1-24-87 Bailing Pumping Test. Well at 36, 5 7/8" dia. Open hole 209 pm ±, less than 1/2 ft alt.
2-20-87 Installed 5" casing to 36'
2-23-87 Installed pump. Surged well
2-24-87 Pump test at 300 pm for 3 hrs
2-25-87 Pulled 5" casing to begin deepening well to 61'
2-27-87 Reinstalled 5" casing to 36 ft.
3-3-87 Bailed well about 4 hrs.
3-4-87 Demobilize rig.

5/27/87 D.C.
Compiled from DSI Logs.
<table>
<thead>
<tr>
<th>DEPTH FROM to (FT.)</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SAMPLE</th>
<th>PEE-N-</th>
<th>TYPE OF BORING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Finished Hauling Rods &amp;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Casing to Young</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brothers went to Well</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site and cleaned</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>up Area Hauled Gas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottles out on boat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Took boat out of water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Washed down good</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For Shipping delivered</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15 to Young Bros.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For Shipping along with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Truck</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Job Complete and Pave</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEPTH FROM to (ft.)</td>
<td>DESCRIPTION OF MATERIAL</td>
<td>SAMPLE</td>
<td>PENETRATION TYPE OF BORING</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------</td>
<td>--------</td>
<td>---------------------------</td>
<td></td>
</tr>
<tr>
<td>Today flew all equipment out of well area.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taped then assembled equipment and hauled it to young Bros. for shipping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PROJECT** Groto Park  
**LOCATION** Kaua'i  
**BORING NO.** 10  
**GROUND ELEVATION** 17.82  
**DATE:** START 3/5/57  
**FINISH**
<table>
<thead>
<tr>
<th>DEPTH FROM to (FT.)</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SAMPLE</th>
<th>PENE-</th>
<th>TYPE OF BORING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Today all shift breaking down rig taking
all equipment and preparing to airlift to staging area for trans porting to young bro.
For shipping, end of shift we picked up
Rental truck to help haul equipment tomorrow.
**CONTRACTOR'S BORING LOG**

**PROJECT**
Grotto Park  

**LOCATION**
Kauai  

**BOARING NO.**
  

**GROUND ELEVATION**
  

**JOB NO.**
  

**TYPE OF EQUIPMENT**
CPS  

**CONTRACTOR**
  

**DEPTH OF WATER TABLE**
12'4"  

**DATE:**
START 3/13/87  
FINISH  

**REMARKS**
Arrived on Kauai this morning met Wishlist at Kauai  

**DEPTH FROM (FT.)**
  

**DESCRIPTION OF MATERIAL**
  

**SAMPLE**
  

**PENETRATION**
  

**TYPE OF BORING**
  

**NO. BLOWS**
  

**TRATION**
  

**TYPE OF SAMPLE**
  

**From to (ft.)**
  

**Description of Material**
  

**Sample**
  

**Penetration**
  

**Type of Boring**
  

**No. Blows**
  

**Tration**
  

**Type of Sample**
  

---

Started Bailing Hole Before Lunch & Continued

Till 4:30 PM Well was expected and was

Instructed to discontinue and start demobilizing
PROJECT: Fern Court  
FEATURE: Waterwell 0221-01  
LOCATION: Kauai  
BORING NO.  
GROUND ELEVATION  
JOB NO.  
TYPE OF EQUIPMENT: CONTRACTOR  

DEPTH OF WATER TABLE: 12'4"  
DATE: START  
FINISH  

REMARKS  

DEPTH  
FROM to (FT.)  
Sample Type of Boring  
No. Blows Penetration  
Description of Material  
Type of Sample  

Finished Reaming Hole to depth of 6" dia.  
Then installed 5" permanent well casing to 36 ft. Hole complete  
End of shift  
Pulled boat out of water washed engines down
<table>
<thead>
<tr>
<th>DEPTH FROM (FT.)</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SAMPLE</th>
<th>PENE-TRATION</th>
<th>TYPE OF BORING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>From 7'AM to 11:30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reamed 5''Casing To</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>46 ft.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46.10</td>
<td>Puka Puka Rock</td>
<td></td>
<td>4'' Core</td>
<td></td>
</tr>
<tr>
<td>51.0</td>
<td></td>
<td></td>
<td>4'' Core</td>
<td></td>
</tr>
<tr>
<td>51.0</td>
<td></td>
<td></td>
<td>4'' Core</td>
<td></td>
</tr>
<tr>
<td>56.0</td>
<td></td>
<td></td>
<td>4'' Core</td>
<td></td>
</tr>
<tr>
<td>56.0</td>
<td>Reamed 5''Casing To</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>600 ft. Pulled Casing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>out and Reamed Hole To 50'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>End of Shift</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROJECT: Fern Grove  
LOCATION: Kauai  
job No.: TYPE OF EQUIPMENT: CP/K CONTRACTOR  
DEPTH OF WATER TABLE: 12'4''  
DATE: START: FINISH:  
REMARKS:

