**CHECKLIST**

**WELL CONSTRUCTION PERMIT**

**WELL NAME or LOCATION:** Kehauiki Well 1 & 2

**WELL NUMBER:** 4457-02, 02  4458-01, 02

**OWNER or OPERATOR:**

**ADDRESS:** 1112 Kincaid Street, Honolulu, 96814

**TELEPHONE (contact person):**

<table>
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<th>Event Description</th>
<th>Date</th>
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<tr>
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<tr>
<td>Date filing fee deposited</td>
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**Date agenda due:**

**Date submittal due:**

**Date submittal sent to applicant:**

**Date application approved or disapproved:** 9/12/89

**Date applicant notified of decision:** 9/27/89

**REMARKS:**

---

---
CHECKLIST

__WELL CONSTRUCTION PERMIT__  __PUMP INSTALLATION PERMIT__

WELL NAME or LOCATION: KOHANAIKI 2  ISLAND: HAWAII

WELL NUMBER: 4458-02  Tax Map Key: 7-2-0501

OWNER/OPERATOR:
Firm Name HANAY HANAI INC.
Contact Person THOMAS YAMAMOTO
Address P.O. Box 11722
Phone 885-5300

LANDOWNER:
Firm Name SAME
Contact Person
Address
Phone

Date application received: 21 MARCH 1991
Date acknowledged receipt/request more info: ________________
Date application accepted: ________________
Suspense date (90 days): ________________
Date filing fee deposited: ________________

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<td>Historic Preserv. Prog.</td>
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<tr>
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<td>Office of Hawaiian Affairs</td>
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Date agenda due: ________________
Date submittal due: ________________
Date submittal sent to applicant: ________________

Date application approved or disapproved: ________________
Date applicant notified of decision: ________________

REMARKS:

_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
CHECKLIST

WELL CONSTRUCTION PERMIT

WELL NAME or LOCATION: KOHANAIKAI
ISLAND: HAWAII

WELL NUMBER: 4458-01

OWNER/OPERATOR:
Firm Name NAKAYAMA HAWAII, INC.
Contact Person THOMAS YAMAMOTO
Address P.O. BOX 111222
KAMUELA, HI 96743-0020
Phone 886-5300

LANDOWNER:
Firm Name
Contact Person
Address
Phone

Date application received: 3-21-91
Date acknowledged receipt/request more info: 
Date application accepted: 
Suspense date (90 days): 
Date filing fee deposited: 

Application sent to following:

- Dept. of Health
- Dept. of Hawi Home Lands
- Dept/Ed of Water Supply
- Historic Preserv. Prog.
- Koolauloa NB #28 (Oahu)
- Dept Pub. Wrks (Hawaii)
- Office of Hawaiian Affairs

Date agenda due: 
Date submittal due: 
Date submittal sent to applicant: 

Date application __ approved or __ disapproved: 
Date applicant notified of decision: 

REMARKS:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Facsimile Transmittal

To: Ryan Imana
Fax: 587-0219

From: Tiffany Page
Date: 5/12/03

Re: Well #1458-02
Pages: 2

CC:

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Respond

Notes: Signed pump installation permit for Well #1458-02.

A Water Development Joint Venture
P.O. Box 5685, Kailua-Kona, Hawaii 96745 • (808) • Fax (808) 322-0928
PUMP INSTALLATION PERMIT
Key 82 Well, Well No. 4459-02

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management’s Administrative Rule: Rules Relating to Water Use, Wells, and Stream Diversion Hydraulics, this document permits the pump installation for Key 82 Well (Well No. 4459-02) of Key, North Kona, Hawaii, Hawaii, TRM 7-2-2-21, subject to the seawater Well Construction & Pump Installation Standards (U2R97) which include but are not limited to the following conditions:

1. The Chairperson to the Commission on Water Resource Management (Chairperson), P.O. Box 821, Hilo, Hi 96720, shall be notified, in writing, at least ten (10) days before any work covered by this permit commences and shall be allowed to inspect installation activities in accordance with §13-198-13, Hawaii Administrative Rules.

2. The pump installation permit shall be for installation of a 720 gpm capacity, or less, pump in this well.

3. The permittee, well operator, owner 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 means for measuring injection rate 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 significantly affect existing or future legal use of water in the area, including any surface water or established groundwater levels. The permit or the authorization to pump water from a well shall not constitute a commitment of continuous water rights. The permittee, well operator, and/or well owner are notified and by this condition 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 all requests for permits and reports (Permit Compliance Report of the Well Completion Report (attached) in the Chairperson either 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 is incorporated into this permit by reference and is subject to the Hawaii Well Construction & Pump Installation Standards (U2R97). If the NWCRP are not followed and as a consequence water is wasted or contaminated, a lien on the property may result.

8. The pump may be revised if work is not started within six (6) months after the date of this permit or 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 approval, unless otherwise specified. The permittee is advised that 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 four (4) months prior to the date the permit expires. If the applicant’s request is not met, the Chairperson may inspect 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 §13-198-15 prior to any well boring or2 digging work.

10. The permittee, its owners, and operators shall indemnify, defend, and hold the State of Hawaii harmless from any and all losses, liability, claims, or demands for property damages, personal injury, or death arising out of any act or omission of the applicant, agents, officers, employees, contractors, or agents under this permit or relating to or connected with the granting of this permit.

11. Special conditions to the attached permit or this permit are incorporated herein by reference.

Date of Approval: November 21, 2000
Expiration Date: November 21, 2002

TIMOTHY E. JOHNS, 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 those conditions or a prerequisite and underlying conditions of my ability to proceed and understand that I shall not commence work until I meet the pump installation permit requirements.

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

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

TOTAL P. 02

Department of Health State Water & Wastewater Branch
Hawaii Department of Water Supply
FROM:  
DATE:  1/31/03  
SUSPENSE DATE:  

TO:  
INIT:  
TO:  
INIT:  
FOR:  
PLEASE:  

BAUER, G.  
CHING, F.  
DANBARA, S.  
FUJII, N.  
GOODING, K.  
HARDY, R.  
HIGA, D.  
ICE, C.  
IMATA, R.  
JINNAI, R.  
KUNIMURA, I.  
MATHIAS, T.  
NAKAMA, L.  
NAKANO, D.  
NISHIOKA, L.  
OHYE, M.  
SAKODA, E.  
SUBIA, S.  
SWANSON, S.  
UYENO, D.  
YODA, K.  

Approval  
Signature  
Information  
See Me  
Review & Comment  
Take Action  
Type Draft  
Type Final  
File  
Xerox ___ copies  

Remit expired 11/21/02. They didn't do any work at all. Requested extension close enough. I told them next time they need to make extension request 3 months prior to expiration.
Mr. Guido Giacometti  
Hiluhilu Development LLC  
62-1210 Kawaiehae Road  
Kamuela, HI 96743

Dear Mr. Giacometti:

Pump Installation Permit Extension Request for Well No. 4458-02

This is in response to a phone call by Dale Stromquist of Wai’eli Drilling on January 31, 2003. Mr. Stromquist requested an extension of your Pump Installation Permit for the Kau Well 2 (Well No. 4458-02). Your request is approved. Your new completion date shall be November 21, 2004. All other conditions of your permit apply. Please remember to sign and return a copy of the permit prior to beginning work.

If you have any questions, please contact Ryan Imata of the Commission staff at [Redacted] or toll-free at [Redacted] (Hawaii), [Redacted] (Kauai), [Redacted] (Maui), or [Redacted] (Lanai & Molokai), extension 70255.

Sincerely,

DEAN A. NAKANO  
Acting Deputy Director

RI:ss
Mr. Guido Giacometti
Hiluhilu Development LLC
62-1210 Kawaihae Road
Kamuela, HI 96743

Dear Mr. Giacometti:

Pump Installation Permit Application for Well No. 4458-02

We acknowledge receipt, on October 28, 2000, of your completed Pump Installation Permit application and filing fee for the Kau Well #2 (Well No. 4458-02). 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 Ryan Imata of the Commission staff at [Contact Information] or toll-free at [Contact Information] (Hawaii), [Contact Information] (Kauai), [Contact Information] (Maui), or [Contact Information] (Lanai & Molokai) extension 70255.

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

Rllky
TO: Honorable Bruce S. Anderson, Director  
Department of Health 
Attention: Dennis Tulang, Wastewater Branch 
William Wong, Safe Drinking Water Branch. 

FROM: Timothy E. Johns, Chairperson 
Commission on Water Resource Management 

SUBJECT: Pump Installation Permit Application 
Kau Well #2 (Well No. 4458-02) 

Transmitted for your review and comment is a copy of the captioned well application. 

We would appreciate your comments on the captioned application for any conflicts or inconsistencies with the programs, plans, and objectives specific to your department. Please respond by returning this cover memo form by November 29, 2000. 

Please find the attached maps to locate the proposed well. If you have any questions about this permit application, request additional information, or request additional review time, please contact Ryan Imata of the Commission staff at [_____] 

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. 

[ ] 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: ___________________ Phone: ___________________ 

Signed: ___________________ Date: ____________
TO: Dean Y. Uchida, Administrator
Land Division

FROM: Linnel T. Nishioka, Deputy Director
Commission on Water Resource Management

SUBJECT: Pump Installation Permit Application
Kau Well #2 (Well No. 4458-02)

Transmitted for your review and comment is a copy of the captioned well application which includes a request for a pump installation permit.

We would appreciate your comments on the captioned application with regard to the programs, plans, and objectives specific to your division. Please respond by returning this cover memo form by November 29, 2000.

Please find the attached maps to locate the proposed well. If you have any questions about this permit application, request additional information, or request additional review time, please contact Ryan Imata of the Commission staff at [Contact Information]

R heavyweight
Attachment(s)

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: _____________________________
**DEPARTMENT OF LAND AND NATURAL RESOURCES**

**UAC OR ATTACHED WORKSHEET**

**DATE:** NOV 16 2000

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**REMARKS:**

LINE (1) PIP Appl. for Well No. 4458-02
LINE (2) (Kau Well #2)
LINE (3)
LINE (4)
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**WELL NUMBER**: 4458-02  | **WELL NAME**: (Hometown Well 2) Now Kau Z

- **WELL CONSTRUCTION**
- **PUMP INSTALLATION**

**ATTACHMENTS FOR APPLICATION**

1. TRANS. LETTER
2. CWRM MAP
3. APPL. FORM (3X)
4. USGS MAPS (3X)
5. TAX MAPS (3X)
6. PARCEL OWNER VERIF.
7. CONTRACTOR VERIF.
8. ALL INFO FILLED IN
9. BACKGROUND CHECK

**FOLDER:**
- MADE NEW FILE FOLDER, ATTACHED
- FILE FOLDER ALREADY MADE, IN FILE CABINET

**INCOMPLETE ACTION DATES:**

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<td>Yes, not answered. E-mailed for more info.</td>
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<tr>
<td>10/28</td>
<td>Gvido said 4458-02. Prep recpt date 10/28/00</td>
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- Same well? Not sure
- Need signed permit - use
-
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**PUBLIC RECORD DATA**

**TMK # 3-7-2-5-1**

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</table>

This information has been supplied by third parties and has not been independently verified by Hawaii Information Service and is, therefore, not guaranteed.

http://webresearch.hawaiiinformation.com/REsearch/Asp/Functions/Property/SearchTMK.a 10/31/2000
## Well Background Check

<table>
<thead>
<tr>
<th>Approved Well No.</th>
<th>Well Name</th>
<th>Applicant</th>
<th>Driller</th>
<th>Type</th>
<th>Well Construction</th>
<th>Pump Installation</th>
</tr>
</thead>
</table>
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT

I, [Name], hereby apply for Permit No. [Number] to extract groundwater from the permitted property in accordance with Sections 42-1 through 42-8 of the Hawaii Revised Statutes and Rules of the Commission on Water Resource Management. The approval date shall be [Date].

1. (a) [WELL OWNER] [Hilinau Dev LLC] Contact Person: [G. Garcia-Melendez] Phone: 808/682-1924
   Mailing Address: 62-1210 Kamehameha Road, KEAAU, HI 96743
   Fax: 808/682-1926
   E-mail: guidex@kona.net

   (b) [LAND OWNER] [Hilinau Dev LLC] Contact Person: [T. Smith] Phone: 808/607-0040
   Mailing Address: 62-1210 Kamehameha Road, KEAAU, HI 96743
   Fax: 808/682-1926
   E-mail: tygers@kava.net

   (c) [CONTRACTOR] [Kehewai Kona Contract] Contact Person: [W. Degele] Phone: 808/325-0199
   Mailing Address: PO Box 9007 Kehewai-Kona, HI 96743
   Fax: 808/325-6605
   E-mail: [Contact Information]

2. WELL NAME: [Kau Well #2] Island: [Hawaii]
   Address: [References Map Key]
   Tax Map Key: [Zone Sec Plat Parcel]

   (if more space is needed, please attach additional sheet)

3. PROPOSED WORK: (check all that apply)
   [ ] Construct New Well
   [ ] Modify Existing Well
   [ ] Abandon/Seal
   [ ] Install New Pump
   [ ] Modify Pump
   [ ] [State Well No.]
   (unavailable, please contact Commission or)

4. CONSTRUCTION:
   [ ] Drill
   [ ] Dug
   [ ] Shaft
   [ ] Tunnel
   [ ] Is this well part of a battery of wells? [Yes/No]
   (Please describe)

5. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: [750] gallons per minute
   Pump Type: (Check one):
   [ ] Deep Well Turbine
   [ ] Submersible
   [ ] Centrifugal
   [ ] Rotary
   [ ] Rotary-Displacement
   [ ] Rotary-Gear
   [ ] Impulse
   [ ] [Municipal (including hotels, stores, etc.)]
   [ ] Industrial
   [ ] Domestic (individual, noncommercial water system)
   [ ] Irrigation (crop)
   [ ] Military
   [ ] No. of Acres:
   [ ] No. of Dwelling Units:
   [ ] Other:

6. PROPOSED USE:
   (check all that apply)
   [ ] Domestic (individual, noncommercial water system)
   [ ] Irrigation (crop)
   [ ] Military
   [ ] No. of Dwelling Units:
   [ ] No. of Acres:
   [ ] Other (explain)

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: [1,000,000] gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
      [ ] Hourmeter
      [ ] Open-cup
      [ ] Weir
      [ ] Other

8. LEGAL REQUIREMENTS:
   [ ] COUP
   [ ] SMAP
   [ ] ES
   [ ] EA
   [ ] [Other (explain)]

9. REMARKS, EXPLANATIONS:
    [June 15, 2023]
    [Use of Water Supply System of Hawaii, PER AGREEMENT]

   (if more space is needed, please attach additional sheet)

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, and a report of monthly water use data shall be submitted to the Commission; 4) such approval shall not constitute a determination of compliance with all applicable regulations.

For Official Use Only:

Latitude
Longitude
State Well No.

For Official Use Only:
Aguijer System No.

WCPFPA Form 713/30
SEE ATTACHED

10. PROPOSED WELL SECTION (Please attach schematic different from diagram provided below)

Hole Diameter: _______ in.

Elevation at top of casing _______ ft., msl

Minimum of 2' Radius & 4" Thick Concrete Pad to contain benchmark surveyed to nearest 0.01 ft.

Ground Elevation _______ ft., msl

Solid Casing: (90%) g (Ground Elev. - Water Level Elev)

Total Length: _______ ft.

Nominal Diameter: _______ in.

Wall Thickness: _______ in.

Bottom Elevation: _______ ft., msl

Open Casing:

Total Length: _______ ft.

Nominal Diameter: _______ in.

Wall Thickness: _______ in.

Bottom Elevation: _______ ft., msl

Solid Casing, (90%) g (Ground Elev. - Water Level Elev)

Elev. ---+ Bottom Elevation: _______ ft.

Annular space between hole and casing (min. 3")

Rock or Gravel Packing:

Material:

 Crushed Basalt

 Round Gravel

Estimated Water Level Elevation: _______ ft., msl

Total Depth: _______ ft.

For non-salt water Basal Wells - bottom elevation of well shall not be deeper than 1/4 of aquifer thickness or, Bottom Elevation of Well Limit = (Water Elevation - (Limit= (Water Elevation - (Well Elevation or water level elevation))

Example: Estimated + 2 ft. Water Level  

Well Elevation: _______ ft.

If applicable, please refer to the HAWAII WEL CONSTRUCTION and PUMP INSTALLATION STANDARDS to ensure your actual is in compliance with applicable standards.

Solid Casing Material:

Carbon Steel: compliant with (check one or more): ANSI/AWWA C200 u API Spec. 5L u ASTM A53 u ASTM A139

And compliant with (check one or more): u ASTM A524 u Type E u Type S u Grade B u Other

Stainless Steel: (check one): u ASTM A499 (production wells) u ASTM A106 (monitor wells) u ASTM A53

ABS Plastic conforming to ASTM F490 and ASTM D1657: (check one) u Schedule 40 u Schedule 80

PVC Plastic conforming to ASTM F490 and (ASTM D1785 or ASTM D2241): (check one or more): u Schedule 40 u Schedule 80 u Schedule 120

Thermoset Plastic: (check one):

Cast Urethane: Cast Resin Pipe conforming to ASTM D2997

Reinforced Plastic: Plastic Pressure Pipe conforming to ASTM D3296

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 u API Spec. 5L u ASTM A53 u ASTM A139

And compliant with (check one or more): u ASTM A524 u Type E u Type S u Grade B u Other

Stainless Steel: (check one): u ASTM A499 (production wells) u ASTM A106 (monitor wells)

ABS Plastic conforming to ASTM F490 and ASTM D1657: (check one) u Schedule 40 u Schedule 80

PVC Plastic conforming to ASTM F490 and ASTM D1785 or ASTM D2241: (check one): u Schedule 40 u Schedule 80 u Schedule 120

Thermoset Plastic: (check one):

Cast Urethane: Cast Resin Pipe conforming to ASTM D2997

Reinforced Plastic: Plastic Pressure Pipe conforming to ASTM D3296

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 wall 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.

"Please refer to the HAWAII WEL CONSTRUCTION and PUMP INSTALLATION STANDARDS to ensure your actual is in compliance with applicable standards."
1' - 0"  
1' - 6"  
3' - 0"  
8" PUMP COLUMN  
1' - 6" I.D. WELL CASING  
4' - 0"  
CEMENT GROUT (24" MINIMUM)  
GROUT SEAL  
DRILL HOLE  
GRAVEL PACK  
SOLID CASING (STEEL: 0.375" WALL)  
PUMP ASSEMBLY  
SCREEN CASING (STEEL: 0.3125" WALL)  
CASING GUIDE (SEE DETAIL)  
8" SHROUD

SECTION
SCALE: 1/2" x

Kau Well #2 4458-02
Witcher Engineering LLP
Construction Plans
Tom Nance Water Resource Engineering

To:  

Fax No.:  

From: Tom Nance  

Date: Jan. 31, 2000  

Subject: SOUTH KOREA WATER WERE GROUP  

No. of Pages: 9 (including header)

---

(1) Copy of the Signed Memorandum of Understanding (pp. 2-5)
(2) (Unsigned) copy of Policies & Procedures (pp. 6-9)

---

680 Ala Moana Boulevard, Suite 406 - Honolulu, Hawaii 96813-5411 - Phone: (808) 537-1141 - Fax: (808) 538-7757

Ryan - Faxed this. Should put copies in relevant Oahu Island well folders.
MEMORANDUM OF UNDERSTANDING BETWEEN MAUNA KEA PROPERTIES, INC., MAUNA LANI RESORT, INC., NAHSAY HAWAII, INC. AND WAIKOLOA LAND COMPANY
ON COOPERATIVE REGIONAL WATER DEVELOPMENT

Mission Statement

To work jointly and cooperatively in developing and implementing a regional water plan which best serves the collective water needs of the parties and others within the region in a manner acceptable to relevant governmental authorities.

