequence of hard basalt, broken lava, red lava, and blue lava</td>
<td>287' - 290' Cinders</td>
<td>275' - 288' Cinders</td>
<td>291' - 316' Weathered blue rock</td>
</tr>
<tr>
<td></td>
<td></td>
<td>290' - 325' Blue rock</td>
<td>288' - 328' Blue rock</td>
<td>316' - 341' Weathered hard rock</td>
</tr>
<tr>
<td></td>
<td></td>
<td>325' - 355' Weathered blue rock medium hard</td>
<td>328' - 360' Weathered blue rock medium hard</td>
<td>341' - 367' Hard blue and weathered rock</td>
</tr>
<tr>
<td></td>
<td></td>
<td>355' - 400' Cinders, medium hard</td>
<td>360' - 380' Cinders, medium hard</td>
<td>367' - 381' Medium hard cinders</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>381' - 385' Hard blue rock</td>
</tr>
</tbody>
</table>

The zones described by the driller that are identified as "cinders", "fractured" rock, "broken" lava rock are probably those permeable layers within the Koloa Volcanics. Rock layers described as "clay", "hard blue rock", and
Figure 4: Water level contours and direction of groundwater flow.

As shown in Table 4, there is a water level drop of 0.13 feet over the measured map distance of 1,360 feet between Well Nos. 1 and 5. The calculated
The pumping tests show that the aquifer the Kahu'aina Plantation wells develop is very permeable. The wells are capable of pumping over 200 gpm with drawdowns less than a foot. Only Well No. 1 had a drawdown greater than a foot. Chlorides in Well Nos. 1, 2, and 4 were less than 100 mg/L and were stable. Chloride concentrations in Well Nos. 3 and 5 were over 100 mg/L but stabilized during the constant rate tests.

Water level measurements during the constant rate tests showed that while the pumpage rates remained constant, water levels varied in response to the ocean tide. For example, during the constant rate test for Well No. 5, the well showed a 0.42-foot fluctuation in water level during an ocean tide fluctuation of 2 ft. at Hanalei Bay. The tidal efficiency is about 20 percent, and considering that the wells are located about a mile from the coast, the response indicates a very permeable aquifer, again suggesting that the aquifer is basal.

e. Calculation of Aquifer Permeability

Analysis of pump test data can provide a measure of permeability of the aquifer. Normally, long-term constant rate pump test data is used, but as suggested above, the constant rate water levels are subject to ocean tides and cannot be reliably used to determine permeability. However, an examination of the data shows that extremely low measured drawdown for different pumping rates gathered during the step-drawdown tests suggests high aquifer permeability. A step-drawdown test gives approximate equilibrium values for drawdowns at various rates. True equilibrium occurs only if time becomes infinite; however, drawdown equilibrium is assumed (tidal fluctuation within each rate is negligible).
Typical dike-free basalts have k values between 1,500 and 2,500 ft./d. The calculated k values for Well No. 2, and especially, Well No. 3 seem excessive. High conductivity numbers are usually associated with young basaltic lava flows such as found on the island of Hawaii. The driller’s logs for Well Nos. 3, 4, and 5 indicate “cinders” near the bottom of the exposed well bore that could provide the permeability required to keep drawdown at a minimum. The high transmissivity calculated for Well No. 3 could be the reason it has the highest chloride water. The driller’s log for Well Nos. 1 and 2 are similar, and the disparity between their hydraulic conductivity values is not apparent. The disparity of hydraulic conductivities between wells is due partly to local variations at the well bore and partly to more global aquifer properties.

f. Well Interference

To calculate well interference among adjacent wells, an average hydraulic conductivity of 2,000 ft./d is applied to an aquifer 100 feet thick. The resulting average aquifer transmissivity is 200,000 ft²/d.

Interference among the wells will be minimal, if it occurs at all, under typical operating conditions. The low drawdowns associated with the constant rate pumping tests (see Table 6) should not affect drawdown in adjacent wells. Calculating the maximum long-term (steady-state) affect of one well on another well can be accomplished using the Thiem Equation for an unconfined aquifer:

\[ s = \frac{Q}{(2\pi T) \ln\left\{ {1.5} / \left( r (T_t / S)^2 \right) \right\} } \]  

Where:

- \( Q \) = pumping rate in ft³/d
- \( T \) = transmissivity in ft²/d
- \( t \) = time in days
Only Well Nos. 1 and 2 have been operated over a long period of time. Regular monitoring of chlorides and EC should be part of the monitoring and reporting of water use data submitted to CWRM (as required by HAR §13-168-7). With the addition of new of Well Nos. 3, 4, 5 in the future, baseline data collection of water levels and chlorides will be needed to determine how best to operate the wells.

![Constant Rate Pump Test Electrical Conductivity](image)

Figure 5: EC measurements over time.

7. **Approximate Zone of Contribution for the Kahu’aina Plantation Wells**

   In order to approximate the zone of contribution to the Kahu’aina Plantation wells, use of the US EPA’s Well Head Protection Area or WHPA
The steady-state zone of contribution and stagnation point defines a parabolic envelope. The zone of contribution equation is:

\[-y/x = \tan(2\pi k_i b_i y / Q) = \tan(2\pi b_i q / Q)\]  \hspace{1cm} (3)

Where:

- \(x, y\) = the coordinate system that defines the parabola where \(x\) is the direction of groundwater flow
- \(q\) = specific discharge = \(k_i\)
- \(k\) = hydraulic conductivity
- \(i\) = hydraulic gradient = 0.5 ft. per 5,280 ft.
- \(b\) = effective extraction depth is assumed to be 100 ft.
- \(Q\) = wells’ discharge rate in cu. ft. per day (200 and 100 gpm = 38,503 and 19,251 ft\(^3\)/d, respectively).

The equation for the down gradient stagnation point is defined as:

\[X_s = -Q / (2\pi b_q)\]  \hspace{1cm} (4)

The maximum up gradient width of the zone of contribution is defined as \(2y\) so that the equation is:

\[2y = Q / (b_q)\]  \hspace{1cm} (5)

From the aquifer test data for the Kahu‘aina Plantation wells, the average hydraulic conductivity, \(k\), is calculated to be about 4,253 ft/d (Table 6). The groundwater gradient is 0.504/mile or 9.559e-5 ft/ft. Therefore, specific discharge, \(q\), is equal to 0.406 ft/d.

Substituting these parameters into the equations 4 and 5, the stagnation point down gradient from the Well Nos. 1 and 2 (using the combined \(Q\) of 38,503...
Figure 6: Representation of zone of contribution for Kahu’aina Plantation wells.
The zone of contribution outlines the areas where aquifer contamination from surface sources could occur. However, the aquifer tapped by the Kahu‘aina Plantation wells is protected by several hundred feet of Koloa Volcanics overburden. The 10-year zones of contribution are in the forest reserve of the Makaleha Mountains.

Monitoring of land-use activities up gradient of the property is important to protect the source aquifer from contamination. Figures 6 and 7 provide an approximate envelope that should be monitored.

8. Conclusions and Recommendations

The Kahu‘aina Plantation wells develop groundwater from a very permeable aquifer within the Koloa Volcanics. The behavior of the groundwater suggests that it is basal with the fresh water portion floating on denser underlying seawater below. Because of this condition the pumping rate at each well should be 90 gpm. Frequent on-and-off cycling of the pumps can cause chlorides to rise over time. The Kahu‘aina Plantation should initiate a salinity-monitoring program for each well. Samples should be collected on a regular basis and analyzed for the chloride ion. In addition, electrical conductivity (specific conductance measured in µS/cm) measurements should also be done to provide a quick check on salinity at each source. These data and pumpage data should be sent to CWRM on a monthly basis as required by HAR §13-168-7. Regular water level measurements should also be conducted using the measuring point elevations on top of the measuring tubes as part of the baseline data collection program.

Addendum A
To determine aquifer properties from the pump tests, only the step-drawdown drawdown data are used. The constant rate tests showed that the drawdowns varied considerably in response to ocean tide diurnal fluctuation. Each rate of the three-rate step-drawdown test lasted for 0.5 hours. The drawdown stabilized shortly after the pumping rate was determined. Minor drawdown fluctuations occurred with variations in the pumping rate.

Assuming that equilibrium was reached during each pumping rate, the total drawdown at each step is the sum of laminar and turbulent losses at the well bore. Where the components of drawdown are:

\[ s_a = aQ \] = laminar drawdown \hspace{1cm} (1) \\
\[ s_b = bQ^2 \] = turbulent drawdown \hspace{1cm} (2)

Total drawdown can be expressed as:

\[ s_t = aQ + bQ^2 \] \hspace{1cm} (3)

Where:

- \( Q \) = pumping rate in cu. ft./d
- \( a \) = aquifer constant related losses due to laminar flow
- \( b \) = well constant related to turbulent flow

A method devised by John Mink (per. comm., 2000) to solve for \( a \) and \( b \) using simultaneous equations from the step-drawdown data, and then using \( a \) to solve for transmissivity using the Thiem Equation. The drawdown equations for two different pumping rates are:

\[ s_1 = aQ_1 + bQ_1^2 \] \hspace{1cm} (4) \\
\[ s_2 = aQ_2 + bQ_2^2 \] \hspace{1cm} (5)
Alternative way for determining T from step-drawdown data (Mink, per. comm)

\[ Q = \text{ft}^3/\text{d} \]
\[ s = \text{ft.} \]

\[ Q1 (\text{gpm}) = 160 = 30,800 \text{ ft}^3/\text{d} \]
\[ Q2 (\text{gpm}) = 70 = 13,475 \text{ ft}^3/\text{d} \]

Set up two equations:

\[ s1 = jQ1 + nQ1^2 \]
\[ s2 = jQ2 + nQ2^2 \]

\[ Q2 = 13,475 \quad s2 = 0.49 \]
\[ Q1 = 30,800 \quad s1 = 1.76 \]

Well Depth below sea level = 121

Radius of well (ft) = 0.25 = r

\[ n = s1 - (Q1/Q2)s2/Q1(Q1-Q2) = 1.20E-09 \]
\[ j = s/Q - nQ = 2.02E-05 \]

Laminar flow equation:

\[ s = jQ = 6.22E-01 \quad 74.07\% \text{ Head loss due to laminar flow} \]

Thiem Eq.

\[ T = \frac{1}{2 \pi j} \left( \ln \left( \frac{r_{e}}{r} \right) \right) \]

\[ r_{e} = \text{Well Depth BSL} \times 1.6 = 193.6 \]

Therefore:

\[ T = \frac{1}{2 \pi j} \left( \ln \left( \frac{r_{e}}{r} \right) \right) = 52,406 \text{ ft}^2/\text{d} \]
Well Name: Falko Well 3  
Date of Test: 26-Oct-06  
Date of Analysis: 1-Jul-07

Alternative way for determining T from step-drawdown data (Mink, per. comm)

\[ Q = \text{ft}^3/\text{d} \]
\[ s = \text{ft} \]
\[ Q_1 (\text{gpm}) = 212 = 40,810 \text{ ft}^3/\text{d} \]
\[ Q_2 (\text{gpm}) = 120 = 23,100 \text{ ft}^3/\text{d} \]

Set up two equations:

\[ s_1 = jQ_1 + nQ_1^2 \]
\[ s_2 = jQ_2 + nQ_2^2 \]

\[ Q_2 = \text{ft}^3/\text{d} \]
\[ Q_1 = \text{ft}^3/\text{d} \]
\[ s_1 = \text{ft} \]
\[ s_2 = \text{ft} \]
\[ n = s_1 - (Q_1/Q_2)s_2/Q_1(Q_1-Q_2) = 1.40E-10 \]
\[ j = s/Q - nQ = 6.68E-07 \]

Laminar flow equation:

\[ s = jQ = 2.73E-02 \]
\[ 26.77\% \text{ Head loss due to laminar flow} \]

Thiem Eq.

\[ T = \frac{1}{2}\pi j \ln(re/r) \]

\[ re = \text{Well Depth BSL} * 1.6 = 110.4 \]

Therefore:

\[ T = \frac{1}{2}\pi j \ln(re/r) = 1,451,086 \text{ ft}^2/\text{d} \]
Well Name: Falko Well 5
Date of Test: 5-Jun-07
Date of Analysis: 1-Jul-07

Alternative way for determing $T$ from step-drawdown data (Mink, per. comm)

$$Q = \text{ft}^3/\text{d}$$
$$s = \text{ft}.$$  

<table>
<thead>
<tr>
<th>$Q_1$ (gpm)</th>
<th>$Q_2$ (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>197</td>
<td>95</td>
</tr>
</tbody>
</table>

$$s_1 = jQ_1 + nQ_1^2$$
$$s_2 = jQ_2 + nQ_2^2$$

Green = input
Red = calculated

$$Q_2 = 18,288$$
$$s_2 = 0.1$$
$$Q_1 = 37,923$$
$$s_1 = 0.22$$

Well Depth below sea level = 62.5 ft
Radius of well (ft) = 0.25 = $r$

$n = s_1 - (Q_1/Q_2)s_2/Q_1(Q_1-Q_2) = 1.70E-11$

$j = s/Q - nQ = 5.16E-06$

Laminar flow equation:
$$s = jQ = 1.96E-01$$  
97.18% Head loss due to laminar flow

Thiem Eq.
$$T = \frac{1}{2\pi j}(\ln(re/r))$$

$re = \text{Well Depth BSL} * 1.6 = 100$

Therefore:
$$T = \frac{1}{2\pi j}(\ln(re/r)) = 184,873 \text{ ft}^2/\text{d}$$
Well Completion Report for Wells Nos. 1221-08 & 09

Dear Lenore:

Per your request, I am faxing the pump rating curves for the above installed pumps.