DRILLING COMPANY, INC.  
CONTRACTOR'S BORING LOG  
2/26/36  
PAGE 1 OF 1
**PROJECT**  Kero Groto  **FEATURE**  WATER WELL 0221-0  
**LOCATION**  Kauai  **BORING NO.**  1  **GROUND ELEVATION**  
**JOB NO.**  **TYPE OF EQUIPMENT**  G7C  **CONTRACTOR**  

**DEPTH OF WATER TABLE**  12' 4"  **DATE: START**  **FINISH**  

**REMARKS**  WAS INSTRUCTED TO DEEPEN WELL

<table>
<thead>
<tr>
<th>DEPTH FROM to (FT.)</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SAMPLE PENETRATION</th>
<th>TYPE OF BORING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Pulled Well Casing Hole Served in Had To drill 6&quot; Casing Down to 26' Ft.</strong> From 7:AM to 8:30 Pulling Well Casing 8:30 To 9:30 Drilled 6&quot; Casing To 26' Ft. End Shift</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

---
<table>
<thead>
<tr>
<th>DEPTH FROM TO (FT.)</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SAMPLE</th>
<th>PENETRATION</th>
<th>TYPE OF BORING</th>
<th>TYPE OF SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed Pump and Pumped well till 10 AM. Then inspector came at 10 AM. Water meter defective so (Nishit) inspector went with us to Board of Water Supply to get water meter.</td>
<td>Pumped for Pump Test from 1:30 PM to 4:30 PM. Well didn't stabilize over 30 G.P.M.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>End shift</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**PR DRILLING COMPANY, INC.**

**CONTRACTOR'S BORING LOG**

**PROJECT**  
KERN COUNTY

**FEATURE**  
WATERWELL 0221-01

**LOCATION**  
KAVAN

**BORING NO.**  
GROUND ELEVATION 1786

**JOB NO.**  
TYPE OF EQUIPMENT CPS

**CONTRACTOR**

**DEPTH OF WATER TABLE** 18'4"  
**DATE:** START FINISH

**REMARKS**

<table>
<thead>
<tr>
<th>DEPTH FROM TO (FT.)</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SAMPLE PENE-TRATION</th>
<th>TYPE OF BORING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Had Electrical Hook Up Generator and Pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spent the remainder of shift Surfing well and Pumping well</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**CONTRACTOR'S BORING LOG**

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>Feature</th>
<th>LOCATION</th>
<th>BORING NO.</th>
<th>GROUND ELEVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferngrove</td>
<td>Water Well</td>
<td>Hawaii</td>
<td>0221-01</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JOB NO.</th>
<th>TYPE OF EQUIPMENT</th>
<th>DATE: START</th>
<th>FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>86-47</td>
<td>CP: 15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEPTH OF WATER TABLE</th>
<th></th>
</tr>
</thead>
</table>

**REMARKS**

<table>
<thead>
<tr>
<th>DEPTH FROM to (FT.)</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SAMPLE PENE-</th>
<th>TYPE OF BORING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Installed 5&quot; Permanent Casing to 36' as instructed welded joint and Angle Iron to hang casing in hole Worked with Generator to check out Pump but couldn't make it work Pulled Boat from water secured every thing for the week end</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEPTH (FT.)</td>
<td>DESCRIPTION OF MATERIAL</td>
<td>SAMPLE NO.</td>
<td>BLOWS</td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>------------</td>
<td>-------</td>
</tr>
<tr>
<td>400-490</td>
<td>Overdrilled a little for Cutting to larger so Wash out of Hole Have</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>490-576 Open hole Reamed 5&quot; airing to</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottom of Hole then Reamed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>576 with 5½ Tricone to 4½'</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Then with Nishi State Inspector on site we</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boiled Hole for 1 Hour She instructed us To set Permanent Casing That The Hole is</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>End of Shift</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Drilling Log

**Project:** Fern Gross  
**Feature:** WATER WEL D221-01  
**Location:** Kauai  
**Type of Equipment:** CP15  
**Contractor:** PR Drilling Co., Inc.