Objectives

The parties to this Memorandum of Understanding (collectively referred to as "South Kohala Water Study Group" or "Group") acknowledge and agree that it is in their long-term best interests to achieve the Mission set forth above in the following manner:

- Reach agreement on a regional plan for the development of sources and distribution systems for potable, non-potable water and effluent reuse;
- Form and establish, as equity participants, a private, regional water company or companies for the development, production, distribution and sale of potable, non-potable and effluent reuse resources serving the parties and others within the region;
- Reach bilateral and multilateral agreements achieving the staged implementation of the regional water plan;
- Publicly support and consider the commitment to the conditional, partial funding of the County of Hawaii Department of Water Supply's (DWS) development of its planned North Kohala Pipeline;
- Develop a Water Commitment Policy, which is incorporated herein by reference, containing guidelines and requirements for each Group Member securing a sufficient supply of water for actual use in accordance with a realistic timetable;
Coordinate the activities of the Water Study Group with all relevant State of Hawaii authorities, including but not limited to its Water Commission, in a manner which promotes and preserves the Group's ability to deal with regional water issues on a collective basis;

Communicate, where appropriate, with other interested parties within the region;

Enter into subsequent joint agreements intended to implement the objectives adopted herein.

**Governance**

The activities of the Group shall be governed and coordinated through an Executive Committee comprised of a designated representative of each signatory to this Memorandum of Understanding.

The Group Executive Committee shall:

- Approve all policies, agreements and expenditures made on behalf of the Group; provided, that if the representative of any Group member specifically disapproves of any such expenditure, that Group member shall be excused from its pro rata share of such expenditure;

- Approve the inclusion of additional members to and approve, except member in question, for the exclusion of existing members from the Water Study Group;

- Approve public statements and testimony regarding Water Study Group activities;

- Develop and approve an annual operating budget, project budgets and the individual party's obligations to fund the operations and the development of these planned projects;

- Be kept informed of all agreements entered into between Water Study Group members affecting the Group's Mission and Objectives;

- Coordinate all contact regarding the activities of the Water Study Group with governmental agencies;
Direct and approve the activities of all consultants retained by the Water Study Group relating to its stated Mission and Objectives.

All decisions of the Group shall be by the majority of the members of the Executive Committee except for "key decisions" which require unanimous approval. Key decisions include approval of the annual operating budget and individual members' obligation to fund operations or make contributions to the development of planned projects, expenditures which are outside of the approved budget in excess of $5,000 in any single case or $25,000 in the aggregate and the addition of any new member to the Executive Committee.

Dispute Resolution

It is acknowledged that from time to time, disputes and disagreements may arise between the parties to this Memorandum of Understanding regarding regional water issues and that it is in their long-term collective best interests that such disputes be resolved without resort to governmental or judicial involvement.

The parties agree that they shall use their individual and collective best efforts to resolve any and all outstanding issues covered by this Memorandum. The parties further agree that in the event negotiations fail to result in acceptable agreement or resolution, they may voluntarily submit outstanding issue(s) to binding or nonbinding arbitration pursuant to terms agreed to by the parties.

North Kohala Pipeline

The parties agree to support the concept of a North Kohala pipeline transporting potable water to South Kohala being pursued by the Department of Water Supply, County of Hawaii.

In the event that the parties are reasonably satisfied that the North Kohala pipeline will be built, but no later than the start of construction, individual signatories to this agreement shall commit, on a fair and equitable basis, to the partial funding of said pipeline under acceptable terms and conditions to be negotiated.
Termination/Withdrawal

A majority of the members of the Group may terminate the Group and joint obligations contained in this Memorandum of Understanding. Individual Group members may withdraw from the South Kohala Water Study Group upon written notice to other members; provided, that members shall remain liable for their or its pro-rata share of costs of operations per the approved budget or amendments thereto, incurred during their membership or prior to withdrawal, as the case may be.

This Memorandum of Understanding is entered into this 9th day of February, 1998.

MAUNA KEA PROPERTIES, INC.  
By Its President

MAUNA LANI RESORT, INC.  
By Its President

NANSAI HAWAII, INC.  
By Its President

WAIKOLOA LAND COMPANY  
By Its President
The South Kohala Water Users Group ("Group") recognizes the need to develop a coherent set of policies and procedures for the development of groundwater to ensure maximum beneficial use of this limited resource, avoid conflicts among users, and facilitate the timely development of water tied to actual use. The parties to this document agree to abide by the policies and procedures it contains and encourage the State Commission on Water Resource Management ("Commission") to evaluate all drilling and pump installation permits received from other water users in the basin by the same criteria.

POLICIES

1. **The group recognizes that all parties need assurance of the availability of water for their developments. The group further recognizes that such assurances can occur only if it is agreed to by all parties.**

2. All drilling, well modification, and pump installation permits will be formulated to conform to the intent of the then current version of the Group's approved South Kohala Water [Master] Resource Plan.

3. All drilling, well modification, and pump installation permits will be submitted to the Group for its approval prior to submittal to the Commission. The Group's approval shall be based on the applicant's conformance with these policies, and the procedures listed below. The Group's approval shall not be unreasonably withheld if such conformance is demonstrated.

4. To minimize excessive use of groundwater, all effluent from sewage treatment plants shall be reused for irrigation unless it can be conclusively demonstrated to be physically and/or economically impractical for the developer of the irrigation supply or the ultimate user of the water.
4. All new landscaping, including golf course turfgrass, will be designed and implemented to minimize irrigation use. Efforts toward this end shall include choosing appropriate plant materials, use of proper soil types and thickness, and avoiding excessive turfgrass areas. Any new 18-hole golf course shall not use more than 0.75 MGD on year-round average nor more than 1.00 MGD over any seven-day period.

5. All new hotel, residential, commercial, and industrial development shall be designed to minimize water use and shall include appropriate water saving devices.

6. Drilling permits should be supported if consistent with the Water Resource Plan as they provide much needed information about this region's aquifer.

7. [Drilling and] Pump installation permits shall not be sought more than two years in advance of actual need [to avoid creating false shortages of supply and inappropriate positioning for the resource, potentially denying others their fair and equitable use].

8. Members of the Group agree to devise water use standards for consumption of potable and irrigation water use in order to implement these policies.

9. It is recognized that agreements between two or more parties may be necessary to facilitate respective water development. [Such agreements shall be consistent with these policies and procedures.]

PROCEDURES

1. All applications for drilling, well modification, and pump installation permits, including extensions of these permits, will be submitted for review and approval by the Group to ensure conformance with the Intent of the Group's policies and [master] water resource plan prior to submittal to the Commission.

2. To initiate the Group's review, application will be submitted with the following supporting information:

   a. Quantity [and timing] of potable and/or non-potable supply requirements, including the basis for these projections (unit counts, acreage, etc.).
b. Measures taken to avoid excessive potable and/or non-potable water use.
c. Exact location of the water uses, including land use plans, TMKs, etc.
d. Approved State land use designation; County General Plan designation; County zoning; use permit for district use; and the prospective land use approvals, including subdivision, needed to achieve the desired land use.
e. The project's site specific water master plan for potable and not potable water shall be submitted.
f. Exact location, dimensions, and pump capacity of the well (or wells) to be developed to meet these supply requirements.

[g. A development schedule indicating the date of actual water use.]

3. The Group's review and response to the application shall be completed within 45 days. The response shall judge the application's conformance with these policies, and with the South Kohala Water [Master] Resource Plan, [the appropriateness of the timing of the application,] and the [Unless there are compelling reasons otherwise, the timing of an application shall be deemed inappropriate unless all land use approvals through and including County zoning have been received and the actual use of water, based on a firm schedule, is to begin within two years.] Listed below are specific criteria of the Group's review of applications.

a. If conformance with these policies and procedures is demonstrated [and the timing of the application is appropriate,] the Group's approval shall not be unreasonably withheld.
b. If the application fails to meet the standards for acceptability set out herein, no submittal of the application to the Commission shall be made until revisions satisfactory to the Group are made.

c. The Group's approval for a pump installation permit shall be given only after tentative subdivision approval for the project to be served has been given.

d. If a proven water source is a condition of County zoning or use permit approvals, the Group's approval of a well construction permit shall be given only if evidence of the actual water use within two years is provided.]
These Water Commitment Policies and Procedures are entered into this day of ____________ 1993.

Mauna Kea Properties, Inc.
By: ____________________________
   Its

Nansay Hawaii, Inc.
By: ____________________________
   Its

Mauna Lani Resort, Inc.
By: ____________________________
   Its

Waikoloa Land Company
By ____________________________
   Its
TO: Mr. Dean Uchida, Administrator  
Land Division
FROM: Linne! T. Nishioka, Deputy Director  
Commission on Water Resource Management (CWRM)
SUBJECT: Review Use Permit Application (Use 99-004) To Develop a Private 18-hole Golf Course, Clubhouse and Driving Range, North Kona, Hawaii TMK: 3/7-2-007:001
FILE NO.: USE9904.CMT

October 18, 1999

Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

In general, the CWRM strongly promotes the efficient use of our water resources through conservation measures and use of alternative non-potable water resources whenever available, feasible, and there are no harmful effects to the ecosystem. Also, the CWRM encourages the protection of water recharge areas, which are important for the maintenance of streams and the replenishment of aquifers.

[x] We recommend coordination with the county government to incorporate this project into the county's Water Use and Development Plan.

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

[x] We are concerned about 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.

[x] A Well Construction Permit and/or a Pump Installation Permit from the Commission would be required before ground water is developed as a source of supply for the project.

[ ] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the Commission would be required prior to use of this source.

[ ] Groundwater withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

[ ] We recommend that no development take place affecting highly erodible slopes which drain into streams within or adjacent to the project.

[ ] If the proposed project includes construction of a stream diversion, the project may require a stream diversion works permit and amend the instream flow standard for the affected stream(s).

[ ] If the proposed project alters the bed and banks of a stream channel, the project may require a stream channel alteration permit.

[x] OTHER:

It appears that the well that is described as Kau Well #2 is designated in our files as Kohanaiki Well #2 (State Well No. 4458-02). A pump installation was issued for this well on January 29, 1993. However, we did not receive a signed pump installation permit, nor any indication that a pump was installed. The pump installation permit for this well expired on January 29, 1995. A new pump installation permit application should be submitted to the Commission, and subsequent pump installation work shall not proceed until a new pump installation permit is issued.

A copy of the DOH Engineering report shall also be submitted to the Commission for review.

If there are any questions, please contact Ryan Imata at...
PUMP INSTALLATION PERMIT

for

Kohanaiki-Nansay Well 2
Well No. 4458-02
Kau, North Kona, Hawaii

TO: Nansay Hawaii, Inc.
P.O. Box 111222
Kamuela, HI 96743-0020

In accordance with the Department of Land and Natural Resources Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", your application to install a pump in Kohanaiki-Nansay Well 2 (Well No. 4458-02) for private/municipal use is approved subject to the following conditions:

1. The Commission on Water Resource Management (Commission), P.O. Box 621, Honolulu, HI 96809, shall be notified in writing before any work covered by this permit commences.

2. The permit shall be for installation of a 700 gpm capacity pump in the well.

3. 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 the well shall not constitute a determination of correlative water rights. The permittee is 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.

4. The applicant shall provide and maintain an approved meter or other appropriate device or means for measuring and reporting total water usage. Water usage shall be measured on a monthly basis and reported to the Commission.
5. The following shall be submitted to the Commission staff within 30 days after completion of the work:
   a. Well Completion Report.
   b. As-built sectional drawing of the installed pump.

6. The applicant shall comply with all applicable laws, rules, and ordinances.

7. This permit may be revoked if work is not started within six months of the date of issuance or if work is suspended or abandoned for six months. The work proposed in the permit application shall be completed within two years from the date of permit issuance.

8. The well will be turned over to the Hawaii Department of Water Supply for operation and maintenance.

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.

Applicant's Signature: ___________________________ Date: ______________

Printed Name: _____________________________

Firm or Title: ___________________________

Please sign and return one copy of this permit to the Commission and retain a copy for your record.

Enc. (Well Completion form)

c: USGS
   Department of Health
   Safe Drinking Water Branch
   Ground Water Protection Program
   Hawaii Department of Water Supply
November 17, 1992

Ms. Rae M. Loui  
Deputy Director  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
P. O. Box 621  
Honolulu, Hawaii  96809

RE: PERMIT APPLICATIONS  
FOR NANSAY HAWAII, INC. - WEST HAWAII

WELL CONSTRUCTION PERMITS  
Kalaoa - Nansay Well (Well No. 4358-02)  
Puako Well 4 (No. 5748-01)  
Puako Well 5 (No. 5648-04)  
Puako Well 6 (No. 5549-02)  
North Waiaha - Nansay (No. 3857-02)  
O'oma Mauka - Nansay (No. 4258-02)

PUMP INSTALLATION PERMITS  
Kohanaiki Well 1 (No. 4458-01)  
Kohanaiki Well 2 (No. 4458-02)

Dear Ms. Loui:

I am responding to your letter of October 21, 1992, regarding the status of our projects in the North Kona and South Kohala Districts of Hawaii Island.

We share your concern for the fair and equitable distribution of the water resources in this region. We are committed to work with the County of Hawaii, State of Hawaii and regional land owners to develop a regional water plan that meets everyone's short term and long term needs. We have been actively involved with the above mentioned groups to develop such plans and are confident that we can find an equitable solution.
Enclosed is a project summary for our projects in this region. We have included project descriptions, timetables, entitlement progress and projected water needs for each.

We would welcome the opportunity to review this information with you and your staff at your convenience.

Very truly yours,

Thomas H. Yamamoto, P.E.
Chief Operating Officer

THY/lo

attachments
KOHANAIKI:  470 acre resort site in North Kona
3 hotel sites - 1500 units
1 golf course
510 condominium units
380 single-family units
1.76 mgd potable water requirement
1.0 mgd irrigation brackish water will be supplied
by the O’oma wells

We are awaiting a decision by the Intermediate Court of Appeals on the validity of our SMA permit. We expect to begin infrastructure construction in mid-1993 with the first hotel (800 rooms) being completed in 1996. Phase I will also include 380 single-family units and 330 multi-family units.
Ka'u (North Kona)

This 1,000 acre project will be developed incrementally with an 82-lot subdivision (3-acre ag) beginning in late 1993.

The next 500 acre increment will be developed into 2,000 affordable units with construction to begin in mid-1994. It will be developed incrementally with 100 - 200 units per year. Based on our projections, we will need 500,00 gpd for the Ag lots and 1.2 mgd for the housing units.

The Ag lots are already zoned and we are going through the subdivision work at this time.

The affordable housing will require approximately 1.2 million gallons per day starting with 120,000 gpd in 1994. We plan to submit applications for State Land Use boundary amendment and county zoning in 1993. Given that this will be a 100 percent affordable housing project we anticipate that the LUC and the county will provide expedited processing. Subdivision processing will commence in 1994 with units on line late in 1994.

Our future plans include urbanization of the 225 acres of land currently in the conservation district at the bottom of this property. Although we do not have detailed plans for this development we expect to include a mix of urban uses. Water requirements are expected to be substantial though we do not have any figures to present at this time.

In order for this processing schedule to be attained we will need to secure pump installation permits for our Kau wells in early 1993 so that we can commit to the design expenditures, order the pumps and have installation in a timely manner.

Please note that for both Kau and Kohanaiki we will be integrating into the DWS system and therefore we are working with them on an agreement for integration. We do expect that the agreement will require that we provide the DWS system with additional water over and above what we use.
Puako: 3,000 acres (2,000 Ag District, 1,000 Urban) 6 golf course Use Permits (approved 1991) 2,658 units - single and multi-family (re-zoning to be completed by 1/93)

We presently have 3 well permits for brackish irrigation wells. The three pending well permits at Puako are to irrigate the remaining three golf courses. The projected need for the six golf courses is 6.16 mgd.

We anticipate construction of the first golf course to begin in 1993 with one additional course every two years. Golf course construction should be completed by 2004. We need to secure our water resources to ensure the entire build-out of the project will support the up-front infrastructure costs.

The potable water for the 2,658 units is intended to come from our previously permitted Ouli wells. We project an average demand of 1.3 mgd with a maximum/day requirement of 1.90 mgd. The first units will come on line in 1995. Market absorption is projected at 125-150 units per year with total build out in 20 years.

Bulk land sales of one or more of the villages could accelerate this process and would require an early commitment of a guaranteed water resource.
November 17, 1992

Ms. Rae M. Loui  
Deputy Director  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
P. O. Box 621  
Honolulu, Hawaii  96809

RE: PERMIT APPLICATIONS  
FOR NANSAY HAWAII, INC. - WEST HAWAII

WELL CONSTRUCTION PERMITS  
PUMP INSTALLATION PERMITS

Kalaoa - Nansay Well (Well No. 4358-02)  
Puako Well 4 (No. 5748-01)  
Puako Well 5 (No. 5648-04)  
Puako Well 6 (No. 5549-02)  
North Waiaha - Nansay (No. 3857-02)  
O'oma Mauka - Nansay (No. 4258-02)  
Kohanaiki Well 1 (No. 4458-01)  
Kohanaiki Well 2 (No. 4458-02)

Dear Ms. Loui:

I am responding to your letter of October 21, 1992, regarding the status of our projects in the North Kona and South Kohala Districts of Hawaii Island.

We share your concern for the fair and equitable distribution of the water resources in this region. We are committed to work with the County of Hawaii, State of Hawaii and regional land owners to develop a regional water plan that meets everyone's short term and long term needs. We have been actively involved with the above mentioned groups to develop such plans and are confident that we can find an equitable solution.
Enclosed is a project summary for our projects in this region. We have included project descriptions, timetables, entitlement progress and projected water needs for each.

We would welcome the opportunity to review this information with you and your staff at your convenience.

Very truly yours,

Thomas H. Yamamoto, P.E.
Chief Operating Officer

THY/lo

attachments
KOHANA IKI: 470 acre resort site in North Kona
3 hotel sites - 1500 units
1 golf course
510 condominium units
380 single-family units
1.76 mgd potable water requirement
1.0 mgd irrigation brackish water will be supplied by the O'oma wells

We are awaiting a decision by the Intermediate Court of Appeals on the validity of our SMA permit. We expect to begin infrastructure construction in mid-1993 with the first hotel (800 rooms) being completed in 1996. Phase I will also include 380 single-family units and 330 multi-family units.
WELLS  
(Nos. 4458-01; 4458-02)

Ka‘u (North Kona)

This 1,000 acre project will be developed incrementally with an 82-lot subdivision (3-acre ag) beginning in late 1993.