If you have any questions, please contact Barry Simmons of Oasis Water Systems, Inc. at 808.635.9790.

Aloha,

Barry

P.O. Box 507 • Hanalei, HI 96714 • Phone 808.635.9790 • Fax 808.826.6530 • Email oasiskauai@yahoo.com
Water Ways Distribution

Preferred Pump
8 Stg. Goulds Sub 5CLC (8 - 3.50" Trims)

HEAD IN FEET

GALLONS PER MIN.

<table>
<thead>
<tr>
<th>Gallons</th>
<th>0</th>
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<th>35</th>
<th>61</th>
<th>88</th>
<th>104</th>
<th>117</th>
<th>125</th>
<th>136</th>
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<tr>
<td>TDH</td>
<td>474</td>
<td>466</td>
<td>442</td>
<td>419</td>
<td>396</td>
<td>373</td>
<td>350</td>
<td>327</td>
<td>304</td>
<td>281</td>
<td>258</td>
<td>235</td>
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</tbody>
</table>

Pump #2 -- Tested 10-03-03 (Tested w/ 20 Hp 3 ph Franklin Motor)
Water Ways Distribution

Preferred Pump
8 Stg. Goulds Sub 5CLC (8 - 3.50" Trims)

HEAD IN FEET

Design Point
100 GPM @ 335' TDH

GALLONS PER MIN.

Pump #1 -- Tested 10-03-03 (Tested w/ 20 Hp 3 ph Franklin Motor)
May 4, 2004

Mr. Greg Kamm
Falco Partners, LLC
P.O. Box 588
Kapaa, HI 96746

Dear Mr. Kamm:

Well Completion Report for Well No. 1221-08 & 09

Thank you for submitting the pump curves for the installed pumps, which we received on May 3, 2004. We acknowledge that the Well Completion Report Part II for the Falko/Koolau Well Nos. 1 & 2 (Well No. 1221-08 & 09) is now complete.

If you have any questions, please contact Lenore Y. Nakama of the Commission staff at 587-0218 or toll-free at 274-3141 (Kauai), extension 70218.

Sincerely,

[Signature]

W. Roy Handy

Ernest Y.W. Lau
Deputy Director

LYN:ss

c: Oasis Water Systems
Preferred Pump
8 Stg. Goulds Sub 5CLC (8 - 3.50" Trims)

HEAD IN FEET

Design Point
100 GPM @ 335' TDH

GALLONS PER MIN.

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<th>TDH</th>
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<td>474</td>
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</table>

Pump #1 - Tested 10-03-03 (Tested w/ 20 Hp 3 ph Franklin Motor)
Water Ways Distribution

Preferred Pump
8 Stg. Goulds Sub 5CLC (8 - 3.50" Trims)

HEAD IN FEET

GALLONS PER MIN.

<table>
<thead>
<tr>
<th>TDH</th>
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<th>17</th>
<th>35</th>
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<td>235</td>
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</tbody>
</table>

Design Point
100 GPM @ 335' TDH

Pump #2 - Tested 10-03-03 ( Tested w/ 20 Hp 3 ph Franklin Motor)
To: Lenore
From: MONICA – FALKO PARTNERS

Fax: 808-587-0219
Phone: 808-587-0219

Fax: 808-587-0219
Phone: 808-587-0219

RE: Pump Curves

Pages: 3 Including cover

Date: May 3, 2004

☐ Urgent ☑ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Aloha Lenore,

Please find your copy of the pump rating curves for Well Nos. 1221-08 & 09, requested in the letter dated April 21, 2004.

Please let me know if there are any other requirements or questions.

Mahalo,

Monica Rodriguez
Falko Partners, LLC
P.O. Box 588 Kapaa, HI 96746
Fax: 808-822-1782 Phone: 808-821-1781
Mr. Greg Kamm
Falko Partners, LLC
P.O. Box 588
Kapaa, HI 96746

Dear Mr. Kamm:

Well Completion Report for Well Nos. 1221-08 & 09

We have received your Well Completion Report Part II for the Falko/Koolau Well Nos. 1 & 2 (Well No. 1221-08 & 09). However, matters which must be addressed before we accept your report as complete are as follows:

1. Please provide the pump rating curves for the installed pumps.

   Please respond to the above item(s) within thirty (30) days of this letter’s date. Failure to do so may result in fines of up to $1000 per day.

   This is also to document our March 14, 2004 telephone call to Steve Goldberg of Oasis Water Systems, wherein Mr. Goldberg confirmed that the identical elevations given in the two sets of as-builts are correct. Mr. Goldberg stated that the well sites were graded extensively, that the new benchmark elevations are 289.5 ft, and that the pumps were installed at an identical depth.

   If you have any questions, please contact Lenore Y. Nakama of the Commission staff at 587-0218 or toll-free at 274-3141 (Kauai), extension 70218.

Sincerely,

W. Roy Handy
DEPUTY DIRECTOR

ERNEST Y.W. LAU
Deputy Director

LYN:ss

c: Oasis Water Systems
Hi Lenore:

Attached is the Pump Installation Report for Wells 1221-06 & 09

Regards,

Steve Goldberg
1. State Well No.: 1221-08  Well Name: 1221-08 FALKO 1  Island: KAUAI
2. Address: Kauai Rd., Kilauea  Tax Map Key: 5-1-36
3. Pump Installation Company: OASIS WATER SYSTEMS INC.
4. Date Pump Installed: 12/12/03
5. PERMANENT PUMP INFORMATION
   - Pump Type, Make, Serial No.: GUD/COUNTY/GCL
   - Rated Capacity: 100 gpm
   - Motor Type, H.P., Voltage, rpm: FRANKLIN/15HP/240/3450
   - Type of flow meter: TURBINE
6. Method of flow measurement:
   - Flowmeter  Manufacturer: NEPTUNE  Make: NEPTUNE  Size: 3"
   - Verify  Open Pipe  Online  Other*  *Other, explain below
   - attach schematic
7. Fill in the as-built section on the other side of this sheet.
8. Other remarks/comments:

Pump Installation Contractor (print): OASIS WATER SYSTEM  C-57/C-37/A  Lic. No. 21457
Signature: [Signature]  Date: 4/13/04
Permittee (print): [Signature]  Date: 4/12/04
Bench mark elevation surveyed to nearest 0.01 ft. = 289.5 ft. mean sea level

Elevation of top of chase tube 291 ft. mean sea level

Pump intake depth ft. -25 (referenced to bench mark)

Chase tube depth = -21 ft. (referenced to bench mark)

If airline installed, bottom of airline elevation = 

______ ft. mean sea level
PUMP INSTALLATION PERMIT

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management’s Administrative Rules, Section 13-16h, entitled “Water Use, Wells, and Stream Diversion Works”, this document permits the pump installation for Falko/Koolea No. 1 & 2 (Wall No. 1221-06 & 08) at Koolea Road, Kualo, THK 5-1-39, subject to the Hawaii Well Construction & Pump Installation Standards (123/97) which include but are not limited to the following conditions:

1. The Chairperson to the Commission on Water Resource Management (Commission), P.O. Box 281, Honolulu, HI 96820, shall be notified in writing, at least two (2) weeks before any work covered by this permit commences and shall be allowed to inspect installation activities in accordance with 233-148-16, Hawaii Administrative Rules.

2. The pump installation permit shall be for a nominal capacity of 30 gpm capacity, or less, pump in the well.

3. The permittee, well operator, and well owner shall provide and maintain an approved meter or other appropriate means for measuring and reporting withdrawals and water levels, and appropriate devices or meters for monitoring chemicals and temperature. These data shall be measured monthly and reported to the Commission on a monthly basis, on forms provided by the Chairperson (attached).

4. The proposed use shall not adversely affect existing or future legal uses of water in the area, including any surface water or established irrigation flow standards. The permit or the authorization to pump water from a well shall not constitute a determination of correlative water rights. The permittee, well operator, and well owner are notified and hereby understand that the quantity of water taken from the well could be reduced by the Commission in the future. This permit is not a statement that the pump capacity permitted here or even some lesser amount is guaranteed in the future.

5. The permittee, well operator, and well owner shall comply with all applicable laws, rules, and ordinances, and non-compliance may be grounds for revocation of this permit.

6. The pump installation permit application and all related staff submitted approved by the Commission are incorporated into this permit by reference. This permit is also subject to the Hawaii Well Construction & Pump Installation Standards (123/97). If the WMP design is not followed and as a consequence water is wasted or contaminated, a lien on the property may result.

7. The permit may be revoked if work is not completed within six (6) months after the date of approval of if work is suspended or abandoned for six (6) months, unless otherwise specified. The work prescribed in the pump installation permit application shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Chairperson upon a showing of good cause and good faith performance. A request to extend the permit shall be submitted to the Chairperson no later than three (3) months prior to the date the permit expires. If the commencement date is not met, the Commission may revoke the permit after giving the permittee, well operator, and well owner notice of the proposed action and an opportunity to be heard.

8. If the well is not to be used it must be properly capped. The well is to be abandoned when the permittee, well operator, or well owner must apply for a well abandonment permit in accordance with 13-108-128 prior to any well sealing or plugging work.

9. 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, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or resulting in or connected with the granting of this permit.

10. Special conditions in the attached cover transmittal letter are incorporated herein by reference.

Date of Approval: July 10, 2002
Expiration Date: July 10, 2004

GILBERT S. COLOMA-AGARAN, Chairperson
Commission on Water Resource Management

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed and understand that I shall not commence work until I and the pump installer have signed, dated, and returned the permit to the Commission. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day starting from the permit date of approval.

Permittee’s Signature: [Signature]
Printed Name: [Printed Name]
Firm or Title: [Firm or Title]

Installer’s Signature: [Signature]
Printed Name: [Printed Name]
Firm or Title: [Firm or Title]

Please sign both copies of this permit, return one to the Chairperson, and retain the other for your records.

Attachments:
- USHA
- Department of Health/State Water/Waste Water Branch
- Kauai Department of Water/Waste

Page 8

08/13/2004 03:16 88882887893
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources

WELL COMPLETION REPORT - PART II
Pump Installation

Instructions: Please print in ink or type and send completed report (with attachments, if applicable) to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. The Commission may not accept incomplete reports. This form shall be submitted within 90 days of the completion of work. For assistance, please consult the Hawaii Well Construction and Pump Installation Standards or call the Regulation Branch at 808-483-3305. For updates to this form or additional information, please visit our website at http://www.state.hi.us/dlnr/wrm/

<table>
<thead>
<tr>
<th>1. State Well No.:</th>
<th>1221-08</th>
<th>Well Name:</th>
<th>1221-08</th>
<th>island:</th>
<th>KAUAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Address:</td>
<td>Koolau Rd, Kilauea</td>
<td>Tax Map Key:</td>
<td>5-1-3:6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Pump Installation Company:</td>
<td>OASIS WATER SYSTEMS INC.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Date Pump Installed:</td>
<td>12/12/03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. PERMANENT PUMP INFORMATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pump Type, Make, Serial No.:</td>
<td>SUB/GOULD/SLCLC</td>
<td>Rated Capacity:</td>
<td>100 gpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Type, H.P., Voltage, rpm:</td>
<td>FRANKLIN/15HP/240/3450</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of flow meter:</td>
<td>Turbine</td>
<td>Which measures in</td>
<td>Gallons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Method of flow measurement:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Flowmeter Manufacturer Neptue Make Neptue Size</td>
<td>3”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Weir □ Open Pipe □ Orifice □ Other*, explain below</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*attach schematic</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>7. Fill in the as-built section on the other side of this sheet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Other remarks/comments:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pump Installation Contractor (print) OASIS WATER SYSTEMS C-57/C-57a/A Lic. No.21457

Signature: John D. Perry Date: 4/5/04

Permittee (print) Signature Date

WCR2 Form 5/2/00
State of Hawaii  
COMMISSION ON WATER RESOURCE MANAGEMENT  
Department of Land and Natural Resources  
WELL COMPLETION REPORT - PART II  
Pump Installation

1. State Well No.: 1221-09  
Well Name: 1221-09 FALKO 2  
Island: KAUAI

2. Address: Koolau Rd Kilauea  
Tax Map Key: 5-1-3-6

3. Pump installation Company: OASIS WATER SYSTEMS INC

4. Date Pump Installed: 12/24/03

5. PERMANENT PUMP INFORMATION  
Pump Type, Make, Serial No.: BEU G060705LC  
Rated Capacity: 100 gpm

Motor Type, H.P., Voltage, rpm: FRANKLIN 16HP/240/3450

Type of flow meter: TURBINE  
Which measures in GALLONS

6. Method of flow measurement:  
- Flow meter  
- Manufacturer: Neptune  
- Make: Neptune  
- Size: 3"  

7. Fill in the as-built section on the other side of this sheet.

8. Other remarks/comments:

Pump Installation Contract  
OASIS WATER SYSTEMS C-57C-57WA  
Lic. No.21457

Signature: [Signature]  
Date: 4/5/04

Permittee (print): Shawn Smith  
Signature: [Signature]  
Date: 4/12/04
3. AS-BUILT PUMP SECTION (Please attach as-built if different from diagram provided below)

Bench mark elevation surveyed to nearest 0.01 ft. = 289.5 ft. mean sea level

elevation of top of chase tube 291 ft. mean sea level

Pump intake depth ft -25 (referenced to bench mark)

Chase tube depth = -21ft. (referenced to bench mark)

If airline installed, bottom of airline elevation = _______ ft. mean sea level

2-1221-09 FALKO 2
State of Hawaii

COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources

WELL COMPLETION REPORT - PART II
Pump Installation

Instructions: Please print in ink or type and send completed report (with attachments, if applicable) to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96820. The Commission may not accept incomplete reports. This form shall be submitted within 60 days of the completion of work. For assistance, please consult the Hawaii Well Construction and Pump Installation Standards or call the Regulation Branch at 808-681-2226. For updates to this form or additional information, please visit our website at http://www.state.hi.us/dlnr/wrmn/.