### Depth of Water Table

**Date Start:** 2/15/52  
**Date Finished:**

### Depth of Material

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Description of Material</th>
<th>Sample No.</th>
<th>Blows</th>
<th>Penetration</th>
<th>Type of Boring</th>
<th>Type of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.0</td>
<td>38.0</td>
<td>Puka Puka Rock Soft</td>
<td></td>
<td></td>
<td></td>
<td>4&quot; Core</td>
<td></td>
</tr>
<tr>
<td>38.0</td>
<td>44.6</td>
<td>Rock more Firm 15 material, Loose</td>
<td></td>
<td></td>
<td></td>
<td>6&quot; Core</td>
<td></td>
</tr>
<tr>
<td>44.0</td>
<td>45.0</td>
<td>Small Core area or Loose Rock</td>
<td></td>
<td></td>
<td></td>
<td>4&quot; Core</td>
<td></td>
</tr>
<tr>
<td>45.0</td>
<td>45.6</td>
<td>Hard Blue Basalt</td>
<td></td>
<td></td>
<td></td>
<td>4&quot; Core</td>
<td></td>
</tr>
<tr>
<td>45.6</td>
<td>46.0</td>
<td>Puka Puka Rock</td>
<td></td>
<td></td>
<td></td>
<td>6&quot; Core</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**
**CONTRACTOR'S BORING LOG**

- **PROJECT**: Fern Grotto
- **LOCATION**: Kaa'at
- **BORE NO.**: 1
- **GROUND ELEVATION**: 
- **JOB NO.**: 
- **TYPE OF EQUIPMENT**: CP-15
- **CLIENT**: 
- **DEPTH OF WATER TABLE**: 12.2
- **DATE**: 
- **START**: 
- **FINISH**: 
- **REMARKS**:
  - Today hauled pipe from Young Brothers to Job Site
  - Launched boat, prepared site and equipment for advancing hole. Contacted Nishi (state inspector) for instructions
State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT

WEEKLY CONSTRUCTION REPORT
Covering Week Ending 24 Jan., 1987

JOB NO. 94-KPA, Parking Improvements, Contractor: George S. Rasmussen, Co. Ltd.

Hawaii, Hawai'i, Hawaii

DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT
P. O. Box 373
Honolulu, Hawaii 96809

MESSAGE

TO: Dave Lum
Res. Farm Grotto Well - 0221-01, Kaua'i

DATE: Jan 23, 1987

I ran a boiler test today with a 15 gal. boiler @ 20 gpm.

Chloride: 130 ppm per 15 minutes. Chloride: 350 ppm per 20 minutes.

Start: 10:50 AM
- 12:10 AM
- 12:30 AM
- 12:45 AM
- 1:00 AM
- 1:30 AM
- 2:00 AM
- 2:30 AM
- 3:00 AM
- 3:30 AM
- 4:00 AM
- 4:30 AM
- 5:00 AM
- 5:30 AM
- 6:00 AM
- 6:30 AM
- 7:00 AM
- 7:30 AM
- 8:00 AM
- 8:30 AM
- 9:00 AM
- 9:30 AM
- 10:00 AM
- 10:30 AM
- 11:00 AM
- 11:30 AM
- 12:00 PM
- 12:30 PM
- 1:00 PM
- 1:30 PM
- 2:00 PM
- 2:30 PM
- 3:00 PM
- 3:30 PM
- 4:00 PM
- 4:30 PM
- 5:00 PM
- 5:30 PM
- 6:00 PM
- 6:30 PM
- 7:00 PM
- 7:30 PM
- 8:00 PM
- 8:30 PM
- 9:00 PM
- 9:30 PM
- 10:00 PM
- 10:30 PM
- 11:00 PM

REPLY

DATE: 0221-01, Kaua'i

BY: [Signature]
SIGNED
<table>
<thead>
<tr>
<th>Depth From (ft.)</th>
<th>Description of Material</th>
<th>Sample No.</th>
<th>Bore</th>
<th>Penetration</th>
<th>Type of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>flew generator to drill site this morning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>made up boiler to meet inspector's request</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>racked hole till 12 noon took a salt test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>had 4 foot 4 inch draw down, test complete by 12:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>pulled boat out of water flushed out motors secured</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>everything checked out of hotel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Contactor's Boring Log**

**Project**: Fern Grator  
**Location**: Waialua River  
**Type of Equipment**: CP15  
**Depth of Water Table**: 12.4

**Remarks**:  
Got word from inspector Mr. Night that they don't want a pump test at this time but they want to bail the hole more and take more slit content tests, but they requested to make my bailer longer to hold more water  
Stood by all shiit for helicopter to haul generator to drill location. Meanwhile serviced all pumps, drill motor, repaired broken suction hose.
**CONTRACTOR'S BORING LOG**