The next 500 acre increment will be developed into 2,000 affordable units with construction to begin in mid-1994. It will be developed incrementally with 100 - 200 units per year. Based on our projections, we will need 500,00 gpd for the Ag lots and 1.2 mgd for the housing units.

The Ag lots are already zoned and we are going through the subdivision work at this time.

The affordable housing will require approximately 1.2 million gallons per day starting with 120,000 gpd in 1994. We plan to submit applications for State Land Use boundary amendment and county zoning in 1993. Given that this will be a 100 percent affordable housing project we anticipate that the LUC and the county will provide expedited processing. Subdivision processing will commence in 1994 with units on line late in 1994.

Our future plans include urbanization of the 225 acres of land currently in the conservation district at the bottom of this property. Although we do not have detailed plans for this development we expect to include a mix of urban uses. Water requirements are expected to be substantial though we do not have any figures to present at this time.

In order for this processing schedule to be attained we will need to secure pump installation permits for our Kau wells in early 1993 so that we can commit to the design expenditures, order the pumps and have installation in a timely manner.

Please note that for both Kau and Kohanaiki we will be integrating into the DWS system and therefore we are working with them on an agreement for integration. We do expect that the agreement will require that we provide the DWS system with additional water over and above what we use.
Puako: 3,000 acres (2,000 Ag District, 1,000 Urban)  
6 golf course Use Permits (approved 1991)  
2,658 units - single and multi-family  
(re-zoning to be completed by 1/93)

We presently have 3 well permits for brackish irrigation wells. The three pending well permits at Puako are to irrigate the remaining three golf courses. The projected need for the six golf courses is 6.16 mgd.

We anticipate construction of the first golf course to begin in 1993 with one additional course every two years. Golf course construction should be completed by 2004. We need to secure our water resources to ensure the entire build-out of the project will support the up-front infrastructure costs.

The potable water for the 2,658 units is intended to come from our previously permitted Ouli wells. We project an average demand of 1.3 mgd with a maximum/day requirement of 1.90 mgd. The first units will come on line in 1995. Market absorption is projected at 125 - 150 units per year with total build out in 20 years.

Bulk land sales of one or more of the villages could accelerate this process and would require an early commitment of a guaranteed water resource.
October 16, 1992

MEMORANDUM FOR THE RECORD

FROM: Glenn Bauer

SUBJECT: Water Level Measurements in Kona

Mitch Ohye and I measured water levels in six Kona wells on October 15. All measurements were done between 10:15 a.m. and 2:40 p.m. We had intended to measure water levels at two Keauhou irrigation wells before 10, however, finding the wells in the dense undergrowth proved to be more difficult than anticipated. Therefore, we focused our survey to wells in the Kalaoa to Kukio area.

We met Keith Kato of Nansay and Steve Bowles of Waimea Water Services to assist in measuring the deep Kohanaiki Wells of Nansay. After completing these wells, Steve helped us to locate the State's Kalaoa Irrigation Well. The well was found and the head measured after a half hour of looking through the underbrush. We then looked for the County's Pahoehoe well. Steve pointed out where it is located, but we will wait until the County DWS can help us with the measurement. We then measured the three Kukio Irrigation wells at 590± feet msl. This was the first time the heads in these wells were measured within a half hour of each other.

Below is a summary of the water level data collected:

<table>
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<tr>
<th>Well</th>
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<th>Water Level (ft, msl)</th>
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TO: Ed Sakoda, Div of Water Resource Management

FROM: Dan Lum

MESSAGE:

Here's the Pumping Test Record for Kau Well 2 (4468-02) for your information and files.
**PUMPING TEST RECORD**  
Kau Well 2, North Kona, Hawaii  
State Well No. 8-4458-02

Test Date: July 15-19, 1991

**DEPTHS (Below Ground Surface):**  
- Solid Csg: 1810 ft.  
- Perforated Csg: 1850 ft.  
- Total Depth: 1880 ft.  
- Depth to Water: __

**ELEVATIONS (Mean Sea Level):**  
- Ground Surface: 1799.8 ft.  
- Bottom of Solid Csg: -10 ft.  
- Bottom of Perf. Csg: -50 ft.  
- Bottom of Well: -80 ft.  
- Static Water Level: 14.94 ft. *

**TEST PUMP:** Line Shaft  
- Intake Elev: -36.4 ft.

**DISCHARGE MEASUREMENT:** Flowmeter

<table>
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<tr>
<th>Time</th>
<th>Pumping Rate (gpm)</th>
<th>Flowmeter Reading (ft)</th>
<th>Over/Under Fall (ft)</th>
<th>Sample No.</th>
<th>Chlorides (ppm)</th>
<th>Temp (°F)</th>
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| 9:00     | START PUMP - ADJUST RATE TO 500 gpm
| 9:15     | 546                | 13.70                  | 0.23                |            |                 |           |
| 9:22     | 545                | 13.70                  | 0.23                |            |                 |           |
| 9:39     | 732                | 13.60                  | 0.46                |            |                 |           |
| 9:44     | 735                | 13.60                  | 0.46                |            |                 |           |
| 9:57     | 732                |                        |                      |            |                 |           |
| 10:00    | 1002               | 13.35                  | 1.08                | 1          | 9               |           |
| 10:20    | 997                | 13.35                  | 1.03                |            |                 |           |
| 11:00    | 995                | 13.30                  | 1.18                |            |                 |           |
| 11:22    | 998                | 13.30                  | 1.16                |            |                 |           |
| 12:00 N  | 1006               | 13.25                  | 1.27                | 2          | 0               |           |
| 1:00 pm  | 995                | 13.25                  | 1.27                | 78.0       |                 |           |
| 2:00     | 996                | 12.25                  | 1.27                | 3          | 9               |           |
| 3:00     | 995                | 13.20                  | 1.38                |            |                 |           |
| 4:00     | 997                | 13.20                  | 1.39                | 4          | 9               |           |
| 5:00     | 995                | 13.20                  | 1.39                |            |                 |           |
| 6:00     | 1003               | 13.20                  | 1.39                | 5          | 9               |           |
| 7:00     | 1003               | 13.05                  | 1.73                |            |                 |           |
| 8:00     | 1002               | 13.20                  | 1.39                | 6          | 9               |           |

*Measured by WRI logger, 3/11/91

Water Resource Associates
### Pumping Test Record (Continued)

**Kau Wall 2, North Kona, Hawaii**

**Test Date:** July 15-19, 1991

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## Pumping Test Record (Continued)

**Kau Well 2, North Kona, Hawaii**

**Test Date:** July 15-16, 1991

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Pumping Test Record (Continued)
Kaua'i Well 2, North Kona, Hawaii
Test Date: July 15-19, 1991

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Kau Well 2, North Kona, Hawaii

Test Date: July 16-19, 1991

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Pumping Test Record (Continued)
Kau Well 2, North Kona, Hawaii
Test Date: July 15-19, 1991

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| 6:42    |              | 13.65          | 0.15     |        |           |       |
| 6:50    |              | 13.65          | 0.15     |        |           |       |
| 6:00    |              | 13.65          | 0.16     |        |           |       |
| 7-23-91 |              |                |          |        |           |       |
| 7:00 am |              | 13.60          | 0.0      |        |           |       |
A. STATE WELL NO. 4458-02  
B. LOCATION North Kona  
C. WELL OWNER Nanay Hawaii Inc.  
D. DRILLING OR PUMP INSTALLATION CONTRACTOR Water Resources International, Inc.  
E. TYPE OF RIG Spencer Harris Rotary  
F. DATE OF WELL COMPLETION 08/05/91  
G. GROUND ELEVATION (m) 1799.84 ft.  
H. TOTAL DEPTH OF WELL BELOW GROUND 1850 ft.  
I. HOLE SIZE: 24 in.  
J. CASING INSTALLED: 18 in. I.D. x 3/8 in. wall solid section to 1810 ft. below ground, 18 in. I.D. x 5/16 in. wall perforated section to 1850 ft. below ground  
K. ANNULUS: Grouted from 0 ft. to 1780 ft. below ground  
L. PERMANENT PUMP INSTALLATION: Gravel packed from 1780 ft. to 1790 ft. below ground  
M. PROPOSED USE  
N. INITIAL WATER LEVEL 1785 ft. below ground.  
O. INITIAL CHLORIDE 15 ppm  
P. PUMPING TESTS: Reference point (R.P.) used: which elevation is ft.  
Q. DRILLER'S LOG:  

<table>
<thead>
<tr>
<th>Depth, ft.</th>
<th>Rock Description &amp; Remarks</th>
<th>Water Level, ft.</th>
<th>Depth, ft.</th>
<th>Rock Description &amp; Remarks</th>
<th>Water Level, ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 22</td>
<td>Hard, black lava rock</td>
<td></td>
<td>1833 to 1880</td>
<td>Med. soft gray &amp; red</td>
<td>porous lava rock</td>
</tr>
<tr>
<td>22 to 161</td>
<td>Med. black lava w/ red cinders</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>161 to 205</td>
<td>Hard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>205 to 806</td>
<td>Med. red/brown cinder mix</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>806 to 935</td>
<td>Dense Formation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>935 to 1259</td>
<td>Clinkery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1259 to 1474</td>
<td>Dense Formation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1474 to 1624</td>
<td>Med. gray/white lava rock</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1624 to 1644</td>
<td>Med. soft cinder mix</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1644 to 1740</td>
<td>Dense Formation</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1740 to 1833</td>
<td>Med. hard, porous lava rock</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REMARKS:  

Submitted by (print) Kathy Watanabe
Signature  

Data  

Title Secretary  

Date October 30, 1991
Mr. Tom Yamamoto  
Nansay Hawaii, Inc.  
P.O. Box 111222  
Kamuela, HI 96743-0020

Dear Mr. Yamamoto:

Permit Applications for Nansay Wells

We are continuing our review of your applications for the following wells:

- Kalaoa-Nansay Well (Well No. 4358-02)
- Puako Well 4 (Well No. 5748-01)
- Puako Well 5 (Well No. 5648-04)
- Puako Well 6 (Well No. 5549-02)
- Kohanaiki Wells 1 2 (Well Nos. 4458-01 & 02)

We will let you know when your applications are scheduled for action by the Commission on Water Resource Management.

Sincerely,

[Signature]

MANABU TAGOMORI  
Deputy Director

ES:bm  
Enc.  
c: Water Resource Associates
Mr. Thomas K. Kaulukukui, Sr.
Page 2

Should you have any questions, please contact Manabu Tagomori, Deputy Director at [Contact Information]

Very truly yours,

[Signature]

WILLIAM W. PATY

Enc.
The Honorable William W. Paty, Chairperson  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
P.O. Box 621  
Honolulu, Hawaii 96809  

Dear Mr. Paty:  

SUBJECT: WELL CONSTRUCTION AND PUMP INSTALLATION PERMIT APPLICATION  
KOHANAIKI WELL NOS. 1 AND 2  
STATE WELL NOS. 4458-01 AND -02  
KAU, NORTH KONA, HAWAII  

Thank you for the opportunity to review and comment on the subject document. We have examined the application and have the following comments to offer:  

1. The application indicates that the subject well will be for municipal use. If the well is to serve 25 or more individuals at least 60 days per year or will have a minimum of 15 service connections, the applicant will be required to comply with the Department's Administrative Rules, Title 11, Chapter 20, "Potable Water Systems."  

2. Section 11-20-29 of Chapter 20 requires that a new source of potable water serving a public water system be approved by the Director of Health prior to its use. Such an approval is based primarily upon the submission of a satisfactory engineering report which addresses the requirements set in Section 11-20-29.  

3. The proposed well is situated above the Underground Injection Control (UIC) line. Land areas above the UIC line are considered to contain underground sources of drinking water. Thus, it is essential that the well be designed and constructed to prevent the possibility of groundwater contamination. For example, the well should have a concrete well pad and full grouting to prevent seepage or floodwaters from migrating down the well shaft.
4. The operation of the well should not be allowed to adversely affect the water quality of nearby wells. The map accompanying the application indicates that there are a number of wells in the area.

If you should have any questions, please contact the Safe Drinking Water Branch at [redacted]

Sincerely,

[Signature]

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

SY:la
cc: Thomas Yamamoto
Nansay Hawaii, Inc.
P.O. Box 111222
Kamuela, Hawaii 96743-0020
The Honorable William W. Paty, Chairperson  
Commission on Water Resource Management  
Department of Land and Natural Resources  
P. O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Paty:

Well Construction and Pump Installation Applications  
Stream Alteration Permit

Thank you for the opportunity to comment on the following permit applications:

✓ Kohanaiki 1 & 2 (4458-01, 02) Well and Pump  
Puako 4-6 (5748-01, 5648-04, 5549-02) Well and Pump  
HCEOC-Milolii (1154-01) Well and Pump  
DHL-L-Kawaihae (6448-02) Exploratory Well  
Fern Grotto 2 (0221-02) Well  
Anahola C (0818-03) Well and Pump  
Moloka'i Golf 1 & 2 (0901-02, 1001-02) Well and Pump  
Naiwa-Ciba/Geigy Irrigation (0705-05) Pump  
and Kihei Gulch No. 2 Stream Alteration Permit

Our comments are directed to two projects with positive impact on Hawaiian home lands -- Kawaihae and Anahola wells; and the Moloka'i Golf resubmittal, for which we prepared comments at an earlier time.

The Kawaihae Well is being drilled and tested for the Department of Hawaiian Home Lands by the Division of Water Resource Management; it will directly benefit new native Hawaiian lessees at Kawaihae, a major anticipated growth area and development priority. We anticipate potable results from the well testing, and request your approval of this project.

The Anahola Well will supplement the system on Hawaiian home lands in Anahola operated by Kaua'i County, which serves
Hawaiian homesteaders and other members of this old community. The system is currently at capacity. Anahola is the Department's primary development area on the island of Kaua'i. We request your approval of this project.

The Moloka'i Golf resubmittal appears to be the same as the previous request, and we are attaching our prior comments, which are still relevant. That letter requests the project be denied.

The other captioned projects do not affect Hawaiian home lands, and we do not have comments at this time.

Warmest aloha,

Hoailuku L. Duke, Chairman
Hawaiian Homes Commission

HLD:DCY:CI
May 2, 1991

MR MANABU TAGOMORI  DEPUTY DIRECTOR
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P O BOX 621
HONOLULU HI  96809

SUBJECT:  WELL CONSTRUCTION PERMIT APPLICATION

We have reviewed the subject permit application and have no objections to the following proposed wells being constructed.

1. Kohanaiki 1, Well No. 4458-01
   TMK: 7-2-5: 1

2. Kohanaiki 2, Well No. 4458-02
   TMK: 7-2-5: 1

3. Puako 4, Well No. 5748-01
   TMK: 6-8-01: 36

4. Puako 5, Well No. 5648-04
   TMK: 6-8-01: 36

5. Puako 6, Well No. 5549-02
   TMK: 6-8-01: 36

6. HCEOC-Milolii, Well No. 1154-01
   TMK: 8-9-4: por. 8

7. DHHL-Kawaihane Expl., Well No. 6448-02
   TMK: 6-1-01: 3

ROBERT H. YANABU, Division Chief
Engineering Division

CKY:byf
MEMORANDUM

TO: Manabu Tagomori, Deputy Director
Commission on Water Resource Management

FROM: Don Hibbard, Administrator
State Historic Preservation Division

SUBJECT: Well and Pump Installation Permit -- Pump Installation for Existing Kohanaiki Wells (Nansay Hawaii, Inc.)
Well Nos 4458-01 & -02
Kau, North Kona, Hawaii
TMK: 7-2-05

HISTORIC PRESERVATION PROGRAM CONCERNS:

We believe that installation of a pump in this existing well will have "no effect" on historic sites because it will apparently cause no additional disturbance of the surrounding ground surface.

If you have any questions about this review, please call Holly McEldowney at [redacted]
Hawaiian homesteaders and other members of this old community. The system is currently at capacity. Anahola is the Department's primary development area on the island of Kaua'i. We request your approval of this project.

The Moloka'i Golf resubmittal appears to be the same as the previous request, and we are attaching our prior comments, which are still relevant. That letter requests the project be denied.

The other captioned projects do not affect Hawaiian home lands, and we do not have comments at this time.

Warmest aloha,

[Signature]
Hoalikau L. Drake, Chairman
Hawaiian Homes Commission

HLD:DCY:CI
May 2, 1991

MR MANABU TAGOMORI  DEPUTY DIRECTOR
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P O BOX 621
HONOLULU HI  96809

SUBJECT:  WELL CONSTRUCTION PERMIT APPLICATION

We have reviewed the subject permit application and have no objections to the following proposed wells being constructed.

1. Kohanaiki 1, Well No. 4458-01
   TMK: 7-2-5: 1

2. Kohanaiki 2, Well No. 4458-02
   TMK: 7-2-5: 1

3. Puako 4, Well No. 5748-01
   TMK: 6-8-01: 36

4. Puako 5, Well No. 5648-04
   TMK: 6-8-01: 36

5. Puako 6, Well No. 5549-02
   TMK: 6-8-01: 36

6. HCEOC-Milolii, Well No. 1154-01
   TMK: 8-9-4: por. 8

7. DHHL-Kawaihae Expl., Well No. 6448-02
   TMK: 6-1-01: 3

ROBERT Y. YANABU, Division Chief
Engineering Division

CKY:bf
Mr. William Sewake, Manager  
Department of Water Supply  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720  

Dear Mr. Sewake,  

Well Construction and Pump Installation Permit Application(s)  

Transmitted for your review and comment is a copy of the following permit application(s):  

<table>
<thead>
<tr>
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Please review the application(s) pursuant to your area of concern and submit your comments to us, orally or in writing, by ten (10) working days from date of letter.  

Should you have any questions, please contact our Regulation Branch at [Contact Information].  

Sincerely,  

[Signature]  
MANABU TAGOMORI  
Deputy Director  

NF:bm  
Enc.
Mr. Bruce C. McClure  
Chief Engineer  
Department of Public Works  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

Dear Mr. McClure:

Well Construction and Pump Installation Permit Application(s)

Transmitted for your review and comment is a copy of the following permit application(s):

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Should you have any questions, please contact our Regulation Branch at\

Sincerely,

MANABU TAGOMORI  
Deputy Director

NF:bm
Enc.
Honorable John C. Lewin, M.D.
Director
Department of Health
State of Hawaii
1250 Punchbowl Street
Honolulu, Hawaii 96813

Attn: Mr. William Wong, Drinking Water Branch

Dear Dr. Lewin:

Well Construction and Pump Installation Permit Application(s)

Transmitted for your review and comment is a copy of the following permit application(s):

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<tr>
<td>Molokai</td>
<td>Molokai Golf 1</td>
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Please review the application(s) pursuant to your area of concern and submit your comments to us, orally or in writing, by ten (10) working days from date of letter.
Should you have any questions, please contact Manabu Tagomori, Deputy Director at

Very truly yours,

WILLIAM W. PATY

Enc.
Mr. Thomas K. Kaulukukui, Sr.
Chairman & Trustee-At-Large
Office of Hawaiian Affairs
1600 Kapiolani Blvd., Suite 1500
Honolulu, Hawaii 96814

Attn: Ms. Linda Delaney, Land & Natural Resources Division

Dear Mr. Kaulukukui:

Well Construction and Pump Installation Permit Application(s)

Transmitted for your review and comment is a copy of the following permit application(s):

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Please review the application(s) pursuant to your area of concern and submit your comments to us, orally or in writing, by ten (10) working days from date of letter.
Honorable Hoaliku L. Drake  
Director  
Department of Hawaiian Home Lands  
State of Hawaii  
P.O. Box 1879  
Honolulu, Hawaii 96805  

Dear Mrs. Drake:

Well Construction and Pump Installation Permit Application(s)

Transmitted for your review and comment is a copy of the following permit  
application(s):

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comments to us, orally or in writing, by ten (10) working days from date of letter.
Honorable Hoaliku L. Drake
Page 2

Should you have any questions, please contact Manabu Tagomori, Deputy Director at [redacted]

Very truly yours,

[Signature]

WILLIAM W. PATY

Enc.
Mr. Thomas Yamamoto  
Nansay Hawaii Inc.  
P.O. Box 111222  
Kamuela, Hawaii 96743-0020

Dear Mr. Yamamoto:

We have received your applications and filing fees for permits to construct and/or install a pump in the following wells:

<table>
<thead>
<tr>
<th>ISLAND</th>
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We are reviewing the applications for completeness.