1. State Well No.: 1221-09  Well Name: 1221-09 FALKO 2  Island: KAUAI
2. Address: Koolau Rd. Kilauea Tax Map Key: 5-1-3-6
3. Pump Installation Company: OASIS WATER SYSTEMS INC.
4. Date Pump Installed: 12/12/03
5. PERMANENT PUMP INFORMATION
   Pump Type, Make, Serial No.: SUB/GOULDS/5CLC  Rated Capacity: 100 gpm
   Motor Type, H.P., Voltage, rpm: FRANKLIN 15HP/240/3450
   Type of flow meter: TURBINE Which measures in Gallons
6. Method of flow measurement:
   □ Flowmeter  Manufacturer Neptune Make Neptune Size 3"  
   □ Weir* □ Open Pipe* □ Orifice* □ Other*, explain below
   *attach schematic
7. Fill in the as-built section on the other side of this sheet.
8. Other remarks/comments:
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________

Pump Installation Contractor (print) OASIS WATER SYSTEMS INC. C-57/C-57a/A  Lic. No.21457
Signature: __________________________  Date: 4/5/04

Permittee (print) __________________________
Signature: __________________________  Date: __________________________

WCR2 Form 02/00
PUMP INSTALLATION PERMIT

F. O. Jones No. 1 & 2, Well No. 1221-08

Note: This permit shall be prominently displayed at the site until the work is completed.

In accordance with the Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-184, entitled "Water Use, Wells, and Stream Diversion Works," this document permits the pump installation for Falko/Koolau No. 1 & 2 (Well No. 1221-08) at Koolau Road, Kauai, TMK 3-3-5-6, subject to the Hawaii Well Construction & Pump Installation Standards (122387) which include but are not limited to the following conditions:

1. The applicant to the Commission on Water Resource Management (Commission), P.O. Box 821, Honolulu, HI 96808, shall be notified, in writing, at least two (2) weeks before any work covered by this permit commences and shall be allowed to inspect installation activities in accordance with 122-156-15, Hawaii Administrative Rules.

2. The pump installation permit shall be for installation of a 90 gpm capacity, or less, pump in the well.

3. The permittee, well operator, and/or well owner shall provide and maintain an approved meter or other appropriate means for measuring and reporting withdrawals and water levels, and appropriate devices or means for measuring chlorides and temperature. These data shall be measured monthly and reported to the Commission on a monthly basis, or on forms provided by the Chairperson (attached).

4. The proposed use shall not adversely affect existing or future legal uses of water in the area, including any surface water or established irrigation flow standards. The permittee or the authorization to pump water from a well shall not constitute a diminution of permissible water rights. The permittee, well operator, and/or well owner are notified and by this provision understands that the quantity of water taken from the well could be reduced by the Commission in the future. This permit is not a commitment that the pump capacity permitted here or even some lesser amount is guaranteed in the future. The permittee, well operator, and/or well owner shall comply with all applicable laws, rules, and ordinances, and non-compliance may be grounds for revocation of this permit. The pump installation permit application and any related staff submitted approved by the Commission are incorporated into this permit by reference. This permit is also subject to the Hawaii Well Construction & Pump Installation Standards (122387). If the HWACPS are not approved and as a consequence, the water is wasted or contaminated, a lien on the property may result. The permit shall be revoked if it is not carried out within six (6) months after the date of approval if the work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the pump installation permit application shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Chairperson upon a showing of good cause and good faith performance. A request to extend the permit shall be submitted to the Chairperson no later than three (3) months prior to the date the permit expires. If the commencement date is not met, the Commission may revoke the permit after giving the permittee, well operator, and/or well owner notice of the proposed action and an opportunity to be heard. If the well is not to be used it must be properly capped. If the well is to be abandoned then the permittee, well operator, and/or well owner must apply for a well abandonment permit in accordance with 122-156-130 prior to any well sealing or plugging work.

5. 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, or death arising out of any act or omission of the applicant, assignee, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

6. Special conditions in the attached cover are noted and incorporated here by reference.

Date of Approval: July 10, 2002
Expiration Date: July 10, 2004

GILBERT S. COLOMA-AGARAN, Chairperson
Commission on Water Resource Management

I have read the conditions and terms of the permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my being to proceed and understand that I shall not commence work until I am the pump installer has signed, dated, and returned this permit to the Commission. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day starting from the permit date of approval.

Permittee's Signature: Date: 7/21/02
Printed Name: Kanoa Kanahele Firm or Title: authorized agent

Installer's Signature: Date: 12/10/03
Printed Name: Steve Guthrie Firm or Title: OASIS WATER

Please sign both copies of this permit, return one to the Chairperson, and retain the other for your records.

Attachments:

- HPDO Department of Health Safe Drinking Water & West SIDE Branch
- Kauai Department of Water Supply
July 24, 2002

Mr. Greg Kamm  
Falko Partners, LLC  
P.O. Box 588  
Kapaa, HI 96746  

Dear Mr. Kamm:

Pump Installation Permit  
Falko/Koolau Nos. 1 & 2 (Well No. 1221-08 & 09)

Enclosed are two (2) originals of your approved Pump Installation Permit for the captioned well(s) that authorize permanent pump installation work for your well(s). As part of the Chairperson’s approval, the following special conditions were added and are part of your permit under Permit Condition 11:

Special Conditions

1. If the elevation benchmark needs to be altered, the permittee, well operator, and/or well owner shall ensure that the benchmark is transferred (or the well resurveyed) and documentation of the new benchmark shall be submitted to the Commission within sixty (60) days after the pump is installed.

2. Please enclose the pump specification and rating curve for the installed pump with the Well Completion Report.

3. Separate Well Completion Reports - Part II shall be filed for each well.

The permittee, well operator, and/or well owner are responsible for all conditions of the permit. This includes ensuring that the pump installation contractor submits a completed Part II of the Well Completion Report form (enclosed) within sixty (60) days after the pump installation work is completed. Be advised that you may be subject to fines of up to $1000 per day for any violations of your permit conditions starting from the permit approval date.

Please sign and have the contractor sign both permit originals and return one for our files. A copy of the Well Completion Report (Part II) and a copy of your water use report form are enclosed for your use.

IMPORTANT - Pump installation shall not commence until a fully signed permit is returned to the Commission. Except for the monthly water use report form, please provide copies of all the information in this packet to your pump installation contractor.

Finally, this letter is notice that we have accepted your Well Completion Report - Part I as complete as of July 10, 2002.

If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218 or toll-free at 274-3141 (Kauai), extension 70218.

Aloha,

[Signature]

GILBERT S. COLOMA-AGARAN  
Chairperson

Enclosure
In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the pump installation for Falko/Koolau Nos. 1 & 2 (Well No. 1221-08 & 09) at Koolau Road, Kauai, TMK 5-1-3-6, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

1. The Chairperson to the Commission on Water Resource Management (Commission), P.O. Box 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work covered by this permit commences and staff shall be allowed to inspect installation activities in accordance with §13-168-15, Hawaii Administrative Rules.

2. The pump installation permit shall be for installation of a 90 gpm capacity, or less, pump in the well.

3. The permittee, well operator, and/or well owner shall provide and maintain an approved meter or other appropriate means for measuring and reporting withdrawals and water levels, and appropriate devices or means for measuring chlorides and temperature. These shall be measured monthly and reported to the Commission on a monthly basis, on forms provided by the Chairperson (attached).

4. The proposed use shall not adversely affect existing or future legal uses of water in the area, including any surface water or established instream flow standards. This permit or the authorization to pump water from a well shall not constitute a determination of correlative water rights. The permittee, well operator, and/or well owner are notified and by this provision understands that the quantity of water taken from the well could be reduced by the Commission in the future. This permit is not a commitment that the pump capacity permitted here or even some lesser amount is guaranteed in the future.

5. The permittee, well operator, and/or well owner shall complete and submit as-built drawings and Part II - (Permanent) Pump Installation Report of the Well Completion Report (attached) to the Chairperson within sixty (60) days after completion of work.

6. The permittee, well operator, and/or well owner shall comply with all applicable laws, rules, and ordinances, and non-compliance may be grounds for revocation of this permit.

7. The pump installation permit application and any related staff submittal approved by the Commission are incorporated into this permit by reference. This permit is also subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97). If the HWCPIS are not followed and as a consequence water is wasted or contaminated, a lien on the property may result.

8. The permit may be revoked if work is not started within six (6) months after the date of approval or if work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the pump installation permit application shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Chairperson upon a showing of good cause and good-faith performance. A request to extend the permit shall be submitted to the Chairperson no later than three (3) months prior to the date the permit expires. If the commencement date is not met, the Commission may revoke the permit after giving the permittee, well operator, and/or well owner notice of the proposed action and an opportunity to be heard.

9. If the well is not to be used it must be properly capped. If the well is to be abandoned then the permittee, well operator, and/or well owner must apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.

10. 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, or death arising out of 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.

11. Special conditions in the attached cover transmittal letter are incorporated herein by reference.

Date of Approval: July 10, 2002
Expiration Date: July 10, 2004

GILBERT S. COLOMA-AGARAN, Chairperson
Commission on Water Resource Management

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed and understand that I shall not commence work until I and the pump installer have signed, dated, and returned the permit to the Commission. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day starting from the permit date of approval.

Permittee's Signature: ______________________ Date: __________

Printed Name: ______________________ Firm or Title: ______________________

Installer's Signature: ______________________ C-57, C-57a, or A License #: ______________________ Date: __________

Printed Name: ______________________ Firm or Title: ______________________

Please sign both copies of this permit, return one to the Chairperson, and retain the other for your records.

Attachments:
- USGS
  Department of Health/ Safe Drinking Water & Wastewater Branch
  Kauai Department of Water Supply
Ms. Linne T. Nishioka - Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii  96809

Dear Ms. Nishioka:

Monitoring Data From Koolau Well No. 1 (No. 1221-08)  
During the Pump Test of Koolau Well No. 2 (No. 1222-09) - Kauai, Hawaii

At the request of Lenore Nakama of your staff, attached is a graph of the water level in Koolau Well No. 1 during the pump test of Koolau Well No. 2. Well No. 1 is 131 feet away from Well No. 2. Since the drawdown in Well No. 2 was too small to measure relative to the tidal variation, it is not surprising that no drawdown in Well No. 1 due to this pumping is discernable. The water level was recorded using a pressure transducer. Its data are available as an electronic file if you'd like.

Well No. 2 hadn't been drilled when Well No. 1 was pump tested, so similar monitoring data for its tests are not available. Feel free to call if you have any questions.

Sincerely,

[Signature]

Tom Nance

cc: Greg Kamm

Attachment
Ms. Linnel T. Nishioka - Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii 96809  

Dear Ms. Nishioka:

Monitoring Data From Koolau Well No. 1 (No. 1221-08)  
During the Pump Test of Koolau Well No. 2 (No. 1229-09) - Kauai, Hawaii

At the request of Lenore Nakama of your staff, attached is a graph of the water level in Koolau Well No. 1 during the pump test of Koolau Well No. 2. Well No. 1 is 131 feet away from Well No. 2. Since the drawdown in Well No. 2 was too small to measure relative to the tidal variation, it is not surprising that no drawdown in Well No. 1 due to this pumping is discernable. The water level was recorded using a pressure transducer. Its data are available as an electronic file if you'd like.

Well No. 2 hadn't been drilled when Well No. 1 was pump tested, so similar monitoring data for its tests are not available. Feel free to call if you have any questions.