**PROJECT**: Fern Creek

**LOCATION**: Wailua River

**TYPE OF EQUIPMENT**: CP-15

**DEPTH OF WATER TABLE**: 12.4 ft

**DATE START**: 11/21/87

**DATE FINISHED**: 11/22/87

---

<table>
<thead>
<tr>
<th>DEPTH FROM (FT.)</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Today Bailed Hole for</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Hours Worked on Hoist</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of drill rig</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worked on Winch Cutting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>for it loose and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turning standing by for</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Helicopter to fly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Generator to drill site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W15' depth 1/2</td>
<td></td>
</tr>
</tbody>
</table>

---

**CONTRACT**: PR Drilling Co., Inc.
<table>
<thead>
<tr>
<th>DEPTH FROM TO (FT.)</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SAMPLE NO.</th>
<th>PENS.</th>
<th>TRATION</th>
<th>TYPE OF BORING OR SAMPLE TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Today Bailed out hole</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Level dropped 14 inches</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bailed for 2 Hours Maximum drop went to 13'6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintained its normal level to 12'4&quot; in 7 Minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After we stopped Bailing Continued to Bail off and during the shift with same results</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Contractor's Boring Log**

**Project**: Crofto Park  
**Location**: Waiakea River  
**Feature**: Water well  
**Type of Equipment**: CP 15  
**Depth of Water Table**: 12' 4"  
**Contractor**: PR Drilling Co., Inc.  
**Date Start**: 4/12/77  
**Date Finished**:  

<table>
<thead>
<tr>
<th>Depth (FT.)</th>
<th>Material Description</th>
<th>Sample No.</th>
<th>Bows</th>
<th>Penetration Type</th>
<th>Type of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.0 - 36.0</td>
<td>Reamed 5&quot; casing</td>
<td></td>
<td></td>
<td></td>
<td>5&quot; Casing</td>
</tr>
<tr>
<td>36.0 - 36.0</td>
<td>Pulled out 5&quot; casing and reamed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hole out with 5 7/8 Rock Bit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36.0 - 36.0</td>
<td>Reamed hole with Rock Bit</td>
<td></td>
<td></td>
<td></td>
<td>5 7/8 Tricone</td>
</tr>
</tbody>
</table>

**Remarks**:  
- Hauled pump in on boat and took to drill site  
- Prepared to install in hole, went to town got pipe and fittings to install pump in hole
# CONTRACTOR'S BORING LOG

**Project**: Fern Grotto  
**Feature**: Water Well  
**Location**: Wailua River  
**Boring No.**: Ground Elevation  
**Job No.**: Type of Equipment  
**CP 15**: Client

**Depth of Water Table**: 12 ft. / in.  
**Date**: Start 1/12/87  
**Finish**

**Remarks**

<table>
<thead>
<tr>
<th>Depth from (ft.)</th>
<th>Description of Material</th>
<th>Sample</th>
<th>Penetration</th>
<th>Type of Boring</th>
<th>Type of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.0</td>
<td>Basalt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32.8</td>
<td>Puka Puka Rock</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Instructed to Stop Drilling to**

Make first pump test. Hole not losing any water.

**Full Water Return**
<table>
<thead>
<tr>
<th>DEPTH FROM (FT.)</th>
<th>DEPTH TO (FT.)</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SAMPLE NO.</th>
<th>BLOWS</th>
<th>PENETRATION</th>
<th>TYPE OF BORING OR TYPE OF SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.0</td>
<td>30.0</td>
<td>Keamed 5&quot; Casing to 30 ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>To make hole straight then pulled</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>out 5&quot; casing and Keamed hole</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>To 5 1/8&quot; to 30' Contracted inspector</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>For instructions he said to continue hole</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>To 32'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth From (ft.)</td>
<td>Description of Material</td>
<td>Sample No.</td>
<td>Blows</td>
<td>Penetration</td>
<td>Type of Boring or Type of Sample</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------</td>
<td>------------</td>
<td>-------</td>
<td>-------------</td>
<td>----------------------------------</td>
<td></td>
</tr>
<tr>
<td>12.0 15.0</td>
<td>Collapsed with Silty Clay</td>
<td></td>
<td>2247</td>
<td>5 7/8 Tricone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.0 20.0</td>
<td>Medium Hard Puka Puka Rock</td>
<td></td>
<td>3587</td>
<td>5 7/8 Tricone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.0 25.0</td>
<td>Medium Hard Puka Puka Rock</td>
<td></td>
<td>3587</td>
<td>5 7/8 Tricone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.0</td>
<td>Rained 6&quot; casing to 25'</td>
<td></td>
<td>507</td>
<td>5 7/8 Tricone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.0 30.0</td>
<td>Medium Hard Puka Puka Rock</td>
<td></td>
<td>1604</td>
<td>5 7/8 Tricone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.5 30.0</td>
<td>Hard Blue Basalt</td>
<td></td>
<td>1604</td>
<td>5 7/8 Tricone</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End of Shift
**PROJECT:** Field Cutoff  
**LOCATION:** Wailing River  
**TYPE OF EQUIPMENT:** CD-15  
**DEPTH OF WATER TABLE:** None  
**CONTRACTOR:** PR Drilling Co., Inc.  
**DATE START:** 1/11/67  
**DATE FINISHED:**  