Should you have questions, please call the Regulation Branch of the Division of Water Resource Management at [redacted].

Sincerely,

[Signature]

MANABU TAGOMORI  
Deputy Director

NF:bm
Honorable Hoaliku L. Drake
Director
Department of Hawaiian Home Lands
State of Hawaii
P.O. Box 1879
Honolulu, Hawaii 96805

Dear Mrs. Drake:

Well Construction and Pump Installation Permit Application(s)

Transmitted for your review and comment is a copy of the following permit application(s):

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Please review the application(s) pursuant to your area of concern and submit your comments to us, orally or in writing, by ten (10) working days from date of letter.
Honorable Hoaliku L. Drake

Page 2

Should you have any questions, please contact Manabu Tagomori, Deputy Director at [redacted]

Very truly yours,

[Signature]

WILLIAM W. PATY

Enc.
Mr. Thomas K. Kaulukukui, Sr.
Chairman & Trustee-At-Large
Office of Hawaiian Affairs
1600 Kapiolani Blvd., Suite 1500
Honolulu, Hawaii  96814

Attn: Ms. Linda Delaney, Land & Natural Resources Division

Dear Mr. Kaulukukui:

Well Construction and Pump Installation Permit Application(s)

Transmitted for your review and comment is a copy of the following permit application(s):

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Please review the application(s) pursuant to your area of concern and submit your comments to us, orally or in writing, by ten (10) working days from date of letter.
Mr. Thomas K. Kaulukukui, Sr.
Page 2

Should you have any questions, please contact Manabu Tagomori, Deputy Director at [redacted]

Very truly yours,

WILLIAM W. PATY

Enc.
Honorable John C. Lewin, M.D.
Director
Department of Health
State of Hawaii
1250 Punchbowl Street
Honolulu, Hawaii 96813

Attn: Mr. William Wong, Drinking Water Branch

Dear Dr. Lewin:

Well Construction and Pump Installation Permit Application(s)

Transmitted for your review and comment is a copy of the following permit application(s):

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Please review the application(s) pursuant to your area of concern and submit your comments to us, orally or in writing, by ten (10) working days from date of letter.
Should you have any questions, please contact Manabu Tagomori, Deputy Director at

Very truly yours,

WILLIAM W. PATY

Enc.
Mr. William Sewake, Manager  
Department of Water Supply  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720  

Dear Mr. Sewake,

Well Construction and Pump Installation Permit Application(s)

Transmitted for your review and comment is a copy of the following permit application(s):

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Should you have any questions, please contact our Regulation Branch at [Redacted].

Sincerely,

[Signature]

MANABU TAGOMORI  
Deputy Director

NF:bm  
Enc.
Mr. Bruce C. McClure  
Chief Engineer  
Department of Public Works  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

Dear Mr. McClure:

Well Construction and Pump Installation Permit Application(s)

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Should you have any questions, please contact our Regulation Branch at [Contact Information]

Sincerely,

[Signature]

MANABU TAGOMORI  
Deputy Director  

NF:bm  
Enc.
MEMORANDUM

TO: Don Hibbard, Director
    Historic Preservation Program

FROM: Manabu Tagomori, Deputy Director
    Commission on Water Resource Management

SUBJECT: Well Construction and Pump Installation Permit Application(s)

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Please review the application(s) pursuant to your area of concern and submit your comments to us, orally or in writing, by ten (10) working days from date of letter.

Should you have any questions, please contact our Regulation Branch at [Contact Information].

NF:bm
Enc.
Mr. Thomas Yamamoto  
Nansay Hawaii Inc.  
P.O. Box 111222  
Kamuela, Hawaii 96743-0020

Dear Mr. Yamamoto:

We have received your applications and filing fees for permits to construct and/or install a pump in the following wells:

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We are reviewing the applications for completeness.

Should you have questions, please call the Regulation Branch of the Division of Water Resource Management at **[redacted]**

Sincerely,

[Signature]

MANABU TAGOMORI  
Deputy Director

NF:bm
MEMORANDUM

TO: Don Hibbard, Director
   Historic Preservation Program

FROM: Manabu Tagomori, Deputy Director
      Commission on Water Resource Management

SUBJECT: Well Construction and Pump Installation Permit Application(s)

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Should you have any questions, please contact our Regulation Branch at

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Enc.
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<th>Depth Interval (ft.)</th>
<th>Description</th>
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<tbody>
<tr>
<td>0-160</td>
<td>No sample collected</td>
</tr>
<tr>
<td>160-180</td>
<td>Mixture of gray and dark gray aphyric aa</td>
</tr>
<tr>
<td>180-190</td>
<td>Same as above, except dark gray aa clinker present</td>
</tr>
<tr>
<td>190-200</td>
<td>Mixture of brown and gray aa clinker</td>
</tr>
<tr>
<td>200-210</td>
<td>No sample collected</td>
</tr>
<tr>
<td>210-220</td>
<td>Unweathered brownish-gray aa</td>
</tr>
<tr>
<td>220-240</td>
<td>No sample collected</td>
</tr>
<tr>
<td>240-250</td>
<td>Sand size gray-red cuttings, minor amount of plagioclase feldspar present</td>
</tr>
<tr>
<td>260-290</td>
<td>Olivine-rich reddish sand size cuttings--aa (?)</td>
</tr>
<tr>
<td>290-300</td>
<td>Vitreous dark gray-red sand size cuttings, some olivine present</td>
</tr>
<tr>
<td>300-320</td>
<td>Same as above, except not vitreous</td>
</tr>
<tr>
<td>320-330</td>
<td>Mixture of dark gray-red aa clinker and dense gray-red aphyric aa</td>
</tr>
<tr>
<td>330-350</td>
<td>Dense gray aphyric aa</td>
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<tr>
<td>350-390</td>
<td>Mixture of dense gray aphyric aa and brown aa clinker</td>
</tr>
<tr>
<td>390-400</td>
<td>Dark gray feldspar-phyric aa, phenocrysts 1-2 mm long</td>
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<tr>
<td>400-410</td>
<td>Gray aa with minor plagioclase phenocrysts</td>
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<tr>
<td>Interval</td>
<td>Description</td>
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<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
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<tr>
<td>410-430</td>
<td>Mixture of gray aa with minor plagioclase phenocrysts and brown scoriaceous pahoehoe</td>
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<tr>
<td>430-440</td>
<td>Dense gray aa with minor plagioclase phenocrysts</td>
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<td>440-490</td>
<td>Mixture of dense gray aa with minor plagioclase phenocrysts and brown scoriaceous pahoehoe</td>
</tr>
<tr>
<td>490-510</td>
<td>Gray scoriaceous pahoehoe with plagioclase phenocrysts</td>
</tr>
<tr>
<td>510-520</td>
<td>Same as above, except brown pahoehoe also included</td>
</tr>
<tr>
<td>520-620</td>
<td>No sample collected</td>
</tr>
<tr>
<td>620-630</td>
<td>Gray sand size cuttings</td>
</tr>
<tr>
<td>630-660</td>
<td>Brown pahoehoe with minor olivine phenocrysts</td>
</tr>
<tr>
<td>660-680</td>
<td>Mixture of dark red-gray aa and dense gray aa containing minor olivine phenocrysts</td>
</tr>
<tr>
<td>680-690</td>
<td>Gray vesicular aphyric aa</td>
</tr>
<tr>
<td>690-710</td>
<td>Mixture of dense dark gray and medium gray aphyric aa</td>
</tr>
<tr>
<td>710-730</td>
<td>Sand size red-gray aa (?)-- minor olivine present</td>
</tr>
<tr>
<td>730-750</td>
<td>Vitreous sand size cuttings</td>
</tr>
<tr>
<td>750-760</td>
<td>Dark gray vesicular aa and aa clinker with limonite covering surfaces</td>
</tr>
<tr>
<td>760-790</td>
<td>Mixture of dense dark gray aa containing olivine phenocrysts and gray vesicular aa clinker</td>
</tr>
<tr>
<td>790-800</td>
<td>Mixture of dense gray aphyric aa and vesicular brown aa clinker</td>
</tr>
<tr>
<td>800-810</td>
<td>Same as above, except some clinker is vitreous</td>
</tr>
<tr>
<td>Time Interval</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>810-820</td>
<td>Dark gray sand size cuttings, some larger pieces of dense gray aphyric aa</td>
</tr>
<tr>
<td>820-830</td>
<td>Vesicular gray aa with minor phenocrysts of olivine and plagioclase</td>
</tr>
<tr>
<td>830-850</td>
<td>Sand size dark gray cuttings—aa (?) some plagioclase phenocrysts</td>
</tr>
<tr>
<td>850-870</td>
<td>Dark gray vitreous pahoehoe with minor altered olivine phenocrysts—glass lining vesicles</td>
</tr>
<tr>
<td>870-890</td>
<td>Gray pahoehoe with minor plagioclase phenocrysts</td>
</tr>
<tr>
<td>890-900</td>
<td>Sand size red-gray cuttings with minor plagioclase phenocrysts</td>
</tr>
<tr>
<td>900-910</td>
<td>Dense gray aa with minor plagioclase phenocrysts</td>
</tr>
<tr>
<td>910-920</td>
<td>Dense gray aphyric aa</td>
</tr>
<tr>
<td>920-930</td>
<td>No sample collected</td>
</tr>
<tr>
<td>930-950</td>
<td>Dense gray aphyric aa</td>
</tr>
<tr>
<td>950-</td>
<td>Vesicular red-brown aphyric aa</td>
</tr>
<tr>
<td></td>
<td>Dark gray slightly vesicular aphyric aa</td>
</tr>
<tr>
<td>1000-1010</td>
<td>Dense dark gray aa with minor olivine phenocrysts</td>
</tr>
<tr>
<td>1010-1030</td>
<td>Dark gray aphyric aa</td>
</tr>
<tr>
<td>1030-1040</td>
<td>Mixture of dense gray aphyric aa and dark gray aphyric pahoehoe</td>
</tr>
<tr>
<td>1040-1050</td>
<td>No sample collected</td>
</tr>
<tr>
<td>1050-1070</td>
<td>Dark gray aa and aa clinker</td>
</tr>
<tr>
<td>1070-1080</td>
<td>Gray aphyric aa, some cuttings are vesicular</td>
</tr>
<tr>
<td>Time</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>1080-1100</td>
<td>Same as above, except aa is dark gray</td>
</tr>
<tr>
<td>1100-1150</td>
<td>Dark gray aa with minor plagioclase phenocrysts &lt; 1 mm long</td>
</tr>
<tr>
<td>1150-1160</td>
<td>Mixture of dense dark gray aphyric aa and brown vesicular pahoehoe</td>
</tr>
<tr>
<td>1160-1170</td>
<td>Brown scoriaceous pahoehoe, sample also contains minor amount of dense aa</td>
</tr>
<tr>
<td>1170-1180</td>
<td>Same as above, except orange-red scoriaceous cinder present</td>
</tr>
<tr>
<td>1180-1190</td>
<td>Dense dark gray aphyric aa</td>
</tr>
<tr>
<td>1190-1220</td>
<td>Mixture of brown aphyric aa and dense gray</td>
</tr>
<tr>
<td>1220-1230</td>
<td>Same as above, except brown pahoehoe also present with minor olivine phenocrysts</td>
</tr>
<tr>
<td>1230-1240</td>
<td>Same as above, except brown pahoehoe contains plagioclase phenocrysts instead</td>
</tr>
<tr>
<td>1240-1260</td>
<td>Mixture of brown aa and plagioclase-phyric gray aa--phenocrysts 1-3 mm long</td>
</tr>
<tr>
<td>1260-1290</td>
<td>Mixture brown and gray plagioclase-phyric aa--phenocrysts &lt;= 1 mm</td>
</tr>
<tr>
<td>1290-1300</td>
<td>Plagioclase-phyric gray aa with laths up to 3 mm long</td>
</tr>
<tr>
<td>1300-1330</td>
<td>Same as above, plagioclase phenocrysts make up 15-20 % of the rock</td>
</tr>
<tr>
<td>1330-1360</td>
<td>Dark gray plagioclase-phyric aa with phenocrysts 1-2 mm long</td>
</tr>
<tr>
<td>1360-1370</td>
<td>Same as above, except some red-brown aphyric scoriaceous aa cuttings present</td>
</tr>
</tbody>
</table>
1370-1380
Same as above, except plagioclase laths 3 mm long

1380-1390
Mixture of red scoriaceous pahoehoe and gray aa both are plagioclase-phyric

1390-1420
Mixture of dark gray aa (basalt?), light tan trachyte, and red altered (?) aa

1420-1430
Mixture light gray and black vitreous trachyte, and red plagioclase-phyric aa

1430-1460
Mixture of light gray trachyte and black basalt (?)

1460-1590
Light gray and dark gray vitreous trachyte--appears streaked

1590-1620
Mixture of trachyte, pahoehoe, and red altered basalt (?)

1620-1640
Mixture of trachyte, scoriaceous pahoehoe, and red altered rock--trachyte << basalt

1640-1650
Gray aphyric aa clinker

1650-1660
Sand size dark gray cuttings (basalt)--some trachyte cuttings mixed in

1660-1670
Dark gray aphyric pahoehoe

1670-1690
Mixture of dark gray pahoehoe and dense gray aa

1690-1700
Gray-brown aphyric aa

1700-1710
Dark gray sand size aa with olivine phenocrysts

1710-1720
Mixture of brown aa and gray pahoehoe

1720-1730
Mixture of gray pahoehoe and aa with some red cinder

1730-1740
Same as above, except red cinder not present
<table>
<thead>
<tr>
<th>Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1740-1750</td>
<td>Olivine-rich dark gray-brown pahoehoe</td>
</tr>
<tr>
<td>1750-1780</td>
<td>No sample collected</td>
</tr>
<tr>
<td>1780-1800</td>
<td>Dark gray aa with olivine phenocrysts up to 2 mm across</td>
</tr>
<tr>
<td>1800-1805</td>
<td>No sample collected</td>
</tr>
<tr>
<td>1805-1815</td>
<td>Mixture of dark gray aphyric aa and brown-red aphyric pahoehoe</td>
</tr>
<tr>
<td>1815-1820</td>
<td>Dark gray aphyric aa</td>
</tr>
<tr>
<td>1820-1825</td>
<td>Mixture of dark gray aphyric pahoehoe and gray aa</td>
</tr>
<tr>
<td>1825-1830</td>
<td>Same as above, except pahoehoe contains olivine phenocrysts</td>
</tr>
<tr>
<td>1830-1840</td>
<td>Dark gray aphyric aa</td>
</tr>
<tr>
<td>1840-1850</td>
<td>Mixture of dark gray pahoehoe and aphyric gray aa</td>
</tr>
<tr>
<td>1850-1860</td>
<td>Dark gray aphyric aa</td>
</tr>
<tr>
<td>1860-1875</td>
<td>Dark gray aphyric vesicular aa</td>
</tr>
<tr>
<td>1875-1880</td>
<td>Same as above, except some vesicular pahoehoe</td>
</tr>
<tr>
<td>1880-1885</td>
<td>Dark gray aa--sample contains &quot;accidental (?)&quot; cutting of trachyte</td>
</tr>
<tr>
<td>1885-1890</td>
<td>Dark gray pahoehoe transitional to aa with minor olivine phenocrysts</td>
</tr>
</tbody>
</table>
A. STATE WELL NO. 4458-01
B. LOCATION North Kona
C. WELL OWNER Mansay Hawaii, Inc.
D. DRILLING OR PUMP INSTALLATION CONTRACTOR Water Resources International, Inc.
E. TYPE OF RIG Sneenor-Harris Rotary
F. DATE OF WELL COMPLETION 01/08/91
G. GROUND ELEVATION (ma) 1799.05 ft.
Top of Drilling Platform (ma) 1806.69 ft.
Height of drilling platform above ground surface 7.64 ft.
Height of bench mark and method used to determine ground elevation 1799.05 ft. (top of I beam)
H. TOTAL DEPTH OF WELL BELOW GROUND 1960'
I. HOLE SIZE:
21 Inch dia. from 0 ft. to 1765 ft. below ground
21 Inch dia. from 1765 ft. to 1840 ft. below ground
12 Inch dia. from 1840 ft. to 1960 ft. below ground
J. CASING INSTALLED:
12 in. I.D. x 2/8 in. wall solid section to 1800 ft. below ground
12 in. I.D. x 5/16 in. wall perforated section to 1850 ft. below ground
Type of perforation Full-Rio
K. ANNULUS:
Grouted from 0 ft. to 600 ft. below ground & 1430’ to 1755’
Gravel packed from 600 ft. to 1430 ft. below ground
L. PERMANENT PUMP INSTALLATION:
Motor type, make, serial No. Capacity gpm
Motor type, H.P., voltage, R.P.M. Capacity gpm
Type of concrete
Type of pipe
Type of perforation
Type of casing
Type of cement
Depth of pump intake setting ft. below which elevation is ft.
Depth of bottom of airline ft. below which elevation is ft.
M. PROPOSED USE
N. INITIAL WATER LEVEL 1788.65 ft. below ground.
O. INITIAL CHLORIDE 17 ppm.
F. PUMPING TESTS: Reference point (R.P.) used: which elevation is ft.
Date
Start water level ft. below R. P.
End water level ft. below R. P.
Depth of well ft. below R. P.
Elapsed Time (hours)
Rate (gpm)
Depth (ft.)
Climent (ppm)
Temp. (°F)

Q. DRILLER’S LOG:

<table>
<thead>
<tr>
<th>Depth, ft.</th>
<th>Rock Description &amp; Remarks</th>
<th>Water Level, ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1463 to 1490</td>
<td>Clinkery, broken a.s.</td>
<td>10</td>
</tr>
<tr>
<td>1490 to 1561</td>
<td>Dense formation</td>
<td>10</td>
</tr>
<tr>
<td>1561 to 1632</td>
<td>Clokey, broken a.s.</td>
<td>10</td>
</tr>
<tr>
<td>1632 to 1675</td>
<td>Dense formation</td>
<td>10</td>
</tr>
<tr>
<td>1675 to 1775</td>
<td>2 dense layers</td>
<td>10</td>
</tr>
<tr>
<td>1775 to 1855</td>
<td>Dense formation</td>
<td>10</td>
</tr>
<tr>
<td>1855 to 1932</td>
<td>Clinkery</td>
<td>10</td>
</tr>
<tr>
<td>1932 to 1985</td>
<td>Dense formation</td>
<td>10</td>
</tr>
<tr>
<td>1985 to 2047</td>
<td>Clokey, broken a.s.</td>
<td>10</td>
</tr>
<tr>
<td>2047 to 2072</td>
<td>Dense formation</td>
<td>10</td>
</tr>
<tr>
<td>2072 to 2132</td>
<td>Clokey, broken a.s.</td>
<td>10</td>
</tr>
<tr>
<td>2132 to 2185</td>
<td>Dense formation</td>
<td>10</td>
</tr>
<tr>
<td>2185 to 2247</td>
<td>Soft, fine cinder mix</td>
<td>10</td>
</tr>
<tr>
<td>2247 to 2300</td>
<td>Dense formation</td>
<td>10</td>
</tr>
<tr>
<td>2300 to 2352</td>
<td>Med. gray/wht. lava rock</td>
<td>10</td>
</tr>
<tr>
<td>2352 to 2400</td>
<td>Soft, fine cinder mix</td>
<td>10</td>
</tr>
</tbody>
</table>

R. REMARKS:

Submitted by (print) Kathy Watanabe
Signature
Title Secretary
Date March 20, 1991
March 19, 1991

Division of Water and Land Development
Department of Land and Natural Resources
P.O. Box 373
Honolulu, Hawaii 96809

RE: APPLICATIONS FOR PUMP INSTALLATION PERMIT
KAU WELLS 1 AND 2
LANDS OF KA’U, NORTH KONA, HAWAII

Dear Sir:

Please find enclosed applications for pump installation permits for Ka’u Wells 1 and 2 and a check for $50.00 ($25.00 per application).