Sincerely,

Tom Nance

cc: Greg Kamm

Attachment
RECORDED WATER LEVEL IN FALKO WELL 1
DURING THE PUMP TESTS OF WELL 2
THEIS DRAWDOWN CALCULATION

by Glenn Bauer & Roy Hardy with numerical approximations by Huntoon (1980)

FILE NAME = Falco/Koolau Well no. 1
TEST NAME =
DATE = January 24, 2002

INPUT PARAMETERS GREEN VALUES

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmissivity T</td>
<td>50,290 ft.²/day</td>
</tr>
<tr>
<td>Storage Coeff. S</td>
<td>0.100 dimensionless</td>
</tr>
<tr>
<td>Time t</td>
<td>365 days</td>
</tr>
<tr>
<td>Pumping Rate Q</td>
<td>30,417.11 cubic ft./day</td>
</tr>
</tbody>
</table>

Aquifer thickness b = 185 ft.
Hydraulic Conductivity K = 271.8 ft./day
Pumping rate Q = 158 gpm
0.228 mgd
0.352 cfs

Radial distance from well r ft.

<table>
<thead>
<tr>
<th>r (ft.)</th>
<th>u</th>
<th>W(u)</th>
<th>W(u) ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.000000</td>
<td>19.837</td>
<td>0.955</td>
</tr>
<tr>
<td>10</td>
<td>0.000000</td>
<td>23.973</td>
<td>1.154</td>
</tr>
<tr>
<td>50</td>
<td>0.000003</td>
<td>20.754</td>
<td>0.999</td>
</tr>
<tr>
<td>100</td>
<td>0.000014</td>
<td>19.368</td>
<td>0.932</td>
</tr>
<tr>
<td>250</td>
<td>0.000085</td>
<td>17.535</td>
<td>0.844</td>
</tr>
<tr>
<td>500</td>
<td>0.000340</td>
<td>16.149</td>
<td>0.777</td>
</tr>
<tr>
<td>1000</td>
<td>0.001362</td>
<td>14.763</td>
<td>0.711</td>
</tr>
<tr>
<td>1500</td>
<td>0.003064</td>
<td>13.952</td>
<td>0.672</td>
</tr>
<tr>
<td>2000</td>
<td>0.005448</td>
<td>13.376</td>
<td>0.644</td>
</tr>
<tr>
<td>2500</td>
<td>0.008512</td>
<td>12.930</td>
<td>0.622</td>
</tr>
<tr>
<td>3000</td>
<td>0.012258</td>
<td>12.565</td>
<td>0.605</td>
</tr>
<tr>
<td>5000</td>
<td>0.034049</td>
<td>11.544</td>
<td>0.556</td>
</tr>
<tr>
<td>10000</td>
<td>0.136196</td>
<td>10.157</td>
<td>0.489</td>
</tr>
</tbody>
</table>

OBSERVATION WELL

Radial distance r from pumping well = 5280 ft.

Time, t (days, years) u W(u) W(u) ft.

<table>
<thead>
<tr>
<th>t</th>
<th>u</th>
<th>W(u)</th>
<th>W(u) ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.19</td>
<td>0.00</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>1</td>
<td>0.00</td>
<td>13.858819</td>
<td>0.000</td>
</tr>
<tr>
<td>2</td>
<td>0.01</td>
<td>6.929409</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Theoretical drawdown a mile (5,280 ft) from the pumping well when \( u = 0.01 \)

\[
\begin{align*}
T & = 50290 \text{ ft}^2/\text{d} \\
\text{Sp. yield} & = 0.1 \\
t & = 365 \text{ days} \\
\text{s} & = 0.13 \text{ ft}
\end{align*}
\]
Well Name: Falco/Koolau Well No. 2 1221-09
Date of Test: 16-Apr-02
Date of Analysis: 8-Jul-02

Alternative way for determining T from step-drawdown data (Mink, per. comm)

\[ Q = \frac{\text{ft}^3}{\text{d}} \]

\[ Q_1 \text{ (gpm)} = 65 = 12513 \text{ ft}^3/\text{d} \]

\[ s = \text{ft.} \]

\[ Q_2 \text{ (gpm)} = 154 = 29645 \text{ ft}^3/\text{d} \]

Set up two equations:

\[ s_1 = jQ_1 + nQ_1^2 \]
\[ s_2 = jQ_2 + nQ_2^2 \]

\[ Q_2 = 29645 \quad s_2 = 0.09 \quad \text{green = input} \]
\[ Q_1 = 12513 \quad s_1 = 0.03 \quad \text{red = calculated} \]

Well Depth below sea level = 150
Radius of well (ft) = 0.5 = r

\[ n = s_1 - \frac{(Q_1/Q_2)s_2}{Q_1(Q_1-Q_2)} = 3.73 \times 10^{-11} \]
\[ j = s/Q - nQ = 1.93 \times 10^{-6} \]

Laminar flow equation:

\[ s = jQ = 0.024167 \quad 80.56\% \text{ Head loss due to laminar flow} \]

Thiem Eq.

\[ T = \frac{1}{2\pi j} (\ln r_e/r) \]

\[ r_e = \text{Well Depth BSL} \times 1.6 = 240 \]

Therefore:

\[ T = \frac{1}{2\pi j} (\ln r_e/r) = 508741 \text{ ft}^2/\text{d} \]
Well Name: Falco/Koolau Well No. 1
Date of Test: 24-Jan-02
Date of Analysis: 8-Jul-02

Alternative way for determining T from step-drawdown data (Mink, per. comm)

\[ Q = \frac{Q^3}{3} \]  
\[ Q_1 \text{ (gpm)} = 70 = 13475 \text{ ft}^3/\text{d} \]  
\[ Q_2 \text{ (gpm)} = 160 = 30800 \text{ ft}^3/\text{d} \]

Set up two equations:

\[ s_1 = jQ_1 + nQ_1^2 \]
\[ s_2 = jQ_2 + nQ_2^2 \]

\[ Q_2 = 30800 \quad s_2 = 1.76 \]
\[ Q_1 = 13475 \quad s_1 = 0.49 \]

Well Depth below sea level = 185
Radius of well (ft) = 0.5 = r

\[ n = s_1 - (Q_1/Q_2)s_2/Q_1(Q_1-Q_2) = 1.2E-09 \]
\[ j = s/Q - nQ = 2.02E-05 \]

Laminar flow equation:
\[ s = jQ = 0.272222 \] 55.56% Head loss due to laminar flow

Thiem Eq.
\[ T = \frac{1}{2\pi j} \ln \left( \frac{r_e}{r} \right) \]

\[ r_e = \text{Well Depth BSL} \times 1.6 = 296 \]
Therefore:
\[ T = \frac{1}{2\pi j} \ln \left( \frac{r_e}{r} \right) = 50290 \text{ ft}^2/\text{d} \]
RECORDED WATER LEVEL IN FALKO WELL NO. 1, APRIL 16 TO 17, 2002

WATER LEVEL (FEET MSL)

DAY IN APRIL 2002
Ms. Linnel T. Nishioka - Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii  96809

Dear Ms. Nishioka:

Well Completion Reports for Falko/Koolau Well Nos. 1 and 2  
(State Nos. 1221-08 and 09), Kauai, Hawaii

Enclosed are the Well Completion Reports for Falko/Koolau Well Nos. 1 and 2. Both wells were pump tested at 100 GPM with no change in salinity. If you have any questions, please feel free to call.

Sincerely,

Tom Nance

Enclosures

cc: Greg Kamm [Fax only (070)]
May 22, 2001

To Whom It May Concern:

Please be advised that Greg Kamm, whose signature appears below, is authorized to represent Falko Partners, LLC in all matters pertaining to Falko-owned real estate on Kauai such as permits, applications and registrations but excluding purchases, sales or encumbrances thereof.

Authorized signature:

Greg Kamm

SIGNED:

[Signature]

Paul R. Perez, CFA
Manager
## State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources

### WELL COMPLETION REPORT - PART I

#### Instructions:
Please print in ink or type and send completed report (with attachments, if applicable) to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. The Commission may not accept incomplete reports. This form shall be submitted within 60 days of the completion of work. For assistance, please consult the Hawaii Well Construction and Pump Installation Standards or call the Regulation Branch at 587-0225. For updates to this form or additional information, please visit our website at http://www.state.hi.us/dlnr/cwrm/.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. State Well No.: 1221-08</td>
<td>Well Name: Falko / Koolau Well No. 1</td>
</tr>
<tr>
<td>2. Address: Koolau Road</td>
<td>Island: Kauai</td>
</tr>
<tr>
<td>4. Drilling method used during construction:</td>
<td>Rotary</td>
</tr>
<tr>
<td>5. Date Well Construction (drilled, cased, grouted) completed:</td>
<td>Oct. 8, 2001</td>
</tr>
<tr>
<td>6. Was the subject well cored?</td>
<td>Yes</td>
</tr>
<tr>
<td>7. Initial water-level encountered:</td>
<td>Refer to the Attached Logs</td>
</tr>
<tr>
<td>8. Step-Drawdown Test completed?</td>
<td>No</td>
</tr>
<tr>
<td>9. Constant Rate Aquifer Test completed?</td>
<td>No</td>
</tr>
<tr>
<td>10. Water-level:</td>
<td>4.53 ft. above msl</td>
</tr>
<tr>
<td>11. Chloride:</td>
<td>33 ppm</td>
</tr>
<tr>
<td>12. Temperature:</td>
<td>74.7 °F</td>
</tr>
<tr>
<td>13. Fill in the as-built section on the other side of this sheet.</td>
<td></td>
</tr>
<tr>
<td>15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.) Welded lock cap.</td>
<td></td>
</tr>
<tr>
<td>16. Remarks:</td>
<td></td>
</tr>
</tbody>
</table>

### Licensed Driller (print)
Marcus Frandsen

| C-57 Lic. No. | 22-700 |
| Date | February 2, 2002 |

### Surveyor (print)
Dennis M. Esaki

| L.P.L.S. Lic. No. | 4383 |
| Date | 12/1/02 |

### Permittee (print)
Falko Partners by Gery Keenan

| Date | 12/25/02 |
13. AS-BUILT WELL SECTION (Please attach as-built if different from diagram provided below)

**Solid Casing Material:**
- Carbon Steel: compliant with (check one or more): ANSI/AWWA C200, API Spec. 5L, ASTM A53, ASTM A139
- Stainless Steel: compliant with (check one or more): ASTM A242, Type E, Type S, Grade B, Other
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) Schedule 40, Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) Schedule 40, Schedule 80, Schedule 120
- Thermoset Plastic: (check one) Filament Wound Resin Pipe conforming to ASTM D2996, Centrifugally Cast Resin Pipe conforming to ASTM D2997, Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517, Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950, PTFE Fluorocarbon Tubing conforming to ASTM D3296, FEP Fluorocarbon Tubing conforming to ASTM D3296

**Open Casing Material:**
- Carbon Steel: compliant with (check one or more): ANSI/AWWA C200, API Spec. 5L, ASTM A53, ASTM A139
- Stainless Steel: compliant with (check one or more): ASTM A242, Type E, Type S, Grade B, Other
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) Schedule 40, Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) Schedule 40, Schedule 80, Schedule 120
- Thermoset Plastic: (check one) Filament Wound Resin Pipe conforming to ASTM D2996, Centrifugally Cast Resin Pipe conforming to ASTM D2997, Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517, Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950, PTFE Fluorocarbon Tubing conforming to ASTM D3296, FEP Fluorocarbon Tubing conforming to ASTM D3296

**Nearby Power Pole**

**Solid Casing:**
- 300 ft. (min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)
- Annular space between hole and casing (min.3"): 3 in.
- Rock or Gravel Packing: Material: Crushed Basalt, Rounded Gravel
- Water Level Elevation: ___ ft., msl*

**Open Casing:**
- Perforated: Screen
- Length: 80 ft.
- Nominal Diameter: 6 in.
- Wall Thickness: 6 in.
- Bottom Elevation: ___ ft., msl*

**Open Hole:**
- Length: 5 ft.
- Diameter: 12 in.
- Bottom Elevation: ___ ft., msl*

*msl = mean sea level

**Bench mark elevation:** 303.66 ft., msl* (Survey to nearest 0.01 ft.)

**Ground Elevation:** 249.3 ft., msl

**Minimum of 2' Radius & 4" Thick Concrete Pad**

**Please refer to the HAWAII WELL CONSTRUCTION AND PUMP INSTALLATION STANDARDS** to ensure that your as-built is in compliance with applicable standards.