If you have any questions, please call. Thank you.

Sincerely,

Thomas H. Yamamoto, P.E.
Chief Operating Officer

Enc.

THY/knn
PAY TO THE ORDER OF DEPT. OF LAND & NATURAL RESOURCES $ 50.00

***** FIFTY AND NO/100 ***** DOLLARS

MEMO Pump installation permits-Kau Wells 1 & 2

March 18, 1991

NANSAY HAWAII, INC.
SUITE 727
BOX 111222
KAMUELA, HAWAII 96743-0020

FIRST HAWAIIAN BANK
KAMUELA BRANCH
KAMUELA, HAWAII 59-101/1213

1628
APPLICATION FOR

WELL CONSTRUCTION PERMIT

PUMP INSTALLATION PERMIT

INSTRUCTIONS: Please print or type and send completed application with attachments to the Division of Water and Land Development, P.O. Box 373, Honolulu, Hawaii 96812. Application must be accompanied by a non-refundable filing fee of $50.00 payable to the Department of Land and Natural Resources. (Filing fee waived for government agencies.) If necessary, phone 543-2107, Hydrology/Geology Section for assistance.

1. WELL LOCATION

Island Hawaii Tax Map Key 7-2-5:1
Address Kau, North Kona, Hawaii

(Attach a USGS map (scale 1"=2000') and property tax map showing well location referenced to established property boundaries.)

2. WELL OWNER

Firm Name Nansay Hawaii, Inc.
Contact Person Thomas Yamamoto
Address P.O. Box 111222
Kamuela, HI 96743-0020

3. PROPOSED CONTRACTOR FOR:

☐ Well Drilling ☐ Pump Installation

Name not determined at this time
Address

4. PROPOSED WORK

☐ Drill New Well ☐ Deepen ☐ Redrill
☐ Alter ☐ Seal ☐ Abandon
☐ Install New Pump ☐ Replace Pump ☐ Modify Pump

(Briefly describe the proposed work and fill in the diagram on the back of this form.)

5. PROPOSED USE

☐ Municipal (including hotels, stores, etc.) ☐ Military
☐ Domestic (individual, noncommercial water systems) ☐ Industrial
☐ Irrigation (specify) ☐ Other (specify)

6. PROPOSED AMOUNT OF WITHDRAWAL

1 mgd gallons per day

7. PROPOSED PUMP INFORMATION

Pump Type: ☐ Vertical Turbine ☐ Submersible
☐ Diesel ☐ Gas ☐ Electric: 420 ☐ Centrifugal
Rated Pump Capacity 700 gallons per minute (gpm)

Well Owner (print) Nansay Hawaii, Inc.
Signature 3/15/91
Date

Landowner (print) Nansay Hawaii, Inc.
Signature 3/15/91
Date

For Official Use Only:
Field Checked By
Signature
Date
Latitude
Longitude
Hydrologic Unit
State Well No. 4458-02
Quad Map No. H-17
Briefly describe the proposed work:

Installation of a 700 gpm submersible pump

*Approximate elevation at time of filing application. Final elevation (msl) by a surveyor licensed by the State must be submitted at start of construction.
APPLICATION FOR

1. WELL LOCATION

Island ______ Tax Map Key ______ Address ______
Hawaii ______ 7-2-5:1 Kau, North Kona, Hawaii ______

(Attach a USGS map (scale 1"=2000') and property tax map showing well location referenced to established property boundaries.)

2. WELL OWNER

Firm Name ______ Contact Person ______
Nansay Hawaii, Inc. Thomas Yamamoto ______
Address ______ Contact Person ______
P.O. Box 111222 Address ______
Kamuela, HI 96743-0020 Address ______
Phone 885-5300 Phone ______

3. PROPOSED CONTRACTOR FOR:

Name ______ Contact Person ______
not determined at this time Contractor's License No. ______
Address ______ Phone ______

4. PROPOSED WORK

☐ New Well ☐ Deepen ☐ Redrill
☐ Alter ☐ Seal ☐ Abandon ☐ Modify Pump
☐ Install New Pump ☐ Replace Pump ☐ Centrifugal
☐ Irrigation (specify) ☐ Industrial ☐ Other (specify)

(Briefly describe the proposed work and fill in the diagram on the back of this form.)

5. PROPOSED USE

☐ Municipal (including hotels, stores, etc.) ☐ Submersible
go. Domestic (individual, noncommercial water systems) ☐ Electric: 420
☐ Irrigation (specify) ☐ Industrial ☐ Other (specify)

6. PROPOSED AMOUNT OF WITHDRAWAL

1 mgd gallons per day

7. PROPOSED PUMP INFORMATION

Pump Type: ☐ Vertical Turbine ☐ Submersible ☐ Centrifugal
Motor: ☐ Diesel ☐ Gas ☐ Electric: 420
Rated Pump Capacity 700 gallons per minute (gpm)

---

Well Owner (print) Nansay Hawaii, Inc. Landowner (print) Nansay Hawaii, Inc.

Signature ______ Date ______ Signature ______ Date ______

3/5/91 3/5/91

For Official Use Only:

Field Checked By Latitude ______ Hydrologic Unit ______
Date ______ Longitude ______ State Well No. 4458-01

Quad Map No. H-7
Briefly describe the proposed work:

Installation of 700 gpm submersible pump

---

**AS-BUILT**

**PROPOSED SECTION OF WELL**

Elevation at top of casing __________ ft., msl.

Ground Elev. - 1799 ft., msl*

Cement Grout 1747 ft.

Hole Dia. 21 in.

Total Depth 1952 ft.

Rock Packing N/A ft.

Solid Casing:
- Material: Steel
- Length: 1792 ft.
- Diameter: 14" I.D. in.
- Wall thickness: .375 in.

Casing: / /Perforated /x/Screen
- Material: Steel
- Length: 50 ft.
- Diameter: 14" I.D. in.
- Wall thickness: .3125 in.
- Openings: ______ sq. in./L.F.

Open Hole:
- Length: 110 ft.
- Diameter: 12 in.

---

*Approximate elevation at time of filing application. Final elevation (msl) by a surveyor licensed by the State must be submitted at start of construction.
Dear Mr. Akita:

Notification of Start of Construction for
Kau Well 2 and Ouli Well 2, North Kona, Hawaii

This is to confirm our verbal notification to Mr. Ed Sakoda of the construction operation schedule for drilling of the following wells:


Ouli Well 2, #6146-01 - Contractor has mobilized and will start construction the latter part of March 1991.

Sincerely,

DAN LUM

cc: Mr. Thomas Yamamoto, Nansay Hawaii
MEMORANDUM FOR THE RECORD

March 8, 1991

From: Glenn Bauer

Subject: Review of Kau (Kohanaiki) Well 1 (4458-01) Well Completion Report by
Water Resource Associates

My comments regarding this report are as follows:

1) Hydrology

Even though the head is 10 + feet msl and the aquifer may be partially confined, I do not think the well is immune from increasing chlorides due to heavy pumpage. Increase in chloride content will probably occur more readily when other sources in the vicinity begin to pump.

Future pumping from our Kalaoa Well may diminish the amount of water that will spill over (?) or pass through the geologic structure that causes the static head to stand at elevation 238 + feet msl. Therefore, less groundwater will be available to the Kohanaiki Well field and other sources nearby.

2) Sustainable Yield

If the average rainfall (based on our isohyet maps) above the well is 35", then a one mile-wide strip, with the well in the middle, would have to be about 3.8 miles long to equal 6.4 mgd of rainfall. A strip this long put a portion of it north of the northwest rift zone of Hualalai. Using a realistic ET value of 73 % of rainfall (Giambelluca) for this isohyetal zone, infiltration into this strip is only 1.7 mgd. Sustainable yield will be some fraction of this recharge. Comparison with Kahaluu Shaft does not make sense since the rainfall mauka of the shaft is much greater and ET is suppressed, resulting in greater recharge.

Utilizing Mink's equation for sustainable yield for basal lenses with heads up to 10 feet, a D/I value of .44 is used (Water Resources Protection Plan, p. B-3). The resulting sustainable yield would be about .75 mgd. The equilibrium head would drop from the initial head of 10 feet to 7.5 feet. This number is valid for the one mile-wide strip. Depending upon future development the amount may be adjusted up or down. Several of the Huehue Ranch wells are within half a mile of Kohanaiki Well 1, including yet-to-be-drilled Kohanaiki Well 2.

I calculated the approximate transmissivity of the well at 183,000 ft²/d by using pump test data provided in the report. Without any transmissivity data from the Huehue Ranch wells, it will be difficult to compute regional drawdown for the unconfined basal aquifer after development of all wells in the area, and to make an informed judgement to the total allowed draft for the region.

Another method to estimate the effect of pumpage on the lens is to first calculate
specific flux through the Keauhou Aquifer System. Total recharge for the system has been calculated to be 87 mgd or $11.6 \times 10^6$ ft$^3$/d. Total coastline length is approximately 21 miles or 110,880 feet. Therefore specific flux, $q$, is:

$$q = (11.6 \times 10^6 \text{ ft}^3/\text{d})/(110,880 \text{ ft})$$

$$= 105 \text{ ft}^3/\text{ft/d}$$

Total flux per mile is equal to about $5.5 \times 10^5$ ft$^3$/d or 4.1 mgd. Employing the analysis used in the Kahakuloa Water Study (State Report R-54, pp. 65-68) to examine the extent and structure of an unconfined basal lens, and taking the data from Kohanaiki Well 1, an assumed $q$ can be computed for coastal discharge below the well.

According to the Kahakuloa Water Study, the parabolic upper surface of a basal lens is defined by:

$$h^2 = ax \quad (1)$$

where $h$ is head, $x$ is the distance (in feet) from the coast, and $a = 2q/gk$, $q$ equal to specific flux, $k$ is hydraulic conductivity, and $g$ is the Ghyben-Herzberg constant of 41. For the Kohanaiki well, $T \approx 183,000 \text{ ft}^2/\text{d}$ and $k = 1123 \text{ ft/d}$ based on partial penetration of 163 feet. Rearranging equation 1:

$$q = gh^2 k/2x \quad (2)$$

Substituting values into this equation:

$$q = 41(10.4 \text{ ft})^2 (1123 \text{ ft/d})/2[4.7(5280 \text{ ft})]$$

$$= 100 \text{ ft}^3/\text{ft/d}$$

A value that is close to the calculated regional specific flux.

Assume that the 1.7 mgd ($2.3 \times 10^5$ ft$^3$/d) estimated total recharge for the one mile strip is withdrawn, then the total flux through that one mile strip is reduced to 2.3 mgd which computes to $q = 58 \text{ ft}^3/\text{ft/d}$. Substituting back into equation 1, then:

$$h^2 = 2(58 \text{ ft}^3/\text{ft/d})/41(1123 \text{ ft/d})*[4.7(5280 \text{ ft})]$$

$$h^2 = 62.8 \text{ ft}^2$$

$$h = 7.9 \text{ ft}$$

The aquifer will not behave as a discrete one mile strip and the reduction of specific flux will not be as great. However, if all wells are on line and reducing flow to the coast, the basal lens will shrink, effectively reducing flux. Any reduction in head will cause the transition zone to react accordingly.
3) Recommented Pump Capacity

The recomended pump capacity of 700 gpm seems to be reasonable. However, if Kohanaiki Well 2 proves to be a good producer, we may need to adjust total water withdrawn between the wells. Distance between these wells is less than 2000 feet.
Mr. Manabu Tagomori  
Deputy Director  
Commission on Water Resource Management  
Department of Land & Natural Resources  
State of Hawaii  
Honolulu, Hawaii  

Dear Manabu:

Well Completion Report, Kau (Kohanaiki) Well 1 (4458-01)

Submitted herewith is the well completion report for Nansay Hawaii’s recently drilled Kau (Kohanaiki) Well 1, North Kona, Hawaii.

The well was pump tested for four days at a constant rate of 700 gpm with a stable drawdown of 2.3 feet and chloride content of 35 ppm.

If you have any questions, please give me a call.

Sincerely,

DAN LUM

Enc.

cc: Mr. Tom Yamamoto, Nansay Hawaii
LOG OF CUTTINGS
Kau Well 1 (4458-01), North Kona
(Depts referenced to RKB = 1806.7 ft.)
By Dan Lum

Depth (ft.)

From  To

645  665  BASALT: Dk gray, dense
665  685  BASALT: Dk gray, dense mixed with fine cuttings
685  705  BASALT: Gray, dense and slightly reddish gray fine cuttings
705  925  BASALT: Gray, dense and reddish brown vesicular cuttings.
   Olivines at 745 - 845. More dense cuttings at 845 - 885
925  945  BASALT: Gray to lt. gray, dense
945  1005  BASALT: Dk gray, dense and reddish brown, vesicular
1045  1065  BASALT: Dk gray, dense
1065  1105  BASALT: Gray, dense, some platy breaks
1105  1185  BASALT: Gray, dense and reddish gray, vesicular
1185  1325  BASALT: Gray, dense and reddish gray, vesicular
1325  1465  TRACHYTE:* Lt. gray, dense and reddish gray vesicular.
   Some clean quartz-looking crystals
1465  1605  BASALT: Gray, dense with some reddish gray vesicular
   cuttings and same crystals (probably from above). A few
   green olivines at 1585-1605
1605  1645  BASALT: Gray, dense cuttings mixed with reddish brown
   finely vesicular cuttings. Green olivines at 1625-1645
1645  1705  BASALT: Gray, dense and reddish brown, vesicular cuttings
1705  1765  BASALT: Gray and reddish, dense to vesicular
1765  1850  BASALT: Gray, dense, some platy at 1785-1850
1860  1868  BASALT: Gray, dense to vesicular with some reddish brown,
   finely vesicular cuttings
1883  BASALT: Reddish brown, slightly to moderately vesicular with
   some dk gray dense chips and grayish tan mineral
   coating vesicles
1880  1890  BASALT: Reddish brown and dk gray, dense to slightly
   vesicular
1893  BASALT: Reddish brown, slightly to moderately vesicular.
   Some dk gray, dense cuttings
1890  1900  BASALT: Reddish brown and dk gray, dense to slightly
   vesicular. Mostly less than 1/4" size cuttings
1908  1910  BASALT: Reddish brown, finely vesicular cuttings up to 1/2" size. Gray and reddish brown, dense cuttings less than 1/4" size
1920  1930  BASALT: Reddish brown, moderately vesicular. Pumiceous
   cuttings up to 1/2" size

*Based on personal communication, G. Bauer
Note: Cuttings recovery not complete.
Many of you have probably already noticed our first well project on the property adjacent to your subdivision. Some may have already heard the noise generated by the initial stages of the drilling. Please accept our apologies for any disruption we may have already caused.

This is to inform you that the initial drilling and testing stages of our second well which is located closer to your subdivision than the first, will begin Tuesday, January 15, 1991.

We have instructed our contractor to work only between the hours of 7:00 a.m. and 6:00 p.m. on weekdays and between 9:00 a.m. and 6:00 p.m. on weekends. In approximately 4 months, we will be casing the well which will require us to work between 6:00 a.m. and 10:00 p.m. one day only. Also at completion of the well we will be required to perform a 24 hour test pump for approximately 4 - 5 days.

We will notify each of you prior to the casing day and the 24 hour test period. If you have questions regarding the project, please do not hesitate to give our office a call. We are prepared to make every effort, within the given limitations, to make this process as painless as possible for everyone concerned. We sincerely hope that the water well project will be of minimal inconvenience to each of you.

In order to make it easier for us to keep each of you up to date on our progress and provide you with information regarding upcoming important dates, please return the enclosed self-address, stamped envelope with your name and address. Also, if you know someone in the area that we have missed, please let us know so that we may properly inform everyone.

Our sincere mahalo for your patience and cooperation.

Aloha,

Rebecca Kwiatkowski
Director of Marketing & Public Relations

cc:  H. Silva, Kona Police Department
     B. Clay, Water Resources International
NANSAY HAWAII INC.
KAMUELA, HAWAII 96743-0020

RE: KAU WELL DRILLING AND PUMPING PHASE 11

I have received your letter from one of your managers, Randy Foitlitz on January 15 the day you have planned to begin drilling.

A week prior to the 15th I spoke to one of your managers who was on the site laying out the footing for the cement pad where the drilling will take place. I do not remember his name.

But in our conversation I have expressed my concern of the noise that the drilling work will make and my interest in the time you will start in the morning and finish. He mentioned that we will get together with the other residences to work together towards a time satisfactory to all in the Makaula Subdivision.

Secondly he mentioned that he would put up a wall to shield of the noise between my home and the drilling rig since my home is only about 130 feet away. My bedrooms faces your drilling rig. Today is the 17th and nothing he has promised has happen. As a Pastor I work out of my home adjacent to my home and my day starts at 6a:m in the morning. From 6 to 8a:m I use this time to study and pray and then I attend to the church affairs. To be reasonable with your work 7:30a:m will help me a lot and stop at 5:30p:m.

You have also mentioned in your letter of work you will be doing at nights. This is going to cause a major problem with our privacy to get any sleep. When you were running your pumps all night at phase 1 which is about 2000 feet away I could hear the noise so clear and loud, can you imagine what it would be like right next to my home. Put yourself in my position and how you would feel.

I am prepared to contact the State of Hawaii Department of Land and Natural Resources to let them know of my situation and will give them a copy of this letter.

I understand that phase 1 took 1 year to finish by your manager. I hope we can work out a solution to this problem, without making our lives miserable for a year.

YOURS TRULY

Pastor:

Bobby Macomber
Pastor
The Vineyard Christian Fellowship
P.O. Box 144 • Kailua-Kona, Hawaii 96745 • Phone
Mr. Manabu Tagomori  
Deputy Director  
Commission on Water Resource Management  
Department of Land & Natural Resources  
P.O. Box 373  
Honolulu, Hawaii 96809

Dear Manabu:

We are pleased to enclose for your personal information a copy of "Prospective Well Sites Between Palani Junction and Kahaluu for Kohanaiki Project, North Kona, Hawaii" prepared for Nansay Hawaii. We look forward to briefing you further about Nansay Hawaii's preliminary plans for water development in west Hawaii.

Also enclosed is a copy of a memo on the July 20th meeting with the Hawaii Department of Water Supply. If you have any questions, please let me know.

Sincerely,

DAN LUM  
President

Enc.  
cc: Mr. Thomas Yamamoto,  
Nansay Hawaii
August 1, 1990

MEMORANDUM FOR THE RECORD

FROM: Dan Lum

SUBJECT: Meeting with Department of Water Supply to Discuss Prospective Well Sites for Kohanaiki Project, North Kona, Hawaii

On Friday, July 20, 1990, a meeting was held in Bill Sewake's office to discuss Nansay Hawaii’s prospective well sites and interest in developing new well sources in cooperation with the Department of Water Supply, in order to provide water for Nansay Hawaii's Kohanaiki and Kau projects. Present at the meeting were Bill Sewake, Quirino Antonio, Kiyoshi Takasaki, Tom Yamamoto, Fred Yamashiro, and myself.

Tom explained that Nansay Hawaii needs potable water for its Kohanaiki and Kau projects and, working with the Department, would like to locate new well sites and develop new well sources that could be added to the Department's water system in return for water service to Nansay Hawaii's two projects. Tom explained that he would need a small amount of water during construction activities, but that about 1.2 mgd would be needed in late 1993, for a planned hotel at Kohanaiki. Approximately 2.5+ mgd would ultimately be needed for Kohanaiki and another 2.5+ mgd for Kau. At 1/2 mgd per well, Bill indicated that might require as many as 10 wells.

Bill described current plans and drilling activities in the North Kona area as follows:

1. Palani Junction - The Department has awarded a contract to WRI to drill a well southeast of Palani Junction. If the well is successful, plans are to drill a second well about 3000 ft. south on Greenwell property with possibly a third well in between the two. Transmission would be along an old government road easement.

2. Liliuokalani Trust - About 4000 ft. south of the Greenwell site, Liliuokalani Trust probably will want to develop ground water for its land.

3. Haseko - About 4000 ft. south of the Liliuokalani Trust area, Haseko plans to drill a well at the Department's 0.05 mg tank site. Their water needs are small.

4. Waiaha Tank Site - About 10,000 ft. south of the Waiaha tank site, the Department plans to drill a well.
5. Pahoehoe Site - The Department is drilling a well about 7000 ft. north of the Kahaluu well field. Unexpectedly, the well has preliminarily tested at about 300 ppm (250 ppm is potable water limit). A 250 gpm pump test will be performed. Head is reported to be 5.6 ft.

6. HFDC - Between Kalaoa and Palani Junction, exploratory well sites have been identified for HFDC's housing project at Kealakehe.

Bill indicated that south of Kahaluu, most of the land is owned by Bishop Estate and that they are reluctant to provide well sites. The Department has future plans for a well at or near their Honalo tank site. A new well source there could relieve some of the South Kona demand for water from the Kahaluu sources which, in turn, would free a corresponding amount of Kahaluu water for service to North Kona. Nansay Hawaii probably could participate in a Honalo source development.

Bill indicated that the size of a well site was about 3/4 acre for one or two wells and a control tank, and about one acre for one or two wells and a storage tank.

Due to the uncertainties of developing wells in the thin basal lens of Kona and determining their sustainable capacities based on short-term pumping tests, Bill was unable to make any commitment on Nansay Hawaii's prospective well sites and their estimated capacities. However, Bill concurred with Nansay Hawaii taking the risk to acquire the well sites listed below and drill and test a well on each site, before discussing and committing to any source agreements. Agreement on drilling a second well at each site would depend upon a review of the production and salinity record (about a year or less) of the first well. Integrating any new well sources developed by Nansay Hawaii would be discussed later when more definitive information is available.

1. Kalaoa North - This site is located half way between Kohanaiki Well 2 and the State's Kalaoa well just below the 1800 ft. elevation. Bill indicated that a property owner may be willing to negotiate a well site provided some water is available for his needs.

2. Waiaha North - This site is about 4000 ft. north of the Department's planned Waiaha well site mauka of Mamalahoa Highway.

3. Waiaha South - This site is about 4000 ft. south of the Department's planned Waiaha site, preferably on the mauka side of the highway.

4. Honalo Tank Site - The Department has been searching for a site close to their Honalo tank site. Development of a well source here could be credited to Nansay Hawaii for relief of water demand on the Kahaluu source.
MEMO

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT
P.O. BOX 373
HONOLULU, HAWAII 96809

TO
THE RECORD

FROM
M. OHYE

DATE
MAY 31, 1990

SUBJECT
KOUNAIKI #1 4458-01, HAWAII, WELL LOGGING
994' PILOT HOLE

MESSAGE:

ON MAY 30, 1990 ELECTRONIC WELL LOGGING WAS
PERFORMED ON THE SUBJECT WELL. THE FOLLOWING DATA WAS GATHERED:

CONTRACTOR: WATER RESOURCES INTERNATIONAL

ROTARY TABLE (R.T.) EL. = 1806.69' USL

R.T. = 8.4' ABOVE GR. SURFACE

DIW = 1530.9' (REF. R.T.) = 1796.3' OR. 10.4' USL HEAD

EL = 17 PPM

TOTAL DEPTH = 1530.9' BELOW R.T.

CAISER LOG.

SIGNED

[Signature]

METCHEL K. OHYE
Letter notifying us of start of drilling as required by permit.

S. Kokubun
L. Nanbu
F. Ching
L. Choo
April 10, 1990

Mr. William W. Paty  
Chairperson  
Commission on Water Resource Management  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
STATE OF HAWAIi  
P. O. Box 621  
Honolulu, Hawaii 96809

RE: KOHANAIKI WELL 1  
WELL NO. 4459-02

Dear Mr. Paty:

We have completed the grading of our well site and have mobilized our well drilling equipment to the site. Drilling is scheduled to begin April 16, 1990 and end no later than August 13, 1990. We will submit all required information within thirty (30) days of completion of the well.

If you have any question concerning the above, please do not hesitate to contact me.

Very truly yours,

Randy Foitz  
Construction Manager

cc: Dan Lum/Water Resources Associates  
    Frank Sanpei/M & E Pacific
TO: Nansay Hawaii
1112 Kinau Street, Penthouse
Honolulu, Hawaii 96814

In accordance with the Department of Land and Natural Resources Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", your application to construct and test Well No. 4459-02 within Tax Map Key: 7-2-5:1 for municipal use is approved, subject to the following conditions:

1. The Division of Water and Land Development (DOWALD), Geology-Hydrology Section, shall be notified at 548-7619, before any work covered by this permit commences.

2. The permit shall be for construction and testing only. No permanent pump may be installed and no water used from the well without the necessary pump installation permit from the Commission.

3. The following shall be submitted to DOWALD within 30 days after completion of the well:
   a. Well Completion Report.
   b. Elevation (referenced to mean sea level) 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 record; including time, pumping rate, drawdown, chloride content, and water quality data.
4. The applicant shall comply with all applicable laws, rules, and ordinances.

5. This permit may be revoked if work is not started within six months of date of issuance or if work is suspended or abandoned for six months. The work shall be completed within two years of the date of issuance.

SEP 27 1989

WILLIAM W. PATY, Chairperson
Commission on Water Resource Management

Date of Issuance

cc: USGS
Department of Health,
   Drinking Water Program
   Ground Water Protection Program
Hawaii Department of Water Supply
PROSPECTIVE WELL SITES
BETWEEN PALANI JUNCTION AND KAHALUU

for

Kohanaiki Project
North Kona, Hawaii

Prepared for
Nansay Hawaii, Inc.
Kamuela, Hawaii

By
Water Resource Associates
PROSPECTIVE WELL SITES
BETWEEN PALANI JUNCTION AND KAHALUU

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Prepared for
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Honolulu, Hawaii

June 1990
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Figure 4. Monthly Pumpage and Chlorides, Kahaluu Shaft and Wells A,B,C,D
Figure 5. Potable Water Requirement
Purpose and Scope

Nansay Hawaii plans to develop a coastal resort at Kohanaiki, North Kona, Hawaii, between Honokohau Harbor and the Keahole Airport. Because there are no potable water resources in the area, Nansay Hawaii must look elsewhere to develop and provide the necessary water supply for its project. Potential sources of supply lie four to eight miles away. The nearest existing sources are the County’s Holualoa well and Kahaluu shaft/well-field located eight and ten miles, respectively, to the southeast. Eight to twenty-inch diameter pipelines transport water from these sources to Keahole Airport and Kalaoa.

The County Department of Water Supply probably will continue to develop new sources and expand its water system to meet the growing demand in the rapidly developing coastal and mauka areas. Because of this, a practical alternative for Nansay Hawaii to meet its water needs at Kohanaiki would be to develop additional well sources in cooperation with the Department of Water Supply. The selection of additional well sources must be consistent with hydrologic criteria, such as sustainable yield, pump capacity, well design, and well spacing.

Geologic and Hydrologic Setting

Highly permeable lava flows underlie the North Kona area between Palani Junction and Kahaluu and form the fresh water aquifer that occurs one to two miles inland from the coast. The surface geology of the area reveals no volcanic structures such as cinder cones or dikes or any coastal caprock sediments which might affect the occurrence of ground water. Thus, fresh ground water underlies the slopes of Kona in a thin (4 to 5 ft. head) basal lens which is subject to sea water intrusion. This has been confirmed by a limited number of wells in the area.

Rainfall is the source of the fresh basal water. Its geographical distribution influences the location of the lens along the Kona coast. Rainfall occurs in a belt four to five miles wide, centered four miles inland at the 2,500 ft. elevation, and parallel to the coastline. This rain belt from Palani Junction to Kahaluu has an average annual rainfall ranging from 40 to 75 inches. Because the slopes of Kona consist of highly permeable, unweathered lava flows with little soil cover, much of the rainfall percolates...
deeply below the surface to become ground water in the fresh water lens at sea level. No perennial or intermittent stream exists in the area. Even during periods of heavy rain, there is no runoff to the sea.

Coincident with the rain belt, fresh ground water occurs as an elongated body that parallels the coastline. Existing wells indicate that the fresh water lens occurs a mile or more inland from the coast. Existing wells provide evidence of localized upconing of salt water and gradual inland intrusion of salt water due to pumping. A few anomalies to the general occurrence of fresh water parallel to the coastline have been observed and may be caused by unusual or localized occurrences of impermeable dense flows, highly permeable pahoehoe or clinkery flows, and lava tubes.

Existing Ground Water Development

Prior to 1959, water supply was provided almost entirely by rain catchment from galvanized corrugated rooftops. Two mountain springs at elevations 2,100 and 2,400 ft. at Wai'aha, however, supplied the hotel in Kailua town. Groundwater exploration began in 1944 with the drilling of the Wai'aha test hole to determine salinity and water level. Fourteen years later, in 1958, a full-size well was drilled and pump tested along Palani Road at elevation 800 feet by the State. The well was unsuccessful and a bit of a disappointment. It yielded very brackish water (2,800 ppm, chlorides) at a distance of two miles inland from the coast.

The State's second exploratory well was located 6,000 feet inland of Kahaluu Bay at an elevation of 833 ft. It was highly successful. The well had a chloride content of only 8 ppm and was the freshest water well on the Island at that time. Known as Kahaluu well A, it was put into production in 1967 with appurtenant tanks, pipelines, etc., to serve the Kailua-Kona area. Additional wells B, C, and D were drilled by the State and turned over to the County, and by 1971 the Kahaluu well field had a pump capacity totaling 3.3 mgd.

To meet the growing demand for water in the North Kona area, the State planned and developed the Kahaluu Shaft which was placed into production in 1975. Then, in 1983, the Holualoa exploratory well at elevation 1123 ft. successfully tapped the fresh water lens and was placed into production in 1985 to help meet the growing water demand of homes to the north along Mamalahoa Highway.

The shaft and wells mentioned above are shown in Table 1 and Figure 1. Figure 1 also shows the system of pipelines and storage tanks that transmits water from Kahaluu and Holualoa to service areas northward to Keahole Airport and Kalaoa. The Kahaluu well-field and Holualoa well supply water northward through an 8" pipeline along Mamalahoa Highway approximately 10 miles to Kalaoa. The Kahaluu well-field also supplies water southward along Mamalahoa Highway. The Kahaluu shaft principally supplies water northward through 20, 16, and 12-inch pipelines to the lower-lying coastal areas extending to Keahole Airport. Water also is supplied southward to Keauhou through 6 and 12-inch pipelines.
### Table 1. Well Record

<table>
<thead>
<tr>
<th>Well Name</th>
<th>State Well No.</th>
<th>Owner</th>
<th>Year Drilled</th>
<th>Ground Elevation (ft.)</th>
<th>Cag Dia. (in.)</th>
<th>Cag Depth (ft.)</th>
<th>Well Depth (ft.)</th>
<th>Static Head (ft.)</th>
<th>Initial Chloride (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holualoa</td>
<td>3657-01</td>
<td>Hawaii DWS</td>
<td>1983</td>
<td>1123</td>
<td>14</td>
<td>1164</td>
<td>1180</td>
<td>5.6</td>
<td>20</td>
</tr>
<tr>
<td>Kahaluu Shaft</td>
<td>3557-05</td>
<td>Hawaii DWS</td>
<td>1976</td>
<td>590</td>
<td>-</td>
<td>-</td>
<td>600</td>
<td>4.0</td>
<td>34</td>
</tr>
<tr>
<td>Kahaluu Well A</td>
<td>3557-01</td>
<td>Hawaii DWS</td>
<td>1959</td>
<td>833</td>
<td>12</td>
<td>871</td>
<td>878</td>
<td>4.0</td>
<td>8</td>
</tr>
<tr>
<td>Kahaluu Well B</td>
<td>3557-02</td>
<td>Hawaii DWS</td>
<td>1959</td>
<td>839</td>
<td>12</td>
<td>869</td>
<td>881</td>
<td>3.2</td>
<td>16</td>
</tr>
<tr>
<td>Kahaluu Well C</td>
<td>3557-03</td>
<td>Hawaii DWS</td>
<td>1969</td>
<td>834</td>
<td>12</td>
<td>859</td>
<td>868</td>
<td>4.6</td>
<td>8</td>
</tr>
<tr>
<td>Kahaluu Well D</td>
<td>3557-04</td>
<td>Hawaii DWS</td>
<td>1970</td>
<td>855</td>
<td>14</td>
<td>900</td>
<td>905</td>
<td>4.0</td>
<td>8</td>
</tr>
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<td>Palani Well</td>
<td>4059-01</td>
<td>State DLNR</td>
<td>1958</td>
<td>800</td>
<td>12</td>
<td>835</td>
<td>853</td>
<td>1.6</td>
<td>2800</td>
</tr>
<tr>
<td>Waiaha Well</td>
<td>3758-01</td>
<td>Hawaii DWS</td>
<td>1944</td>
<td>595</td>
<td>6</td>
<td>539</td>
<td>615</td>
<td>3.3</td>
<td>440</td>
</tr>
</tbody>
</table>

### Occurrence of Fresh Ground Water

Beneath the steep basaltic slopes of North Kona lies a thin (150 to 200 ft. thick) lens of fresh ground water that is recharged and sustained by rainfall on the slopes principally above 2,000 ft. elevation. Presumably, the lens is more or less continuous along the coast, mirroring the rain belt. Floating upon salt water, the lens' condition is dynamic as fresh water moves seaward under a slight hydraulic gradient, mixes with the underlying salt water principally due to tidal fluctuations, and ultimately discharges as brackish water near the shoreline.

Figure 2 shows the approximate boundary between the fresh water and brackish water portions of the basal lens from Palani Junction to Kahaluu. This interpretive boundary is based upon a limited number of wells and should be used cautiously. At Kahaluu, fresh water occurs only a mile inland from the shoreline. Along the entire Kona coast, it is the closest such distance known to occur along the entire Kona coast. It was fortuitously discovered 31 years ago, in 1959.

North of Kahaluu, the boundary between fresh and brackish water gradually shifts inland until it occurs two miles inland from shore, five miles north of Kahaluu at Kailua. Less ground water recharge and/or more permeable lavas may account for the increased inland intrusion of sea water. These two factors tend to lower the hydraulic gradient of a basal lens and, in fact, the hydraulic gradient of the basal lens does decrease northward of Kahaluu. Well records show a seaward water table gradient of -4.0 ft./mile at Kahaluu, -3.3 ft./mile at Holualoa, -2.4 ft./mile at Waiaha Well #12, and -0.7 ft./mile at the Palani exploratory well.
Water Budget

One of the methods used to determine the availability of ground water in an area is to compute its water budget, based upon proper assumptions of geology and hydrology. The objective of a water budget is to estimate the amount of recharge (from rainfall) to an aquifer or ground water body. The water budget method is especially useful in areas where little or no well data is available and when long-term averages of rainfall, etc., are used to indicate long-term average (i.e., sustainable) conditions of an aquifer or ground water body. The water budget method is not used to account for periods of drought.

The sustaining source of recharge to the basal ground water lens is the mauka rain belt, described earlier. For the water budget calculation, it is conservatively assumed that recharge originates between the 50-inch makai isohyet (annual rainfall contour) and the 40-inch mauka isohyet. It is also reasonably assumed that the four-mile wide rain belt creates a lens of fresh water extending parallel to the coast with ground water flow more or less perpendicular to the coastline. For purposes of selecting well sites and determining well spacing and well capacity, the recharge area between Palani Junction and Kahaluu is divided into one-mile-wide sectors. For each sector, the average rainfall (expressed in million gallons per day) has been computed and is shown in Figure 2. Approximately 15 to 17 mgd of rain falls, on average, on each coastal mile-wide sector. In the area between Palani Junction and Kahaluu, total rainfall in the rain belt averages 125 mgd.

The amount of rainfall that percolates deeply and becomes recharge (ground water flow) to the basal lens is determined by subtracting losses due to evapotranspiration and runoff. Runoff is nil. However, evapotranspiration cannot be accurately calculated without reliable evaporation data for the Kona upland area. Therefore, computation of recharge by the water budget method was not made. Studies done elsewhere, however, show calculations of recharge as a percentage of total rainfall ranging from 25% in southeast Oahu to 44% in the Pearl Harbor area. Because there is no runoff, the recharge in the Kona area probably amounts to 50% or more of total rainfall.

Estimate of Recharge by Darcy's Law

As a check on the magnitude of recharge per coastal mile, Darcy’s law is used as follows:

\[ Q = K A \frac{dh}{dl} \]

where,

\[ Q = \text{ground flow or recharge in mgd/coastal mile} \]
\[ K = \text{hydraulic conductivity in feet/day} \]
\[ A = \text{cross sectional area through which recharge occurs} \]
\[ \frac{dh}{dl} = \text{water gradient in feet/mile} \]
For the study area, \( K \) is assumed to range between 1500 to 2000 feet/day. The hydraulic conductivity of Koolau lava flows on Oahu has been calculated to range from 1000 to 1500 feet/day. The lava flows in the Kona area are geologically younger than the Koolau lavas and it is reasonable to assume a similar or higher hydraulic conductivity for Hualalai lava flows.