**2-12-21-08 Falco Koolau Well 1**
<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock Description, Water Level, etc.</th>
<th>Dates</th>
<th>Depths (ft.)</th>
<th>Rock Description, Water Level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 40</td>
<td>red clay</td>
<td>10-11-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 to 55</td>
<td>red clay</td>
<td>10-12-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55 to 63</td>
<td>red clay</td>
<td>10-12-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63 to 85</td>
<td>red clay and coral</td>
<td>10-13-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85 to 95</td>
<td>red clay</td>
<td>10-13-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95 to 100</td>
<td>brown clay</td>
<td>10-13-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 to 110</td>
<td>red and brown clay</td>
<td>10-15-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110 to 125</td>
<td>brown clay</td>
<td>10-15-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>125 to 135</td>
<td>red cinders (water)</td>
<td>10-15-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>135 to 142</td>
<td>hard coral</td>
<td>10-16-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>142 to 170</td>
<td>red clay</td>
<td>10-17-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>170 to 190</td>
<td>brown clay</td>
<td>10-18-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>190 to 192</td>
<td>loose lava 4&quot; dia.</td>
<td>10-18-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>192 to 197</td>
<td>brown clay</td>
<td>10-19-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>197 to 230</td>
<td>black lava</td>
<td>10-22-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>230 to 250</td>
<td>red clay</td>
<td>10-23-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250 to 260</td>
<td>red lava</td>
<td>10-23-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>260 to 280</td>
<td>black lava</td>
<td>10-24-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>280 to 300</td>
<td>red lava</td>
<td>10-24-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300 to 326</td>
<td>red and black lava</td>
<td>11-08-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>326 to 334</td>
<td>blue hard lava</td>
<td>11-08-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>334 to 350</td>
<td>red lava</td>
<td>11-08-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>350 to 368</td>
<td>blue hard lava</td>
<td>11-08-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>368 to 380</td>
<td>red broken lava</td>
<td>11-09-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>380 to 382</td>
<td>cavity</td>
<td>11-12-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>382 to 430</td>
<td>black lava</td>
<td>11-13-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>430 to 440</td>
<td>blue lava</td>
<td>11-14-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>440 to 455</td>
<td>broken red</td>
<td>11-14-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>455 to 463</td>
<td>blue lava</td>
<td>11-14-01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>463 to 485</td>
<td>red lava</td>
<td>11-14-01</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:

Water Levels: 99-102, 125-135, 190-192, 250-260, 368-380, 440-455, 463-485

Hole was caving alot at 100', 135', 250'
ELEVATION

BENCH MARK USED:
MAG-NAIL IN POWER POLE
#8601. (ELEV.=303.66)

WELL #1
State of Hawaii
Water Commission
Well #1221-08
Owner: FALKO Partners
Date of Survey: April 1, 2002
### Table 1 (SDPTD Form 12/17/87)

**STEP-DRAWDOWN PUMP TEST DATA**  
(not required for wells producing < 100,000 gpd or 70 gpm)

<table>
<thead>
<tr>
<th>Pumped Well No.</th>
<th>Observation Well no.</th>
<th>Distance between Obs. &amp; Pumped Well</th>
<th>Reference pt. for depth to water</th>
<th>Static Water Level @ start of test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1221-08</td>
<td>(NONE)</td>
<td></td>
<td></td>
<td>302.83 ft. msl</td>
</tr>
</tbody>
</table>

**Water level measurements by:**
- steel tape
- pressure transducer
- airline

**START TEST**  
Date: 01-24-2002  
Time of day: 09:10 (START OF PUMPING)

Flow Meter Reading Start: 3,770,000 gals

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Elapsed Time (min)</th>
<th>Depth to water (nearest 0.1 ft)</th>
<th>Drawdown S (unadjusted to nearest 0.1 ft)</th>
<th>Pumping rate Q (at least 3 steps) (gpm)</th>
<th>EC (µmhos)</th>
<th>Temp. ° F or ° C</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:40</td>
<td>0</td>
<td>298.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:50</td>
<td>0</td>
<td>298.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:00</td>
<td>0</td>
<td>298.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:10</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>298.79</td>
<td>0.49</td>
<td>70.2</td>
<td>282</td>
<td>74.6</td>
<td>START PUMP</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>298.79</td>
<td>0.49</td>
<td>70.2</td>
<td>282</td>
<td>74.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>298.79</td>
<td>0.49</td>
<td></td>
<td>282</td>
<td>74.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>298.79</td>
<td>0.49</td>
<td></td>
<td>282</td>
<td>74.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>298.79</td>
<td>0.49</td>
<td></td>
<td>282</td>
<td>74.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>298.79</td>
<td>0.49</td>
<td></td>
<td>282</td>
<td>74.6</td>
<td>SAMPLE</td>
</tr>
<tr>
<td>9:40</td>
<td>30</td>
<td>299.79</td>
<td>0.49</td>
<td>70.2</td>
<td>282</td>
<td>74.6</td>
<td>ADJUST TO 2ND STEP</td>
</tr>
<tr>
<td>9:40(+)</td>
<td>30(+)</td>
<td>299.79</td>
<td>1.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9:44</td>
<td>33</td>
<td>299.76</td>
<td>1.06</td>
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Data in this table is for:
- Pumped Well
- Observation Well

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**END TEST**  Date: Jul. 24, 2002  Time of day: 11:59

**ADDITIONAL REMARKS:**

Person in charge of pump test (print): **TOM NANCE**

Signature: **TOM NANCE**

The signature above indicates that the data reported on this form is accurate and true to the best of the person's knowledge who operated this pump test.
# CONSTANT-RATE PUMP TEST DATA

**Pumped Well No.** 1221-08  
**Pumped Well Name** FAURO/SOLO - NO-1  
**Target Q** 60 ft³/min  
**Observation well no.** (NONE)  
**Distance between Obs. & Pumped Well** -- ft.  
**Reference pt. for depth to water** 202.83 ft msl  
**Static Water Level @ start of test** 4.93 ft msl  

Water level measurements by:  
- ✔️ steel tape  
- □ pressure transducer  
- □ airline  

**START TEST** Date: 01-24-2002  
**Time of day:** 12:00 (START OF PUMPING)  

**Flow Meter Reading Start:** 37,302.80 gpm  

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Data in this table is for:  
- ✔️ Pumped Well  
- □ Observation Well  

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<th>Depth to Water</th>
<th>Drawdown ( \Delta s ) (nearest 0.1 ft)</th>
<th>Pumping Rate ( Q ) (gpm)</th>
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<th>( Cl^- ) (mg/l)</th>
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**Remarks**

1. Chloride sampling required
2. Use same ending drawdown figure as start for recovery

**Meter Reading @ End:** 4,008,000

**AVG. CPM = 158.2**
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<th>Depth to water (nearest 0.1 ft)</th>
<th>Recovery Drawdown (unadjusted to nearest 0.1 ft)</th>
<th>Pumping rate (gpm)</th>
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<th>Remarks</th>
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END TEST  Date: **Jul 25, 2002**  Time of day: **13:00**

ADDITIONAL REMARKS:

Person in charge of pump test (print): **Tom Nash**

Signature: **Tom Nash**

The signature above indicates that the data reported on this form is accurate and true to the best of the person's knowledge who operated this pump test.
State of Hawaii  
COMMISSION ON WATER RESOURCE MANAGEMENT  
Department of Land and Natural Resources  

WELL COMPLETION REPORT - PART I  

Instructions: Please print in ink or type and send completed report (with attachments, if applicable) to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. The Commission may not accept incomplete reports. This form shall be submitted within 60 days of the completion of work. For assistance, please consult the Hawaii Well Construction and Pump Installation Standards or call the Regulation Branch at 587-0225. For updates to this form or additional information, please visit our website at http://www.state.hi.us/dlnr/cwrm/

<table>
<thead>
<tr>
<th>1. State Well No.:</th>
<th>1221-09</th>
<th>Well Name: Falko/Koolau Well No. 2</th>
<th>Island: Kauai</th>
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<td>2. Address:</td>
<td>Koolau Road</td>
<td>Tax Map Key: 5-1-3:6</td>
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<tr>
<td>4. Drilling method used during construction:</td>
<td>Rotary ☑</td>
<td>Percussion ☐</td>
<td>Other (describe)</td>
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<td>5. Date Well Construction (drilled,cased,grouted) completed:</td>
<td>April 20, 2002</td>
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<td>In addition to the driller’s log, if a geologic log was prepared, please submit with this form.</td>
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<tr>
<td>6. Was the subject well cored?</td>
<td>☑ Yes</td>
<td>☐ No</td>
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<tr>
<td>7. Initial water-level encountered</td>
<td>140 ft. below ground</td>
<td>Date and time of measurement: Feb. 5, 2002</td>
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<tr>
<td>8. Step-Drawdown Test completed?</td>
<td>☑ Yes</td>
<td>Attach Step-Drawdown Test form (12/17/97 SDPTD Form)</td>
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<tr>
<td>9. Constant Rate Aquifer Test completed?</td>
<td>☑ Yes</td>
<td>Attach Constant Rate Aquifer Test form (12/17/97 CRPTD Form)</td>
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<tr>
<td>Parameters prior to pump test:</td>
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<td>10. Water-level:</td>
<td>3.1 ft. above msl</td>
<td>Date and time of measurement: 4-16-02 8:30 AM</td>
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<td>11. Chloride:</td>
<td>40 ppm</td>
<td>Date and time of sampling: 4-16-02 9:40 AM</td>
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</tr>
<tr>
<td>12. Temperature:</td>
<td>74.6 °F</td>
<td>Date and time of measurement: 4-16-02 9:40 AM</td>
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<td>13. Fill in the as-built section on the other side of this sheet.</td>
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<tr>
<td>14. Attach plot plan and surveyor’s stamped elevation report.</td>
<td></td>
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</tr>
<tr>
<td>15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)</td>
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<td>16. Remarks:</td>
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Licensed Driller (print) Marcus Frandsen C-57 Lic. No. 22-700
Signature MARCUS FRANDSEN Date 4-18-02

Surveyor (print) Dennis M. Esaki L.P.L.S. Lic. No. 4383
Signature Date 6/29/02

Permittee (print) [Signature] Date 6/25/02

WCR1 Form 9/29/00
13. AS-BUILT WELL SECTION (Please attach as-built if different from diagram provided below)

Elevation at top of casing ___ ft., msl

Minimum of 2' Radius & 4" Thick Concrete Pad

Ground Elevation: 291.9 ft., msl

Bench mark elevation: 303.66 ft., msl*
(Survey to nearest 0.01 ft.)

Note: Nearby Power Pole

Total Depth 440 ft.

Solid Casing Material:
- Carbon Steel: compliant with (check one or more): [ ] ANSI/AWWA C200 [ ] API Spec. 5L [ ] ASTM A53 [ ] ASTM A139
- Stainless Steel: (check one):
  - [ ] ASTM A409 (production wells)
  - [ ] ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one): [ ] Schedule 40 [ ] Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): [ ] Schedule 40 [ ] Schedule 80 [ ] Schedule 120
- Thermoset Plastic: (check one)
  - [ ] Filament Wound Resin Pipe conforming to ASTM D2996
  - [ ] Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - [ ] Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - [ ] Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - [ ] PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - [ ] FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:
- Carbon Steel: compliant with (check one or more): [ ] ANSI/AWWA C200 [ ] API Spec. 5L [ ] ASTM A53 [ ] ASTM A139
- Stainless Steel: (check one):
  - [ ] ASTM A409 (production wells)
  - [ ] ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one): [ ] Schedule 40 [ ] Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): [ ] Schedule 40 [ ] Schedule 80 [ ] Schedule 120
- Thermoset Plastic: (check one)
  - [ ] Filament Wound Resin Pipe conforming to ASTM D2996
  - [ ] Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - [ ] Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - [ ] Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - [ ] PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - [ ] FEP Fluorocarbon Tubing conforming to ASTM D3296

*msl = mean sea level

2.12.21-09 KALAO KOLOA 2
13. AS-BUILT WELL SECTION (Please attach as-built if different from diagram provided below)

**Cement Grout:**
- Elevation at top of casing: 293.19 ft., msl
- Minimum of 2' Radius & 4" Thick Concrete Pad

**Ground Elevation:**
- 291.9 ft., msl (to nearest 0.01 ft.)

**Bench mark elevation:**
- 303.66 ft., msl (Survey to nearest 0.01 ft.)

Note: Nearby Power Pole

**Solid Casing Material:**
- Carbon Steel: compliant with (check one or more): ANSI/AWWA C200, API Spec. 5L, ASTM A53
- And compliant with (check one or more): ASTM A242, Type E, Type S, Grade B, Other
- Stainless Steel: (check one): ASTM A409 (production wells), ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one): Schedule 40, Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): Schedule 40, Schedule 80, Schedule 120
- Thermoset Plastic: (check one)
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3296

**Open Casing Material:**
- Carbon Steel: compliant with (check one or more): ANSI/AWWA C200, API Spec. 5L, ASTM A53
- And compliant with (check one or more): ASTM A242, Type E, Type S, Grade B, Other
- Stainless Steel: (check one): ASTM A409 (production wells), ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one): Schedule 40, Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): Schedule 40, Schedule 80, Schedule 120
- Thermoset Plastic: (check one)
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3296
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<th>Depths (ft.)</th>
<th>Rock Description, Water Level, etc.</th>
<th>Dates</th>
<th>Depths (ft.)</th>
<th>Rock Description, Water Level, etc.</th>
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Remarks:
WELL #2
State of Hawaii
Water Commission
Well #1221-09
Owner: FALKO Partners
Date of Survey: April 1, 2002
Table 1 (SDPTD Form 12/17/97)

STEP-DRAWDOWN PUMP TEST DATA
(not required for wells producing < 100,000 gpd or 70 gpm)

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<th>Drawdown S</th>
<th>Pumping rate Q</th>
<th>EC</th>
<th>Temp.</th>
<th>Remarks</th>
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<td></td>
<td>(nearest 0.1 ft)</td>
<td>(unadjusted to nearest 0.1 ft)</td>
<td>(at least 3 steps) (gpm)</td>
<td>(gph)</td>
<td>°F or °C</td>
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<td>73.9</td>
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</table>