Assuming \( K = 1500 \) feet/day, \( A = (5280 \text{ ft.})(41)(4.0 \text{ ft.}) \), and \( \frac{dh}{dl} = 4.0 \) ft./mile; the ground water flow, flux, or recharge per coastal mile at Kahaluu is:

\[
Q = (1500)(5280)(164)(4/5280)(7.48) = 7.4 \text{ mgd/coastal mile}
\]

Assuming \( K = 2000 \) feet/day, and the same terms above, the ground water flow, flux, or recharge per coastal mile at Kahaluu is:

\[
Q = (2000)(5280)(164)(4/5280)(7.48) = 9.8 \text{ mgd/coastal mile}
\]

Thus, the ground water recharge for the coastal mile sector at Kahaluu is estimated to range, roughly, between 7 and 10 mgd (45 and 65%) of total rainfall in the rain belt. The 7 mgd figure probably is conservative. Rainfall mauka of the computed rain belt undoubtedly contributes additional recharge to the basal lens, but was not included in the calculations. The calculations of recharge by the water budget method and Darcy’s law are intended to show approximate, rather than precise values for recharge.

**Sustainable Yield**

Sustainable yield is herein referred to as the amount of ground water that can be developed from the basal lens without adversely affecting the long-term ability of the lens to produce acceptable quality water from existing and new sources. Adverse effect may relate to localized upconing of salt water caused by excessive pumping rates; or to shrinking of the lens caused by excessive total pumpage from an area or hydrologic sector. Sustainable yield is always less than recharge.

For ground water management purposes, estimation of sustainable yield in mgd/coastal length is very useful in planning the spacing of wells and well-fields along the Kona coast.

Fortunately, records of the Kahaluu shaft and well-field, taken as a point source of ground water withdrawal, provide a good estimate of sustainable yield and an insight to the behavior of the basal lens under pumping conditions. Making a reasonable and conservative assumption that the Kahaluu "point source" is laterally capturing the mauka-to-makai ground water flow a half mile to either side of it, the sustainable yield of the Kahaluu coastal mile sector is estimated to be about 5.5 mgd. This amount equals 35% of the conservatively computed total rainfall and 55% of the estimated recharge.
Rounding values toward the conservative side, the estimated sustainable yield per coastal mile, based upon the Kahaluu sector, is approximately 5 mgd/coastal mile or 1 mgd/coastal 1000 feet between Kailua and Kahaluu as shown in Figure 2.

Figure 4 shows monthly pumpage of the Kahaluu shaft and well-field (Wells A,B,C,D), and monthly chlorides (an average of two to four irregular readings taken each month) of the shaft. Between mid-1982 and mid-1985, the shaft and well-field (principally Well D) pumpages were fairly constant at about 4.5 and 1 mgd, respectively. The chlorides at the shaft were fairly stable at about 125 parts per million and those at Well D (not shown) were fairly stable at about 40 parts per million. Thus, based upon the mid-1982 to mid-1985 data, the estimated sustainable yield of the Kahaluu one-mile sector is 5.5 mgd.

However, from mid-1985 to mid-1988, as can be seen in Figure 4, the shaft pumpage rose gradually to between 5.5 and 6.5 mgd and the well-field to about 1.5 mgd (about 7 to 8.5 mgd, total). The shaft chlorides became unstable, rising steadily to 200 parts per million, while the well-field (not shown) rose to between 40 and 90 parts per million. After mid-1988 shaft pumpage was gradually reduced to 4.5 mgd by early 1990 and the well-field pumpage was increased to 3.5 mgd (8 mgd, total). At 4.5 mgd, the shaft chlorides have adjusted downward toward 200 parts per million, from a high of 250. However, the increased pumpage at the well-field has caused chlorides to rise in the two southernmost wells: from 90 to 170 ppm in Well B and from 80 to 100 ppm in Well D. The current total pumpage of 8 mgd, as adjusted, may or may not prove sustainable.

Well Spacing

The Kahaluu well-field consists of four wells. They are aligned in a north-south direction, roughly parallel to the coastline. From north-to-south they are spaced 145 feet, 370 feet, and 225 feet apart. The two northern-most wells, spaced 145 feet apart, have a 700 gpm and a 1000 gpm pump and produced 20 to 60 ppm water in 1987-88. During this same period, the two southernmost wells, spaced 225 feet apart, produced 50 to 90 ppm water. The spacing between these two pairs of wells is 370 feet, yet they produce water with different salinities. This difference suggests that conditions of the basal lens are not always predictable and that wells 300 to 400 feet apart may show no apparent interference.

Potable Water Requirement

The potable water requirement for the Kohanaiki resort project is shown in Figure 5. A total of 2.279 mgd will be needed by 1998 with the first large increment (1.119 mgd) needed in 1993. Not shown in the 1991-1998 schedule is an additional 0.5 mgd for a marina, tennis, and ARTI.
Prospective Well Sites

Planning of prospective well sites was based upon hydrological considerations of the occurrence of the fresh water lens and the estimated sustainable yield per coastal mile. Planning was also based upon the Department of Water Supply's current and future source development plans in the study area.

Figure 3 shows the Department's existing, under construction, and future well sources. By coincidence, the interpreted boundary between the fresh and brackish water parts of the basal lens lies 2000 to 3000 feet makai of Mamalahoa Highway. Therefore, all prospective well sites have been located along Mamalahoa Highway.

Spacing of the well sites was integrated with the Department's existing, under construction, and future well sites. All well sites are more or less evenly spaced 3500 to 4000 feet apart. Between the Kahaluu sector and Palani Junction, the estimated sustainable yield is 35 mgd. Therefore, with 11 sites altogether, each site has the potential to produce 3 mgd, possibly less toward Palani Junction.

Recognizing that much more has yet to be learned about the basal lens and barring any unexpected conditions, chances appear good that each of the sites (as pumping centers of one to three wells) will be able to produce anywhere from 1.5 to 2 million gallons per day from two or three wells spaced a minimum of 100 feet apart with pump capacities of 500 to 700 gpm each. The optimistic figure is 3 mgd per site and the optimistic pumping rate is 700 to 1000 gpm per well, but such optimism should be constrained until proven by pumping test results and longer-term pumpage records.

As each well site is drilled and tested, the results should be carefully reviewed for any recommended changes to interpretations or estimates presented in this report.
Figure 2.
HYDROLOGY & SUSTAINABLE YIELD
Honokohau-Kahaluu, Kona, Hawaii
Figure 3. GROUNDWATER DEVELOPMENT & PROSPECTIVE WELL SITES
Honokohau-Kahaluu, Kona, Hawaii
May 1990

LEGEND:
- County Shaft
- County Well
- County Well Site - Under Construction
- County Well Site - Future
- Prospective Well Site
Figure 4. Monthly Pumpage and Chlorides
Kahaluu Shaft and Wells A,B,C,D
North Kona, Hawaii
Figure 5. Potable Water Requirement
Kohanaiki Project
North Kona, Hawaii
TO: Nansay Hawaii
1112 Kinau Street, Penthouse
Honolulu, Hawaii 96814

In accordance with the Department of Land and Natural Resources Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Division Works", your application to construct and test Well No. 4459-03 within Tax Map Key: 7-2-5:1 for municipal use is approved, subject to the following conditions:

1. The Division of Water and Land Development (DOWALD), Geology-Hydrology Section, shall be notified at [redacted] before any work covered by this permit commences.

2. The permit shall be for construction and testing only. No permanent pump may be installed and no water used from the well without the necessary pump installation permit from the Commission.

3. The following shall be submitted to DOWALD within 30 days after completion of the well:

   a. Well Completion Report.

   b. Elevation (referenced to mean sea level) 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 record; including time, pumping rate, drawdown, chloride content, and water quality data.
4. The applicant shall comply with all applicable laws, rules, and ordinances.

5. This permit may be revoked if work is not started within six months of date of issuance or if work is suspended or abandoned for six months. The work shall be completed within two years of the date of issuance.

SEP 27 1989

WILLIAM W. PATY, Chairperson
Commission on Water Resource Management

Date of Issuance

cc: USGS
    Department of Health,
    Drinking Water Program
    Ground Water Protection Program
    Hawaii Department of Water Supply
September 8, 1989

Mr. Manabu Tagomori, Deputy Director
State Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

WELL CONSTRUCTION PERMIT APPLICATION
KOHANAIKI WELLS 1 AND 2

The developer for the Kohanaiki Development is required to provide for water source development to fulfill the water demand requirements.

We have no objections to the subject permit application.

[Signature]
H. William Sewake
Manager

GK

... Water brings progress...
The Honorable William W. Paty, Chairperson  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
P.O. Box 621  
Honolulu, Hawaii 96809  

Dear Mr. Paty:

SUBJECT: WELL CONSTRUCTION PERMIT  
KOHANAIKI WELLS 1 and 2  
STATE WELL Nos. 4459-02 and 4459-03  
KAILUA, HAWAII  

Thank you for the opportunity to comment on the well construction permits for the Kohanaiki Wells 1 and 2. We offer the following comments:

1. The permits state that the wells are intended for municipal (including hotels, stores, etc) use. If the wells will be serving a public water system, you will be required to comply with the Department’s Administrative Rules, Title 11, Chapter 20, "Potable Water Systems". A public water system is defined as a system serving 25 or more individuals at least 60 days per year or which has a minimum of 15 service connections.

2. Section 11-20-29 of Chapter 20 requires that a new source of potable water serving public water systems be approved by the Director of Health prior to its use. Such approval is based primarily upon the submission of a satisfactory engineering report which addresses the requirements set in Section 11-20-29.

3. The proposed wells lie above the UIC line. Land areas above the UIC line are considered to contain underground sources of drinking water. Thus, it is essential that the proposed well be designed and constructed to prevent the possibility of groundwater contamination. For example, the well should have a concrete well pad and full grouting to prevent seepage or floodwaters from migrating down the well shaft.
If you should have any questions, please contact the Safe Drinking Water Branch at [contact information]

Very truly yours,

[Signature]

JOHN C. LEWIN, M.D.
Director of Health

cc: Philip Ho
Nansay Hawaii
1112 Kinau St., Penthouse
Honolulu, Hawaii 96814
September 8, 1989

Nanney Hawail
1112 Kinoau Street, Penthouse
Honolulu, Hawaii 96814

Gentlemen:

The Commission on Water Resource Management will be acting on your permit application for Kahului Wells 1 & 2 at their meeting on September 13, 1989, at 2:00 p.m. Please note that the meeting will take place in Lihue, Kauai, at the State Office Building, Conference Rooms A and B, 3060 Kiwa Street.

Your application will be included on the agenda as Item 12 (attached).

You or your representative are invited to attend the meeting.

Sincerely,

[Signature]

MANABU TAGUCHI
Deputy Director

ES:bm
Attach.
August 29, 1989

MR MANABU TAGOMORI
DEPUTY DIRECTOR
DEPT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P O BOX 621
HONOLULU HI 96809

SUBJECT: WELL CONSTRUCTION PERMIT APPLICATION
Kohanaiki Wells 1 & 2 (4459-02-03)
TMK: 7-2-5: 1

We have reviewed the subject permit application and have no objections to the proposed well construction.

ROBERT K. YANABU, Division Chief
Engineering Division

STT:jjs
Honorable John C. Lewin, M.D.
Director of Health
Department of Health
1250 Punchbowl Street
Honolulu, Hawaii 96813

Attention: Mr. Thomas Arizumi, Drinking Water Program

Dear Dr. Lewin:

Well Construction Permit Application

In accordance with the Department of Land and Natural Resources Administrative Rules, Section 13-108-12(c), we are sending you a copy of the following permit application:

Kehauulu Wells 1 and 2 (4459-07,08)

Please submit your comments to us, orally or in writing, within three weeks from the date of this letter.

If you have any questions, please contact Kanabu Tagomori at 548-7523.

Very truly yours,

WILLIAM W. PATY

Enc.
August 21, 1989

Mr. Hugh Y. Oto
Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Oto:

Well Construction Permit Application

We are sending you a copy of the following permit application for your review and comments:

Kohalaiki Wells 1 and 2 (4459-02,03)

Please submit your comments to us, orally or in writing, within three weeks from the date of this letter.

If you have any questions, please contact Dan Luri at 548-7643.

Sincerely,

[Signature]

TANABU TACHIBA
Deputy Director

[Stamp]
August 21, 1989

Honesay Hawaii
1112 Kinau St., Penthouse
Honolulu, Hawaii 96814

Gentlemen:

We acknowledge receipt of your application for well construction permits for Kehanaiki Wells 1 and 2 (4459-02,03) at Kau, North Kona, Hawaii.

My staff will be processing the permits and will contact your staff should there be any questions.

Sincerely,

[Signature]

MANABU TAGOCHI
Deputy Director

cc: M&K Pacific, Inc.
August 11, 1989

Division of Water and Land Development
P.O. Box 373
Honolulu, Hawaii 96809

Dear Sir:

Transmitted herewith are applications for construction permits for Kohana'iki Wells No.1 and No. 2. The wells will be consolidated for Nansay Hawaii, Inc. The drilling contractor will be chosen in the near future.

Attached are the following items as requested:

- Application for Kohana'iki Well No. 1
- Application for Kohana'iki Well No. 2
- U.S.G.S. Kailua topographic map showing well locations
- Tax Map Key 7-2-5: 1
- Check for $50.00 payable to the Department of Land and Natural Resources

Thank you for your consideration.

FRANCIS T. SANPEL, P.E.
Vice President

FTS:gt

Enclosures
APPLICATION FOR

XX WELL CONSTRUCTION PERMIT  Well No. 1 of 2 Kohana'i'iki

PUMP INSTALLATION PERMIT

INSTRUCTIONS: Please print or type and send completed application with attachments to the Division of Water and Land Development, P.O. Box 373, Honolulu, Hawaii 96809. Application must be accompanied by a non-refundable filing fee of $25.00 payable to the Department of Land and Natural Resources. (Filing fee waived for government agencies.) If necessary, phone 548-7543, Hydrology/Geology Section for assistance.

1. WELL LOCATION

Island Hawaii  Tax Map Key 7-2-5: 1

Address ________________________________

(Attach a USGS map (scale 1"=2000') and property tax map showing well location referenced to established property boundaries.)

2. WELL OWNER

Firm Name Nansay Hawaii

Contact Person Mr. Philip Ho

Address 1112 Kinau St., Penthouse

Honolulu, Hawaii 96814

Phone ________________________________

LANDOWNER

Firm Name Nansay Hawaii

Contact Person Mr. Philip Ho

Address 1112 Kinau St., Penthouse

Honolulu, Hawaii 96814

Phone ________________________________

3. PROPOSED CONTRACTOR FOR: ☑ Well Drilling ☐ Pump Installation

Name to be arranged

Address ________________________________

Contractor's License No. __________________

4. PROPOSED WORK

☐ Drill New Well ☐ Deepen ☐ Redrill

☐ Alter ☐ Seal ☐ Abandon

☐ Install New Pump ☐ Replace Pump ☐ Modify Pump

(Briefly describe the proposed work and fill in the diagram on the back of this form.)

5. PROPOSED USE

☑ Municipal (including hotels, stores, etc.) ☐ Military

☐ Domestic (individual, noncommercial water systems) ☐ Industrial

☐ Irrigation (specify) ☐ Other (specify) ☐

6. PROPOSED AMOUNT OF WITHDRAWAL one million gallons per day

7. PROPOSED PUMP INFORMATION

Pump Type: ☑ Vertical Turbine ☐ Submersible ☐ Centrifugal

Motor: ☑ Diesel ☐ Gas ☐ Electric: ☐ Rated Horsepower

Rated Pump Capacity 750 gallons per minute (gpm)

Well Owner (print) PHILIP HO

Signature Date 8/17/87

For Official Use Only:

Field Checked By __________________________ Latitude __________________________

Date __________________________  Longitude __________________________

Hydrologic Unit __________________________

State Well No. __________________________
Briefly describe the proposed work:

The objective is to drill, construct and test a water well by the rotary method, to a total depth of 1,665 feet. The planned yield of the well is one million gallons per day to provide potable water for public supply purposes. This is one of two wells that will provide a total of 1.6 mgd for the hotels plus 10 percent for the use of the Hawaii County water supply.

PROPOSED SECTION OF WELL

---

*Approximate elevation at time of filing application. Final elevation (msl) by a surveyor licensed by the State must be submitted at start of construction.*
APPLICATION FOR

WELL CONSTRUCTION PERMIT

XX Well No. 2 of 2 Kohana'iki

INSTRUCTIONS: Please print or type and send completed application with attachments to the Division of Water and Land Development, P.O. Box 372, Honolulu, Hawaii 96805. Application must be accompanied by a non-refundable filing fee of $25.00 payable to the Department of Land and Natural Resources. (Filing fee waived for government agencies.) If necessary, phone 548-7562, Hydrology/Cartography Section for assistance.

1. WELL LOCATION

Island: Hawaii Tax Map Key: 7-2-5: 1
Address

(Attach a USGS map (scale 1"=2000') and property tax map showing well location referenced to established property boundaries.)

2. WELL OWNER

Firm Name: Nansay Hawaii Contact Person: Mr. Philip Ho
Address: 1112 Kinau St., Penthouse Honolulu, Hawaii 96814
Phone

3. PROPOSED CONTRACTOR FOR: ☒ Well Drilling ☐ Pump Installation

Name: to be arranged
Address

Contractor's License No.

4. PROPOSED WORK

☒ Drill New Well ☐ Deepen ☐ Sealed ☐ Abandon
☒ Alter ☐ Install New Pump ☐ Replace Pump ☐ Modify Pump

(Briefly describe the proposed work and fill in the diagram on the back of this form.)

5. PROPOSED USE

☒ Municipal (including hotels, stores, etc.) ☐ Military
☒ Domestic (individual, noncommercial water systems) ☐ Industrial
☒ Irrigation (specify) ☐ Other (specify)

6. PROPOSED AMOUNT OF WITHDRAWAL

one million gallons per day

7. PROPOSED PUMP INFORMATION

Pump Type: ☒ Vertical Turbine ☐ Gas
Motor: ☐ Diesel ☐ Electric: ☑ Submersible ☑ Centrifugal
Rated Pump Capacity: 750 gallons per minute (gpm)

Field Checked By

For Official Use Only:

Latitude

Hydrologic Unit

Longitude

State Well No.

Well Owner (print)

Landowner (print)

Signature Date

Date

Signature Date
Briefly describe the proposed work:

The objective is to drill, construct and test a water well by the rotary method, to a total depth of 1,665 feet. The planned yield of the well is one million gallons per day to provide potable water for public supply purposes.

This is one of two wells that will provide a total of 1.6 mgd for the hotels plus 10 percent for the use of the Hawaii County water supply.

**PROPOSED SECTION OF WELL**

<table>
<thead>
<tr>
<th>Elevation at top of casing</th>
<th>1,605 ft., msl.</th>
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<tbody>
<tr>
<td>Cement Grout</td>
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<td>Hole Dia.</td>
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<td>Total Depth</td>
<td>1,665 ft.</td>
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<td>Rock Packing</td>
<td>990 ft.</td>
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<td>Filter pack</td>
<td>55 feet</td>
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<td>Ground Elevation</td>
<td>1,600 ft., msl*</td>
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<tr>
<td>Solid Casing</td>
<td>A-283 Grade B</td>
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<tr>
<td>Material</td>
<td>Mild steel</td>
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<tr>
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<tr>
<td>Diameter</td>
<td>14 in.</td>
</tr>
<tr>
<td>Wall thickness</td>
<td>3/8 in.</td>
</tr>
<tr>
<td>Roscoe Moss Full Flow Louver Casing</td>
<td>/ /Perforated XX/Screen</td>
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<tr>
<td>Material</td>
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<td>80 sq. in./L.F.</td>
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<tr>
<td>Open Hole</td>
<td>Length 20</td>
</tr>
<tr>
<td>Diameter</td>
<td>12 in.</td>
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*Approximate elevation at time of filing application. Final elevation (msl) by a surveyor licensed by the State must be submitted at start of construction.
Tax Map Key: 7-2-5: 1
Showing location of Kohana'iki Well No. 1 and Well No. 2
Nansay Hawaii, Inc.
Tax Map
Nansay Hawaii
Wells No. 1 and 2

LAND DEPARTMENT

69 AUG 16 p 3 : 16
RECEIVED
**PAY TO THE ORDER OF M&E Pacific, Inc.**

**PAY TO THE ORDER OF DEPT. OF LAND & NATURAL RESOURCES**

Kohaniiki Wells 1-2, Well Cost Permit Application Fees

**FIFTY AND 00/100 DOLLARS**

**CHECK NO. 002298**

**CHECK AMOUNT**

**50.00**

**FIRST HAWAIIAN BANK**

HONOLULU, HAWAII

**CHECK DATE** 08/11/89

**PAYEE NO.** 2298
July 27, 1989

MEMORANDUM FOR THE RECORD

FROM: Gordon Akita

SUBJECT: Water Source Development for Kohanaiki, North Kona, Hawaii

A meeting was held on the subject above on July 13, 1989 in the Division of Water and Land Development's conference room. The purpose of this meeting was to discuss the State and Kohanaiki Water Sources Development Plans.

Persons in attendance:

   Ed Harada, M & E Pacific        Dan Lum, DOWALD
   Frank Sanpei, M & E Pacific     Gordon Akita, DOWALD
   Joe Callahan, M & E Pacific

Discussion:

   1. Attached map shows the Kohanaiki Hotel development location, the additional parcel (TMK 7-2-5:1) location, proposed well field location, and proposed transmission line (2 alternatives) shown in red.

   2. The Kohanaiki Hotel development is owned by Nansay and will require approximately 2.5 MGD.

   3. Wastewater will be reused for irrigation water for the golf course.

   4. Nansay also acquired TMK: 7-2-5:1 for additional development and well field.

   5. The hotel is scheduled to open in early 1993.

   6. Developer proposes to use wells to provide total hotel water needs plus 10% to DWS. DWS has agreed to operate and maintain offsite water system.

   7. Info on North Kona (Kalaoa) Exploratory Well were provided as follows:

      - Anticipated NTP is August 1989
      - 8-month construction period
      - Copy of plan and specifications

   8. Funds for future Hualalai Exploratory Well in North Kona have been appropriated. Location of this well will depend on the results of the Kalaoa Well.

   9. The yield of Kalaoa Well is expected to be about 300-350 gpm.
MEDIUM-LOW DENSITY RESIDENTIAL AND GOLF COURSE
(368 ± acres)

Lot 7-B

MEDIUM-LOW DENSITY RESIDENTIAL
(575 ± acres)
Lot 7-C

Lot 7-A
BUSINESS COMMERCIAL:
(225 ± acres)

Lot 7-D
LIGHT INDUSTRIAL
(165 ± acres)

KALOKO LIGHT INDUSTRIAL PHASE

KALOKO PROPERTIES
FOR KALOKO & KOHANAHI
Kaloko, North Kona, Hawaii
Prepared: TSU DEVELOPMENT COMPANY, LTD.
Prepared by: WILSON OKAMOTO & ASSOCIATES INC., HONOLULU
Scale: 7'-3"-00'-07 7'-3'-01'-01
Area: 1,233 ± acres
<table>
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<th>TO:</th>
<th>INITIAL:</th>
<th>PLEASE:</th>
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</thead>
<tbody>
<tr>
<td>M. TAGOMORI</td>
<td>See Me</td>
<td></td>
</tr>
<tr>
<td>D. Lum</td>
<td>Take Action By</td>
<td></td>
</tr>
<tr>
<td>G. Matsumoto</td>
<td>Route to Your Branch</td>
<td></td>
</tr>
<tr>
<td>G. Akita</td>
<td>Review &amp; Comment</td>
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<td>E. Sakoda</td>
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</tbody>
</table>

REMARKS:
- S. Kokubun
- D. Hamada
- L. Nanbu
- F. Ching
Mr. Manabu Tagomori  
Department of Land and Natural Resources  
State of Hawaii  
1151 Punchbowl Street  
Honolulu, Hawaii 96813  

Dear Manabu:

Re: Kohanaiki Project - North Kona

Thank you for making time from your busy schedule last week to meet with Takeo Fujii, Joe Callahan and me to discuss the water system requirements for the Kohanaiki project. The information provided by you and your staff was very beneficial in giving us a clearer picture of the State’s plans for water development in the North Kona area in addition to requests made by private developers to the State Water Commission.

As we indicated at the meeting, a request for drilling of exploratory/production wells for the Kohanaiki project within TMK: 7-2-5: 1 will be submitted to the Water Commission in the near future. With the data available from the Huehue Ranch Well No. 1 in addition to information from your State exploratory well in Kalaoa, we should all get a better idea as to the potential and capacity of the North Kona aquifer.

I thank you again for your assistance and ask for your continued help and guidance as we proceed with our project. Please feel free to call me should you have any questions.

Very truly yours,

Edward K. Harada  
Manager

cc: Mr. Phillip Ho  
Mr. Frank Sanpei  
Mr. Joseph Callahan
Huehue Ranch Well
1600' Elevation
340 gpm, 120 ppm

Proposed
Well Field

State Exploratory
Well 1760 Elev.
Under Contract.

Watermain to be
constructed with
Imp. Dist. proj.

NORTH KONA
COUNTY OF HAWAII
Kebun - see kid?

Tulip Fujii - M+E

2:30 - 3:30

Marg 7/20/81

Total (net) needs: 25 mg/l ultimate

Overcap by 10%
July 17, 1989

Mr. Dan Lum
Department of Land and Natural Resources
Division of Water and Land Development
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dan:

Re: Kohanaiki Development

Thank you for making time from your busy schedule to meet with Frank Sanpei, Joe Callahan and me last week to discuss the water requirements for the Kohanaiki project in North Kona. We appreciated especially your sharing of information regarding your department's experiences and knowledge in deep well exploration in that region and your current and future plans for water source development.

As discussed with you, the water needs for our project are proposed to be provided by a series of wells in the vicinity of TMK: 7-2-5: 1 and along the Mamalahoa Highway as shown on the attached map. We propose to drill an initial exploratory/production well on TMK: 7-2-5: 1 and, consequently, look with interest at the State's proposed well to the south currently under contract with Water Resources, Inc. The results of your testing for quality and quantity together with our knowledge of the Huehue Well to the north would give us a better understanding of the aquifer in that area.

We have scheduled a meeting with Manabu Tagomori on July 20th to inform him of our plans and to discuss the requirements of the State Water Commission for our proposed well development. We will continue to keep in touch with your division as we proceed with our plans for Kohanaiki.
Thank you again for your help. Please feel free to call me should you wish to discuss this matter.

Very truly yours,

Edward K. Harada
Manager

Attachment: 1

cc: Mr. Phillip Ho w/attachment
Mr. Frank Sanpei w/attachment
Mr. Joe Callahan w/attachment
Wai ka ola: water is life

The tiny article of a few lines in the Hawaii Tribune Herald of May 14 entitled "The Department of Health says Fish Eaters, Beware," should be a concern to all of us. As island people fish is a vital part of our diet and daily lives.

The death of two dolphins from the Waikoloa Hotel raises the question: did ciguatera picked up from mullet they ate. There has been a rash of ciguatera cases in our island populace of late; and the Department of Health warns us not to eat fish caught in West Hawaii.

Is it possible that fish are getting ciguatera because of developments along the coastline? A Hawaiian friend told me that the time used in building the hotels along the coastline is hosed toward makai side. Could it be that lime and other pollutants from the construction sites and chemicals from golf courses ho'opilau the sea, contaminate the fish, killed those dolphins, and could possibly kill us? This line ends up polluting the ocean, and destroys the ecosystem called ciguatera. The DOH warns us that humans, too, can die from this toxic disease.

Over 75 rare anachialine ponds (home of the endangered species opae-ula) were destroyed by the developers of the Hyatt Hotel at Waikoloa. In my opinion as trustee of OHA there is a strong link between these events and the poisoning of humpback whales.

Bad enough air pollution and destruction of forests is contributing to drought, green-house effect, and destruction of our planet's ozone layer. Water pollution is one of the greatest threats to our environment and our health.

Our beloved brother, the late and sorely missed Wayne Westlake once told me that Hawaii's motto 'waiakea ke ea o ka 'aina i ka pono. With the kokua of Hawaiians, taro has been eaten by the Native Hawaiian Health Task Force member Laurel Au. Native Hawaiians legists related that endangered green turtles and humpback whales are "caught between a rock and a hard place... Encroaching are the land developers that are destroying the creatures' dwindling habitat."

Biologist Gene Nitta pointed out that marine resources need to be considered before development begins. He spoke of how the endangered species are having their habitats destroyed and no one is sure of the long term effects. Nitta stressed that each development project is studied separately, rather than looking at what all projects in an area will do to the local marine life and ecosystem. A more holistic Aloha Aina approach is imperative! As island people the ocean is like our refrigerator; we've got to protect our ocean and our sea life.

The biologists main concern is the loss of habitat for endangered marine life. "Once we lose the habitat we lose the species," according to Nitta. He also stated endangered species such as the green turtles are virtually ignored when water usage declarations are made.

These experts also voiced concern for the potential impact of development at favorite Pine Trees, which is named Kohanaki located a few miles from Kailua, Kona. First, Kailua mai i au for a statement I made in my last column of June issue of Ka Wai Ola O OHA about the Bishop Estate. I had been told by several residents that the Bishop Estate is now trying to get rezoning of this area. This is not true; the Bishop Estate does not own Kohanaki. However, regardless of who owns Kohanaki it should not be developed. The owners, a local hui convinced the County Council to change the zoning of this area from conservation to resort last fall. As soon as they received their change the hui sold this plot at a more than $30 million profit to Japanese Nansan Corporation. At the Wednesday, June 7th County Council meeting, Councilman Takashi Domingo showed his displeasure at the sale and high profits at the expense of the community after the rezoning passed. Biologists were also concerned that since Kohanaki is a resting place for humpback whales and their calves. I am happy to convey that at this time county council made the proposed Marina that was to be a part of this project was voted down by the County Council. However, there is a feeling there should be no resort at all at Pine Trees and that it should be left alone as a park for the community to enjoy.

Stand up you all people! Stand up for our aina and ocean. Don't wait until it's gone before you stand up!

Ua mau ke ea o ka 'aina i ka pono.

"In celebration of taro" festival July 22

Everything you wanted to know about the history and cultural significance of taro will be featured July 22 at the Windward Community College's "In Celebration of Taro." The festival will be from 9 a.m. to 3 p.m. on the Windward Community College Campus. It is being co-sponsored by the National Taro Association of Hawaii and the Windward Community College and Friends of Taro.

The festival will combine fun and educational activities—Hawaiian legends in storytelling, arts and crafts with taro, informative lectures on the role of taro in Hawaiian history and culture, raising tao and demonstrations on the various techniques of harvesting and preparing taro for cultural purposes. There will be huli (young taro shoots) available to take home. Children's activities include learning about the different parts of taro, poi pounding, and how to use simple taro or poi-based recipes.

Different varieties of taro will be exhibited along with other food booths featuring kulolo, poi pounding, and how to use simple taro or poi-based recipes. For many centuries taro was the staple of the Hawaiian people. Today it has been termed "the forgotten food" because taro is less widely cultivated or used, according to Mitsue Cook-Carlson of Friends of Taro. Native Hawaiian Task Force member Laurel Au Muneoaka notes, "For Hawaiians, taro has been considered "a valued blood brother" and its growing pattern demonstrated the central concept of 'ohana (family and extended family). Planting, growing and eating taro reinforced important Hawaiian concepts of cooperation, contribution to the community, enjoyment, and that hard work was required to reap a crop."

The purpose of the festival is to educate the public about the importance of taro in the past, its value as a food source with multiple uses, and to encourage its increased use in the future.

For more information call the Windward Community College Community Services Office at 235-7434.

More than 50 percent of adult Americans have blood cholesterol levels above 200 milligrams per deciliter, a level at which the risk of coronary heart disease begins to rise sharply, says the American Heart Association.
My grandmother’s grandmother was a Kahuna Ma-Kani, (spirit priest), she handed down the tradition to her children. My grandmother’s grandfather was a Kahuna Kahea (priest of calling), he handed down the tradition to his children. They married each other. Their grandchild, my grandmother, was the last Kahuna Ma-Kani Kahea in my family. Because of one generation of interruption, I had to retrace the steps created by thousands of generations to re-establish only the understanding of such greatness!

My great-grandfather was the last ‘Olohe lua (martial arts expert), he handed down the tradition to his children. My grandmother’s grandfather was an ‘Olohe ha’a (expert in sacred temple dance), and he handed the tradition down to his children and grand children, who married each other. My great-grandfather was the last ‘Olohe lua in my family. Because of two generations of interruption, I had to retrace the steps created by thousands of generations to re-establish only the understanding of such greatness!

I could go on indefinitely, the purpose being to show that much of our cultural past was misplaced because of another’s deception. What do these vocations have in common? They represent three of our Zen-Like art-forms which are on the verge of extinction. I say on the verge because although we do practice the arts themselves we still retain the knowledge of each working society. And, unless haste is made, these too will go the way of the dinosaurs. There were others to be sure, but these three were the most prominent in my family.

Those people who are acquainted with me know that I am a staunch advocate of reintroducing our collective-mind to our former, tried and true philosophy. The understanding and representation of this lies in the culture of a given people, and that culture expressed through the high arts. I know that I’ve championed this cause endlessly, but it bears repeating, lest those arts follow the path of the ‘olohe, the kalai ki’i and a variety of Kahuna. In my lectures, I have tried to discourage our people from their fear of our past—our real past. I have discouraged the romanticization of our history and our key historical figures. I have tried to explain the need for delving into understanding and accepting our esoteric culture as it was, and not as it is perceived to be. Sometimes, I feel that my words have fallen on deaf ears, my reputation suffering in the attempt.

We need our high arts as well as our philosophy as well as our myths but why isn’t it recognized or respected?

As much as I have presented the issue to our established entities, such as SFCA, NEA, etc., I believe that the trouble lies within our own people. If we cannot understand and appreciate our own problems, how can we expect others to assist in addressing them? We need dialogue amongst our own. But then, how do we come to a consensus when each separate ego tries desperately to outdo the other? Our revered scholar, Charles Kenn, once asked, “Do you know why Hawaiians will never see eye to eye on anything?” Of course, I answered, “No, why?” He volunteered, “Because, we are not unified spiritually. We are Catholics, Anglicans, Baptists, etc.”

We need our ancestral imagery as well as our canoes, but why aren’t they recognized or respected?

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Going boldly where thousands have gone before

Haumea

Mormons, Episcopalians, Protestants, etcetera, first and Hawaiians second.” At one time, we were Kanaka Maoli first and foremost!

Mai ka po mai ‘oia ‘i o. Truth does not require belief in order to exist.

‘Ai Pono, E Ola

By Terry Shintani, M.D.

Weight loss, health and the Hawaiian diet

The Waianae Diet Program, based on a traditional Hawaiian diet, will be starting soon. It represents the joint efforts of the Waianae and Nanakuli home- stead associations with the assistance of other Hawaiians from Molokai and elsewhere in the state.

In past articles I have discussed how the traditional Hawaiian diet helps to lower cholesterol and to reduce the risk of the number one killer of native Hawaiians—heart disease. The traditional Hawaiian diet also helps us to lose weight and decrease our risk of diabetes.

When I tell people that the Hawaiian diet helps people to lose weight, it seems like a paradox. This may be because so many people still believe it was natural for Hawaiians to be overweight.

In fact, this was not the case. In pre-Western contact Hawai'i, (that is, before Captain James Cook arrived in 1778), the average Hawaiian, the maka'aina, was slender. In 1779, Captain James King, who sailed with Cook, stated in the ship's log, “The Hawaiian people are of a slim rather than full habit . . .”

How is this possible when we see so many obese individuals today? One of the reasons is that diet has changed drastically since that time. The ancient diet consisted of kalo, ‘ulu (breadfruit), ‘uala (sweet potato), uhi (yams), limu (seaweed), i‘a (fish) and hua’ai (fruit). Total dietary fat was only 9 percent of the calories.

Today, with foods such as SPAM, beef, pork, macaroni salad, cheese, french fries and fast foods as our staples, dietary fat is up to 42 percent.

In a previous column, I discussed how “starch makes you skinny, and fat makes you fat.” A 1985 study graphically illustrates this point: only three percent of mice who were fed a 13 percent fat diet became obese, or excessively fat. However, almost half of the mice who were fed a 45 percent fat diet became obese.

This pattern of increased obesity in high fat diets is found all over the world when people change from their low fat traditional diets to a high fat western diet. These studies suggest that dietary fat is directly related to the obesity found among people of the modern world, including Hawaiians.

Obesity also increases the risks of heart disease and cancer, and in the case of diabetes, raises the risk by 290 percent. In ancient times, diabetes was practically unknown in Hawaii and in other traditional cultures. With the change to a modern high fat western diet, obesity and diabetes have both increased dramatically.

Today, Native Hawaiians have a diabetes rate of 300-500 percent higher than that of the general public.

Does reducing dietary fat also decrease obesity and thereby reduce diabetes? A study in Samoa, a culture with a traditional diet similar to the Hawaiian, has found this to be the case. An individual who was placed on a 10 percent fat diet (similar to the fat content of his traditional diet) decreased his insulin requirement significantly within one month. While such a study is only preliminary, it is certainly encouraging to people with diabetes.

The Waianae Diet Program intends to help the participants lose weight naturally and decrease the risk of diabetes. These objectives are in addition to the objectives of reducing cholesterol and blood pressure, and increasing the survival of all Hawaiians.

If you would like to know more about the Waianae Diet Program, or if you would like to kokua in any way with ideas or food donations, please call me at the Waianae Coast Comprehensive Health Center at

Dr. Shintani, Director of Prevention Health Services at the Waianae Coast Comprehensive Health Center, is a physician and nutritionist. He is also coordinator of their Malama Ola preventive health program. A majority of the Center’s clients are native Hawaiians.