Data in this table is for:
- [ ] Pumped Well
- [ ] Observation Well

Remarks:
- START OF PUMPING
- INCREASED THE PUMPING RATE
- SHUT OFF PUMP;
- START RECOVERY
Table 1 (SDPTD Form 12/17/97)

<table>
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<th>Elapsed Time (min)</th>
<th>Depth To Water (nearest 0.1 ft)</th>
<th>Recovery Drawdown (unadjusted to nearest 0.1 ft)</th>
<th>Pumping rate (gpm)</th>
<th>EC (unmhos)</th>
<th>Cl (mg/l)</th>
<th>Temp. °F or °C</th>
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</table>

**ADDITIONAL REMARKS:**

Person in charge of pump test (print): **TOM RANCE**

Signature: [Signature]

The signature above indicates that the data reported on this form is accurate and true to the best of the person's knowledge who operated this pump test.
Table 2 (CRPTD Form 12/17/97)

### CONSTANT-RATE PUMP TEST DATA

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<th>Depth to Water (nearest 0.1 ft)</th>
<th>Drawdown (unadjusted to nearest 0.1 ft)</th>
<th>Pumping Rate Q (gpm)</th>
<th>EC (in H forwards)</th>
<th>CTR (mg/l)</th>
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TOTAL VARIATION GREATER THAN DRAWDOWN
Table 2 (CRPTD Form 12/17/97)

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<th>Recovery Drawdown (unadjusted to nearest 0.1 ft)</th>
<th>Pumping rate (gpm)</th>
<th>EC (mgh)</th>
<th>Temp. °F or °C</th>
<th>Remarks</th>
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</thead>
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**END TEST** Date: April 17, 2022  Time of day: 13:35

**ADDITIONAL REMARKS:**

Person in charge of pump test (print): TOM MANCE

Signature: [Signature]

The signature above indicates that the data reported on this form is accurate and true to the best of the person's knowledge who operated this pump test.
October 2, 2001

Gilbert S. Coloma-Agaran, Chairperson
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

Re: Well Construction Permit
Falko/Koolau Nos. 1 & 2 (Well No. 1221-08 & 09)

Dear Mr. Agaran:

Pursuant to the instructions contained in your letter of September 25, 2001, please find enclosed the original Permit referenced above, executed by Falko Partners, LLC and the well driller, High Plains Drilling.

Sincerely,

Greg Kamm

Encls.

CC: Tom Nance
Paul Perez
In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of Fa'ikoo/ Koolau Nos. 1 & 2 (Well No. 1221-08 & 09) at Koolau Road, Waipake, Kauai, TMK 5-1-36, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

1. The Chairperson of the Commission on Water Resource Management (Commission), P.O. Box 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work authorized by this permit commences and staff shall be allowed to inspect installation activities in accordance with §§13-169-15, Hawaii Administrative Rules.

2. The well construction permit shall be for construction and testing of the well only. A minimum 14-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

3. In basal ground water, the depth of the well may not exceed one-fourth (1/4) of the theoretical thickness (41 times initial head) of the basal ground water unless otherwise authorized by the Chairperson.

4. The permittee, well operator, and/or well owner shall incorporate mitigation measures to prevent construction debris from entering the aquatic environment, to schedule work to avoid periods of high rainfall, and to revegetate any cleared areas as soon as possible.

5. In the event that subsurface cultural remains such as artifacts, burials or concentrations of shells or charcoal are encountered during construction, the permittee, well operator, and/or well owner shall stop work and contact the Department's Historic Preservation immediately.

6. The proposed well construction shall not adversely affect existing or future legal uses of water in the area, including any surface water or established instream flow standards. This permit or the authorization to construct the well shall not constitute a determination of correlative water rights.

7. The following shall be submitted to the Chairperson within sixty (60) days after completion of work:
   b. Elevation (referenced to mean sea level, msl) survey by a Hawaii-licensed surveyor.
   c. As-built sectional drawing of the well.
   d. Plot plan and map showing the exact location of the well.
   e. Complete pumping test records, including time, pumping rate, drawdown, chloride content, and other data.

8. The permittee, well operator, and/or well owner shall comply with all applicable laws, rules, and ordinances; non-compliance may be grounds for revocation of this permit.

9. The well construction permit application is incorporated into this permit by reference and is subject to the Hawaii Well Construction & Pump Installation Standards (January 23, 1997; HWCPIS). If the HWCPIS are not followed and as a consequence water is wasted or contaminated, a lien on the property may result.

10. The permit may be revoked by the Commission if work is not started within six (6) months after the date of approval or if work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the well construction permit application shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Chairperson upon a showing of good cause and good-faith performance. A request to extend the permit shall be submitted to the Chairperson no later than three (3) months prior to the date the permit expires. If the commencement date is not met, the Commission may revoke the permit after giving the permittee, well operator, and/or well owner notice of the proposed action and an opportunity to be heard.

11. If the well is not to be used it must be properly capped. If the well is to be abandoned then the permittee, well operator, and/or well owner must apply for a well abandonment permit in accordance with §§13-168-12(f) prior to any well sealing or plugging work.

12. 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, or death arising out of 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.

13. Special conditions in the attached cover transmittal letter are incorporated herein by reference.

Date of Approval: August 27, 2001
Expiration Date: August 27, 2003

GILBERT S. COLOMA-AGARAN, Chairperson
Commission on Water Resource Management

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed and understand that I shall not commence work until I and the driller have signed, dated, and returned the permit to the Commission. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day starting from the permit date of approval.

Permittee's Signature: Greg Kamn Date: 9-18-01
Printed Name: Greg Kamn Firm or Title: Faikoo Pumps, Inc.

Driller's Signature: Marcus Frandsen Date: 10-2-01
Printed Name: Marcus Frandsen C-57 License #: 22708 Firm or Title: High Paine Drilling

Please sign both copies of this permit, return one to the Chairperson, and retain the other for your records.

Attachment
USGSS
Department of Health's Safe Drinking Water, Wastewater, and Clean Water Branches
Kauai Department of Water Supply
Mr. Greg Kamm  
Falko Partners, LLC  
P.O. Box 588  
Kapaa, HI 96746  

Dear Mr. Kamm:  

Well Construction Permit  
Falko/Koolau Nos. 1 & 2 (Well No. 1221-08 & 09)  

Enclosed are two (2) copies of your approved Well Construction Permit for the captioned well(s) that authorize well construction activities but excludes installation work for your permanent pump. As part of the Chairperson's approval, the following special conditions were added and are part of your permit under Permit Condition 13:  

**Special Conditions**  

1. Attached for your information is a copy of the Department of Health's (DOH) review comments. Please note DOH's requirements related to discharge of effluent from well drilling and testing activities.  
2. Separate Well Completion Reports shall be filed for each well.  
3. Well No. 1221-09 shall be used as an observation well during the pump test for Well No. 1221-08.  

Please sign and have the contractor sign both permit originals and return one for our files. Also, copies of the aquifer pump test worksheet and the well completion report form are enclosed for your use.  

**IMPORTANT** - Drilling work shall not commence until a fully signed permit is returned to the Commission. Please provide all the information in this packet to your well drilling contractor. The permittee, well operator, and/or well owner are responsible for all conditions of the permit. This includes ensuring that the well construction contractor, or other party who constructs the well(s), submits a completed Part I of the Well Completion Report form (enclosed) within sixty (60) days after the well construction work is completed. Be advised that you may be subject to fines of up to $1000 per day for any violations of your permit conditions starting from the permit approval date.  

If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218 or toll-free at 274-3141, extension 70218.  

Aloha,  

GILBERT S. COLOMA-AGARAN  
Chairperson  

Enclosures
In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of Falko/Koolau Nos. 1 & 2 (Well No. 1221-08 & 09) at Kauai Road, Waipake, Kauai, TMK 5-1-3, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

1. The Chairperson of the Commission on Water Resource Management (Commission), P.O. Box 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work authorized by this permit commences and staff shall be allowed to inspect installation activities in accordance with §13-168-15, Hawaii Administrative Rules.

2. The well construction permit shall be for construction and testing of the well only. A minimum 1x4-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

3. In basement ground water, the depth of the well may not exceed one-fourth (1/4) of the theoretical thickness (41 times initial head) of the basement ground water unless otherwise authorized by the Chairperson.

4. The permittee, well operator, and/or well owner shall incorporate mitigation measures to prevent construction debris from entering the aquatic environment, to schedule work to avoid periods of high rainfall, and to revegetate any cleared areas as soon as possible.

5. In the event that subsurface cultural remains such as artifacts, burials or concentrations of shells or charcoal are encountered during construction, the permittee, well operator, and/or well owner shall stop work and contact the Department's Historic Preservation immediately.

6. The proposed well construction shall not adversely affect existing or future legal uses of water in the area, including any surface water or established instream flow standards. This permit or the authorization to construct the well shall not constitute a determination of correlative water rights.

7. The following shall be submitted to the Chairperson within sixty (60) days after completion of work:
   b. Elevation (referenced to mean sea level, msl) survey by a Hawaii-licensed surveyor.
   c. As-built sectional drawing of the well.
   d. Plot plan and map showing the exact location of the well.
   e. Complete pumping test records, including time, pumping rate, drawdown, chloride content, and other data.

8. The permittee, well operator, and/or well owner shall comply with all applicable laws, rules, and ordinances; non-compliance may be grounds for revocation of this permit.

9. The well construction permit application is incorporated into this permit by reference and is subject to the Hawaii Well Construction & Pump Installation Standards (January 23, 1997; HWCPIS). If the HWCPIS are not followed and as a consequence water is wasted or contaminated, a lien on the property may result.

10. The permit may be revoked by the Commission if work is not started within six (6) months after the date of approval or if work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the well construction permit application shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Chairperson upon a showing of good cause and good-faith performance. A request to extend the permit shall be submitted to the Chairperson no later than three (3) months prior to the date the permit expires. If the commencement date is not met, the Commission may revoke the permit after giving the permittee, well operator, and/or well owner notice of the proposed action and an opportunity to be heard.

11. If the well is not to be used it must be properly capped. If the well is to be abandoned then the permittee, well operator, and/or well owner must apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.

12. 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, or death arising out of 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.

13. Special conditions in the attached cover transmittal letter are incorporated herein by reference.

Date of Approval: August 27, 2001
Expiration Date: August 27, 2003

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed and understand that I shall not commence work until I and the driller have signed, dated, and returned the permit to the Commission. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day starting from the permit date of approval.

Permittee's Signature: _______________________________ Date: ______________________
Printed Name: ___________________________ Firm or Title: ___________________________

Driller's Signature: ___________________________ C-57 License #: ___________________________ Date: ______________________
Printed Name: ___________________________ Firm or Title: ___________________________

Please sign both copies of this permit, return one to the Chairperson, and retain the other for your records.

Attachment:

C: USGS
Department of Health/ Safe Drinking Water, Wastewater, and Clean Water Branches
Kauai Department of Water Supply
**SECTION 1: WELL LOCATION INFORMATION**

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<thead>
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<th>Island</th>
<th>KAUAI</th>
<th>Proposed Use</th>
<th>Domestic</th>
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<td>LIHUE</td>
<td>Proposed Withdrawal</td>
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**SECTION 2: WELL SECTION DATA** (enter data in grey cells only)

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<th>Elevation at top of casing</th>
<th>902 ft., m.s.l.</th>
<th>Solid Casing</th>
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<td>Cement Grout</td>
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<td>Total Depth</td>
<td>400 ft.</td>
<td>Wall Thickness</td>
</tr>
</tbody>
</table>

| Estimated Head             | 10 ft., m.s.l.  | Casing       |
|                           |                 | Material     |
| Calculated Aquifer Thickness | 410 ft.      | Designation  |
|                           |                 | Length       |
| County Water Supply (Y/N?) | NO             | Diameter     |

**SECTION 3: CHECKLIST** (values to check are shaded)

**Well Depth**
- Theoretical Thickness of Aquifer: 410 ft.
- 1/4 Aquifer Thickness: 102.5 ft.
- Depth of Well below Sea Level: 100 ft.
- Depth of Well provided: okay (refer to HWCPIS Section 2.2)

**Well Casing**
- Minimum Wall Thickness:
  - Material: Steel
  - County or Non-County: non-county
  - Minimum Thickness per standards: 0.313 in.
  - Wall Thickness provided: 0.313 in.
- Minimum Length of Solid Casing: 261 ft.
- Length of solid casing provided: 300 ft.
- Casing Material: ASTM A53
- Depth of Grouting:
  - Calculated Depth of Grouting: 203 ft.
  - Depth of Grouting provided: 210 ft.
  - Thickness of Annular Space: 3.5 in.
TO: Harry Yada, Acting Administrator
    Land Division
FROM: Linnel T. Nishioka, Deputy Director
    Commission on Water Resource Management
SUBJECT: Well Construction/Pump Installation Permit Applications
         Falko/Koolau Nos. 1 & 2 (Well Nos. 1221-08 & 09)

Transmitted for your review and comment are copies of the captioned well applications which includes requests for pump installation permits.

We would appreciate your comments on the captioned applications with regard to the programs, plans, and objectives specific to your division. Please respond by returning this cover memo form by August 24, 2001.

Please find the attached maps to locate the proposed wells. If you have any questions about these permit applications, request additional information, or request additional review time, please contact Lenore Nakama of the Commission staff at 587-0218.

RESPONSE:

A water lease/permit is required of this applicant and an application for such will be requested by our division.

A water lease/permit is not required of this applicant.

A water lease/permit has been obtained by the applicant through lease no. ________________.

Other relevant Land Division rules/regulations, information, or recommendations are attached.

No objections

Other comments: Original source of private title is Land Commission Award 6730 issued between 1845 and 1855.

Contact Person: Gary Martin            Phone: 587-0421

Signed: _______ Date: _______
TO: Honorable Bruce S. Anderson, Director
Department of Health
Attention: Dennis Tulang, Wastewater Branch
William Wong, Safe Drinking Water Branch
Dr. Keith Kawaoka, Hazardous Evaluation and Emergency Response

FROM: Gilbert S. Coloma-Agaran, Chairperson
Commission on Water Resource Management

SUBJECT: Well Construction/Pump Installation Permit Applications
Falko/Koolau Nos. 1 & 2 (Well Nos. 1221-08 & 09)

Transmitted for your review and comment are copies of the captioned well applications.

We would appreciate your comments on the captioned applications for any conflicts or inconsistencies with the programs, plans, and objectives specific to your department. Please respond by returning this cover memo form by August 24, 2001.

Please find the attached maps to locate the proposed wells. If you have any questions about these permit applications, request additional information, or request additional review time, please contact Lenore Nakama of the Commission staff at 587-0218.

LN:ky
Attachment(s)

RESPONSE:

This well qualifies as a source which will serve as a source of potable water to a public water system (defined as serving 25 or more people at least 62 days per year or has 15 or more service connections) and must receive Director of Health approval prior to its use to comply with Hawaii Administrative Rules (HAR), Title 11, Chapter 20, Rules Relating to Potable Water Systems, §11-20-29.

This well does not qualify as a source serving a public water system (serves less than 25 people or more people at least 60 days per year or 15 service connections) and if the well water is used for drinking, the private owner should test for bacteriological and chemical presence before initiating such use and routinely monitor the water quality thereafter. However, if future planned use from this source increases to meet the public water system definition then Director of Health approval is required prior to implementation.

If the well is used to supply both potable and non-potable purposes in a single system, the user shall eliminate cross-connections and backflow connections by physically separating potable and non-potable systems by an air gap or an approved backflow preventer, and by clearly labeling all non-potable spigots with warning signs to prevent inadvertent consumption of non-potable water. Backflow prevention devices should be routinely inspected and tested.

It does not appear that this well will be used for consumptive purposes and is not subject to Safe Drinking Water Regulations.

For the applicant's information, a source of possible wastewater contamination is not located near the proposed well site (information attached).

Other relevant DOH rules/regulations, information, or recommendations are attached.

No comments/objections

Contact Person: Loni N. Kajiwara
Phone: 586-4290

Signed: Loni N. Kajiwara
Date: 8-13-2001
TO: Lenore Nakama  
Commission on Water Resource Management  
Department of Land & Natural Resources  
FROM: Lori Kajiwara  
Wastewater Branch, Environmental Management Division  
Department of Health  
SUBJECT: Well Construction/Pump Installation Permit Application  
Falko/Koolau Nos. 1 & 2 (Well Nos. 1221-08 & 09)  
TMK: (4) 5-1-3: 6  

August 13, 2001  

Thank you for allowing us the opportunity to review the above subject project submitted by your office. We have the following comments to offer. We are concerned with any potential contamination to the wells via improper wastewater treatment and disposal from any nearby source. Although we have no objections to the proposed well construction/pump installation, we would like to inform you of our findings.

Our Kauai wastewater engineer, Mr. Joe Tateyama, states that Individual Wastewater System (IWS) File No. 2767 has design plans approved on April 13, 1994 and Building Permit issued on May 2, 1994 but no final inspections/documentation for either IWS or residence. Building Division has advised Mr. Tateyama that preliminary inspections for electrical and framing were conducted but the last inspection was in January 1997. Please find attached a copy of the plot plan.

Should you have any further questions, please contact Lori Kajiwara of the Planning/Design Staff of the Wastewater Branch at telephone (808) 586-4294 or Mr. Joe Tateyama of the Kauai District Health Office telephone (808)241-3323.

LNK
NOTE:

No CP entry

Proposed Residence

Future Driveway

Existing cesspool
(approx. location)

Septic Tank

Absorption Bed
(20' x 45' = 900 sq ft)

DETAIL

Scale: 1" = 50'

Existing C.P.

See Blow-up Details

Access Road

KOOLAU ROAD

1

2

3

4

Page 1 of 2
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 821
HONOLULU, HAWAII 96809

AUG 6 2001

TO:
Honorable Bruce S. Anderson, Director
Department of Health
Attention: Dennis Tulang, Wastewater Branch
William Wong, Safe Drinking Water Branch
Dr. Keith Kawakoa, Hazardous Evaluation and Emergency Response

FROM:
Gilbert S. Coloma-Agaran, Chairperson
Commission on Water Resource Management

SUBJECT:
Well Construction/Pump Installation Permit Applications
Falko/Koolau Nos. 1 & 2 (Well Nos. 1221-08 & 09)

Transmitted for your review and comment are copies of the captioned well applications.

We would appreciate your comments on the captioned applications for any conflicts or inconsistencies with the programs, plans, and objectives specific to your department. Please respond by returning this cover memo form by August 24, 2001.

Please find the attached maps to locate the proposed wells. If you have any questions about these permit applications, request additional information, or request additional review time, please contact Lenore Nakama of the Commission staff at 587-0218.

LN:k
Attachment(s):

RESPONSE:

[ ]
This well qualifies as a source which will serve as a source of potable water to a public water system (defined as serving 25 or more people at least 60 days per year or has 15 or more service connections) and must receive Director of Health approval prior to its use to comply with Hawaii Administrative Rules (HAR), Title 11, Chapter 20, Rules Relating to Potable Water Systems, §11-20-20.

[ ]
This well does not qualify as a source serving a public water system (serves less than 26 people or people at least 60 days per year or 15 service connections) and if the well water is used for drinking, the private owner should test for bacteriological and chemical presence before initiating such use and routinely monitor the water quality thereafter. However, if future planned use from this source increases to meet the public water system definition then Director of Health approval is required prior to implementation.

[ ]
If the well is used to supply both potable and non-potable purposes in a single system, the user shall eliminate cross-connections and backflow connections by physically separating potable and non-potable systems by an air gap or an approved backflow prevention device should be routinely inspected and tested.

[ ]
It does not appear that this well will be used for consumptive purposes and is not subject to Safe Drinking Water Regulations.

[ ]
For the applicant's information, a source of possible wastewater contamination [ ] is not located near the proposed well site (information attached).

[ ]
Other relevant DOR rules/regulations, information, or recommendations are attached.

[ ]
No comments/objections

Contact Person: Stuart Yamada
Phone: 586-4258

Signed: ____________________________ Date: 8/13/01
The Department of Health, Safe Drinking Water Branch has the following additional comments for the Well Construction / Pump Installation Permit Application for the Falko/Koolau Well Nos. 1 & 2 (Well No. 2-1221-08 & 09 Kauai):

Please be advised that the Department of Health has experienced drinking water and groundwater contamination by submersible pumps containing mercury. Specifically, the failure of the seals of the pumps allowed mercury to leak out into the well shaft resulting in contamination of the well and the water served by the well. Please review your pump specifications to be sure that the submersible pump(s) you are proposing to use do not contain materials which could result in either groundwater contamination or drinking water contamination.

The Department of Health, Clean Water Branch has the following comments:

1. For Well-Drilling Activities:

   Any discharge to State waters of treated process wastewater effluent associated with well drilling activities is regulated by Hawaii Administrative Rules, Title 11, Chapter 55, Appendix I, effective September 1997. Treated process wastewater effluent covered by this general permit includes well drilling slurries, lubricating fluids wastewaters, and well purge wastewaters. This general permit does not cover well pump testing. The applicable Notice of Intent Forms and filing fee shall be submitted at least thirty (30) days before the start of discharge to the Department of Health, Clean Water Branch at 919 Ala Moana Boulevard, Room 301, Honolulu, Hawaii 96814-4290 or P.O. Box 3378, Honolulu, Hawaii 96801-3378. Inquiries may be directed to the Clean Water Branch at (808) 586-4309 or by fax at (808) 586-4352.

2. For Well Pump Testing:

   The discharger shall take all measures necessary to prevent the discharge of pollutants from entering State waters. Such measures shall include, if necessary, containment of the initial discharge until the discharge is essentially free of pollutants. If the discharge is entering a stream or river bed, best management practices shall be implemented to prevent the discharge from disturbing the clarity of the receiving water. If the discharge is entering a storm drain, the discharger must obtain written permission from the owner of that storm drain prior to discharge. Furthermore, best management practices shall be implemented to prevent the discharge from collecting sediments and other pollutants prior to entering the storm drain.
Mr. Greg Kamm  
Falko Partners, LLC  
P.O. Box 588  
Kapaa, HI 96746

Dear Mr. Kamm:

Well Construction/Pump Installation Permit Application for Well Nos. 1221-08 & 09

We acknowledge receipt, on July 20, 2001, of your completed Well Construction/Pump Installation permit applications and filing fee for the Falko/Koolau Nos. 1 & 2 (Well Nos. 1221-08 & 09). You can expect your application to be processed within ninety (90) days from this date.

For your information, the process of constructing a well is normally regulated and permitted in two (2) steps. First, a well construction permit is issued for drilling and testing purposes only. Based upon information provided by you through a Well Completion Report Part 1 (Well Construction), a pump installation permit (upon completed application) may then be issued to authorize pump work. If a pump is installed then a Well Completion Report Part 2 (Pump Installation) is required.

If you have any questions about your permit application, please contact Lenore Nakama of the Commission staff at 587-0218 or toll-free at 274-3141, extension 70218.

Sincerely,

LINNEL T. NISHIOKA  
Deputy Director

LN:ky
TO: Honorable Bruce S. Anderson, Director
Department of Health
Attention: Dennis Tulang, Wastewater Branch
William Wong, Safe Drinking Water Branch
Dr. Keith Kawaoka, Hazardous Evaluation and Emergency Response

FROM: Gilbert S. Coloma-Agaran, Chairperson
Commission on Water Resource Management

SUBJECT: Well Construction/Pump Installation Permit Applications
Falko/Koolau Nos. 1 & 2 (Well Nos. 1221-08 & 09)

Transmitted for your review and comment are copies of the captioned well applications.

We would appreciate your comments on the captioned applications for any conflicts or inconsistencies with the programs, plans, and objectives specific to your department. Please respond by returning this cover memo form by August 24, 2001.

Please find the attached maps to locate the proposed wells. If you have any questions about these permit applications, request additional information, or request additional review time, please contact Lenore Nakama of the Commission staff at 587-0218.

LN:ky
Attachment(s)

RESPONSE:
[ ] This well qualifies as a source which will serve as a source of potable water to a public water system (defined as serving 25 or more people at least 60 days per year or has 15 or more service connections) and must receive Director of Health approval prior to its use to comply with Hawaii Administrative Rules (HAR), Title 11, Chapter 20, Rules Relating to Potable Water Systems, §11-20-29.
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[ ] It does not appear that this well will be used for consumptive purposes and is not subject to Safe Drinking Water Regulations.
[ ] For the applicant's information, a source of possible wastewater contamination [ ] is [ ] not located near the proposed well site (information attached).
[ ] Other relevant DOH rules/regulations, information, or recommendations are attached.
[ ] No comments/objections

Contact Person: __________________________ Phone: ____________

Signed: __________________________ Date: ____________
TO: Harry Yada, Acting Administrator  
Land Division  
FROM: Linnel T. Nishioka, Deputy Director  
Commission on Water Resource Management  
SUBJECT: Well Construction/Pump Installation Permit Applications  
Falko/Koolau Nos. 1 & 2 (Well Nos. 1221-08 & 09)

Transmitted for your review and comment are copies of the captioned well applications which includes requests for pump installation permits.

We would appreciate your comments on the captioned applications with regard to the programs, plans, and objectives specific to your division. Please respond by returning this cover memo form by August 24, 2001.

Please find the attached maps to locate the proposed wells. If you have any questions about these permit applications, request additional information, or request additional review time, please contact Lenore Nakama of the Commission staff at 587-0218.

RESPONSE:

[ ] A water lease/permit is required of this applicant and an application for such will be requested by our division.

[ ] A water lease/permit is not required of this applicant.

[ ] A water lease/permit has been obtained by the applicant through lease no. ________________.

[ ] Other relevant Land Division rules/regulations, information, or recommendations are attached.

[ ] No objections

[ ] Other comments:

Contact Person: ______________________ Phone: __________

Signed: ____________________________ Date: __________
## Filing Fee

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**REMARKS:**

LINE (1) WC/PIP Appl. for Well No. 4226-16
LINE (2) WCPA for Well No. 5118-01
LINE (3) ATP WCPA for Well No. 5341-02
LINE (4) WC/PIP Appl. for Well Nos. 1221-08,09
PUBLIC RECORD DATA

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This information has been supplied by third parties and has not been independently verified by Hawaii Information Service and is, therefore, not guaranteed.
Ms. Linnel T. Nishioka - Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Nishioka:

Well Construction and Pump Installation Permit
Application for Falko/Koolau Well Nos. 1 and 2
Waipake, Kauai, Hawaii

Attached are Well Construction and Pump Installation permit applications and filing fee for Falko/Koolau Well Nos. 1 and 2 located on TMK 5-1-3:6 in Waipake, Kauai. The wells are intended to provide drinking water and landscape irrigation for the parcel. One of the two wells would provide back-up supply.

If you have any questions or need additional information, feel free to call me or Greg Kamm at 808-639-1144. Thank you for your attention to this matter.

Sincerely,

Tom Nance

cc: Greg Kamm

Attachments
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT

Instructions: Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. Application must be accompanied by 3 copies and a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 587-0225. For further information and updates to this application form, visit http://www.state.hi.us/dlnr/cwrm.

APPLICANT INFORMATION: (Fill out all three, if applicable, and place a check next to the primary contact)

1. (a) WELL OWNER: Falko Partners, LLC
   Contact Person: Greg Kamm
   Phone: 808-639-1144
   Fax: 808-822-1782
   Mailing Address: P.O. Box 588, Kapaa, Kauai, Hawaii 96746
   (b) LAND OWNER: Falko Partners, LLC
   Contact Person: Greg Kamm
   Phone: 808-639-1144
   Fax: 808-822-1782
   Mailing Address: P.O. Box 588, Kapaa, Kauai, Hawaii 96746
   (c) CONTRACTOR: To Be Competitively Bid
   Contact Person: Phone: 
   Fax: 
   Mailing Address:

WELL & PUMP INFORMATION: (Please fill in the diagram on the back of this form.)

2. WELL NAME: Falko/Koolau No. 1
   Island: Kauai
   Address: Along Koolau Road - Waipake, Kauai
   Tax Map Key: 5 1 3 6
   Zone: 5 Sec: 1 Plat: 3 Parcel: 6
   (Attach the relevant portion of (a) a 7.5-Minute Series USGS topographic map (scale 1:24,000) and include the name of the quad map, and (b) a property tax map, showing well location referenced to established property boundaries.

3. PROPOSED WORK:
   (check all that apply)
   4) Install New Pump*
   5) Modify Existing Well*
   6) Abandon/Seal*

   *State Well No.: (if unknown, please call Commission at 587-0225)

4. CONSTRUCTION:
   1) Drilled
   2) Dug
   3) Shaft
   4) Tunnel
   Is this well part of a battery of wells? Yes No (Please describe)

5. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: 90 gallons per minute
   Pump Type (Check one):
   1) Deep Well Turbine
   2) Rotary
   3) Centrifugal
   4) Submersible
   5) Rotary-Displacement
   6) Reciprocating
   7) Rotary-Gear
   8) Pump
   9) Impulse

6. PROPOSED USE:
   (check all that apply)
   1) Municipal (including hotels, stores, etc.)
   2) Industrial
   3) Domestic (individual, noncommercial water system)
   4) Irrigation (crop)
   5) No. of Acres:
   6) No.
   7) Other (explain):

   Does this well serve 25 or more people at least 60 days per year or have 15 or more service connections? Yes No

7. (a) PROPOSED AMOUNT OF WITHDRAWAL:
   85,000 gallons per day

   (b) METHOD OF FLOW MEASUREMENT:
   1) Flowmeter
   2) Open-pipe
   3) Weir
   4) Orifice
   5) Other (explain):

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS:
   1) CDUP
   2) SMAP
   3) EIS
   4) EA
   5) None
   6) Other (explain)

9. REMARKS, EXPLANATIONS: If successful, the well would provide drinking water and landscape irrigation for the parcel. Two wells would be completed, one to provide back-up supply.

I understand that approval of this application attaches the following standard conditions: 1) the proposed work is to be completed within two (2) years of the approval date; 2) the contractor shall submit to the Commission a well completion/abandonment report within 60 days after the completion date of the permitted work; 3) monthly water use data shall be submitted to the Commission; 4) such approval shall not constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity.

Well Owner
Falko Partners, LLC
Signature
Date
Landowner
Falko Partners, LLC
Signature
Date
Contractor
Falko Partners, LLC
Signature
Date

For official use only
Latitude
Longitude
State Well No.
Aquifer System No.
38G
808-639-1144

WCP/IPA Form 10/25/00
10. PROPOSED WELL SECTION (Please attach schematic if different from diagram provided below)

**Solid Casing Material:**
- Carbon Steel: compliant with (check one or more): ANSI/AWWA C200, API Spec. 5L, ASME A53, ASTM A139
- Stainless Steel: (check one): ASTM A409 (production wells), ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM D480 and ASTM D1527: (check one): Schedule 40, Schedule 80
- PVC Plastic conforming to ASTM D480 and (ASTM D1785 or ASTM D2241): (check one): Schedule 40, Schedule 80, Schedule 120
- Thermoset Plastic: (check one): Filament Wound Resin Pipe conforming to ASTM D2996
- Centrifugally Cast Resin Pipe conforming to ASTM D2997
- Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
- Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
- PTFE Fluorocarbon Tubing conforming to ASTM D3296
- FEP Fluorocarbon Tubing conforming to ASTM D3296

**Open Casing Material:**
- Carbon Steel: compliant with (check one or more): ANSI/AWWA C200, API Spec. 5L, ASME A53, ASTM A139
- Stainless Steel: (check one): ASTM A409 (production wells), ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM D480 and ASTM D1527: (check one): Schedule 40, Schedule 80
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- Centrifugally Cast Resin Pipe conforming to ASTM D2997
- Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
- Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
- PTFE Fluorocarbon Tubing conforming to ASTM D3296
- FEP Fluorocarbon Tubing conforming to ASTM D3296

*The approximate elevation must be referenced to mean sea level (msl) at the time of application filing. Final elevations of well components shall be submitted in the Well Completion/Well Abandonment reports and referenced to a benchmark which has been established by a surveyor licensed by the State.

For non-salt water Basal Wells - bottom elevation of well should not be closer than 1/4 of aquifer thickness or, Bottom Elevation of Well Limit = \[ \frac{1}{4} \times \text{Aquifer Thickness} \]

Example: Estimated + 2 ft. Not elevation. Bottom Elevation of Well Limit = \[ \frac{1}{4} \times 2 \] ft. = -18.5 ft.
To Whom It May Concern:

Please be advised that Greg Kamm, whose signature appears below, is authorized to represent Falko Partners, LLC in all matters pertaining to Falko-owned real estate on Kauai such as permits, applications and registrations but excluding purchases, sales or encumbrances thereof.

Authorized signature:

Greg Kamm

SIGNED:

Paul R. Perez, CFA
Manager
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT

Instructions: Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, P.O. Box 521, Honolulu, Hawaii 96809. Application must be accompanied by 3 copies and a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 587-0225.

For further information and updates to this application form, visit http://www.state.hi.us/dlnr/cwrrm.

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1. (a) WELL OWNER: Falko Partners, LLC Contact Person: Greg Kamm Phone: 808-639-1144
   Mailing Address: P.O. Box 588 Kapaa, Kauai, Hawaii 96746
   Fax: 808-822-1782
   (b) LAND OWNER: Falko Partners, LLC Contact Person: Greg Kamm Phone: 808-639-1144
   Mailing Address: P.O. Box 588 Kapaa, Kauai, Hawaii 96746
   Fax: 808-822-1782
   (c) CONTRACTOR: To Be Competitively Bid Contact Person: Phone:
   Mailing Address:
   Fax: E-mail: Lic 

WELL & PUMP INFORMATION: (Please fill in the diagram on the back of this form.)

2. WELL NAME: Falko/Koolau No. 2 Island: Kauai
   Address Along Koolau Road - Waipake, Kauai Tax Map Key: 5 1 3 6
   Attach the relevant portion of (a) a 7.5-Minute Series USGS topographic map (scale 1:24,000) and include the name of the quad map, and (b) a property tax map, showing well location referenced to established property boundaries.

3. PROPOSED WORK: (check all that apply)
   ☐ Construct New Well ☐ Install New Pump*
   ☐ Modify Existing Well* ☐ Modify Pump*
   ☐ Abandon/Seal*
   *State Well No.: (if unknown, please call Commission at 587-0225)

4. CONSTRUCTION: ☐ Drilled ☐ Dug ☐ Shaft ☐ Tunnel
   Is this well part of a battery of wells? ☐ Yes ☐ No (Please describe)

5. PROPOSED PUMP INFORMATION: Rated Pump Capacity: 90 gallons per minute
   Pump Type (Check one):
   ☐ Deep Well Turbine ☐ Rotary ☐ Propeller
   ☐ Submersible ☐ Rotary-Displacement ☐ Reciprocating
   ☐ Centrifugal ☐ Rotary-Gear ☐ Impulse

6. PROPOSED USE: (check all that apply)
   ☐ Municipal (including hotels, stores, etc.) ☐ Industrial
   ☐ Domestic (individual, noncommercial water system)
   Does this well serve 25 or more people at least 60 days per year or have 15 or more service connections? ☐ Yes ☐ No
   ☐ Irrigation (crop) ☐ No. of Acres: ___________
   ☐ Military ☐ Other (explain): ___________

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: 85,000 gallons per day
   (b) METHOD OF FLOW MEASUREMENT: ☐ Flowmeter ☐ Open-pipe ☐ Weir ☐ Orifice ☐ Other(explain)

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS: ☐ CDUP ☐ SMAP ☐ EIS ☐ EA ☐ None ☐ Other (explain)

9. REMARKS, EXPLANATIONS: If successful, the well would provide drinking water and landscape irrigation for the parcel. Two wells would be completed, one to provide back-up supply.

I understand that approval of this application attaches the following standard conditions: 1) the proposed work is to be completed within two (2) years of the approval date; 2) the contractor shall submit to the Commission a well completion/abandonment report within 60 days after the completion date of the permitted work; 3) monthly water use data shall be submitted to the Commission; 4) such approval shall not constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity.

Well Owner
Falko Partners, LLC
Signature ____________________________ Date __________________
Landowner
Falko Partners, LLC
Signature ____________________________ Date __________________
Contractor
Falko Partners, LLC
Signature ____________________________ Date __________________

For official use only
Latitude ____________________________ Aquifer System No. ________________
Longitude ____________________________ State Well No. ________________

WCPIPA Form 10/25/00
**10. PROPOSED WELL SECTION**

*(Please attach schematic if different from diagram provided below)*

- **Hole Diameter:** 13 in.
- **Minimum of 2' Radius & 4" Thick Concrete Pad (to contain benchmark surveyed to nearest 0.01 ft.)**
- **Ground Elevation:** 280 ft., msl*

**Solid Casing**
- Total Length: 280 ft.
- Nominal Diameter: 6 in.
- Wall Thickness: 0.375 in.
- Bottom Elevation: 0.0 ft., msl*

**Open Casing**
- Perforated: 
- Screen: 
- Total Length: 40 ft.
- Nominal Diameter: 6 in.
- Wall Thickness: 0.375 in.
- Bottom Elevation: -40 ft., msl*

**Solid Casing:** 
- Material: Crushed Basalt
- Estimated Water Level Elevation: 10 ft., msl*

**Open Hole**
- Length: 60 ft.
- Diameter: 13 in.
- Bottom Elevation: -100 ft., msl*

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* The approximate elevation must be referenced to mean sea level (msl) at the time of application filing. Final elevations of well components shall be submitted in the Well Completion/Well Abandonment reports and referenced to a benchmark which has been established by a surveyor licensed by the State.

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,
- Bottom Elevation of Well Limit = \( \left( \frac{\text{Water Elevation - Ground Elev.}}{4} \right) \)

Example: Estimated +2 ft. Water Level Elev. = Bottom Elevation of Well Limit = \( \left( \frac{2 - 10.01}{4} \right) \approx -1.85 \) ft.

**Solid Casing Material:**
- Carbon Steel: compliant with (check one or more): ASTM A409 (production wells) | ASTM A312 (monitor wells)
- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A242 | Type E | Type S | Grade B | Other
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one)
  - Schedule 40 | Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1765 or ASTM D2241): (check one)
  - Schedule 40 | Schedule 80 | Schedule 120
- Thermoset Plastic: (check one)
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3296

**Open Casing Material:**
- Carbon Steel: compliant with (check one or more): ASTM A409 (production wells) | ASTM A312 (monitor wells)
- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one)
  - Schedule 40 | Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1765 or ASTM D2241): (check one)
  - Schedule 40 | Schedule 80 | Schedule 120
- Thermoset Plastic: (check one)
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3296
May 22, 2001

To Whom It May Concern:

Please be advised that Greg Kamm, whose signature appears below, is authorized to represent Falko Partners, LLC in all matters pertaining to Falko-owned real estate on Kauai such as permits, applications and registrations but excluding purchases, sales or encumbrances thereof.

Authorized signature:

Greg Kamm

SIGNED:

Paul R. Perez, CFA
Manager