**REMARKS:** Had catch problems on drill rig.

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>DESCRIPTION OF MATERIAL</th>
<th>SAMPLE NO.</th>
<th>BLOWS</th>
<th>PENETRATION</th>
<th>TYPE OF BORING OR TYPE OF SAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.7</td>
<td>Good silt clay</td>
<td>3474A</td>
<td>53.6</td>
<td>Tricone</td>
<td>5 1/2 Shovel</td>
</tr>
<tr>
<td>12.5</td>
<td>Good silt clay</td>
<td>4147B</td>
<td>57.5</td>
<td>Tricone</td>
<td>5 1/2 Shovel</td>
</tr>
<tr>
<td></td>
<td>Holes casing in Reamed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Green casing to 11 ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Contractor's Boring Log

**Project:** Seal Breaks  
**Location:** Wicker Creek Knob  
**Type of Equipment:** CP 18  
**Depth of Water Table:** None  
**Remarks:** Considered making up anchor and pulling up mast before starting drilling.

<table>
<thead>
<tr>
<th>Depth From</th>
<th>To (ft.)</th>
<th>Description of Material</th>
<th>Sample No.</th>
<th>Blows</th>
<th>Penetration</th>
<th>Type of Boring or Type of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6</td>
<td>3.2</td>
<td>Cobbled Bone Springs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>5.7</td>
<td>Boulders (Caving in)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** Installed 6ft. of given casing.
Don

Mr. Nishi called w/ results as follows:

Fern Grotto Pump Test
Pressure at shut off: 68 PSI
1-well went dry after 1 min 45 sec
pumping, orange in color, appears to be rust

2-5 test: 5 min. Recharge time
after 1 min 45 sec well went dry
discharge 1/2 brown in color
like surrounding dirt

6-7 trial: 3 min recharge time
well went dry 1 min 35 sec.
1/2 br. discharge

8 test after 2 min recovery, after
1 min 18 sec. well went dry
some light brown color

9 test - 2 min recharge time,
well dry in 1 min 17 sec.
discharge 1/2 br. in color

10, 11, 12: 2 min recharge
well dry in 1 min 16 sec.
1/2 brown in color (over)
TO: Dan Lum via George Matsumoto
FROM: Tinford Chang
SUBJECT: Job No. 94-KP-A, Park Improvements, Fern Grotto, Kauai

MESSAGE:

The contractor is ready to install the pumping unit for the well on this subject project. As such, we are requesting for your recommendation and determination on the pump test results for the subject well.

The well was pumped tested by Tats Nishi on 2/24/81 at 30 gpm, 7.5' drawdown, 600 ppm chloride, well depth at 36 ft. Well then deepened to 61 ft, but not pump tested again. Recommended 30 gpm pump.

Signed: Tinford Chang
FROM: [Signature]

TO: INITIAL:

PLEASE:

A. CHING: See Me
D. Lust: Call
E. Sakoda: Review & Comment
D. Nakano: Take Action
M. Ohye: Investigate & Report
S. Miyamoto: Draft Reply
S. Samuels: Acknowledge Receipt
D. Hamada: Type Draft
K. Oshiro: Type Final
D. Stewart: cc:

FOR YOUR

M. Tagomori: Xerox ___ copies
H. Sakai: File
G. Morimoto: Mail
S. Kokubun: ___

REMARKS:
Fern Groth will
30 gpm yield
Chlorides 60 ± ppm
dd = 7±
What were we expecting?
Good news?
Chlorides over 100 ppm
20-30 ppm worse needed
we identified 3 wells 40 gpm
Pl. Mary Ann: For Ed Zeller
PUMPING TEST RECORD
for
FERN GROTTO Well 02.21-01
(Name) (No.)
Kaua'i Island 44-KP-1 Project or Job No. 19

Description of Well--
1. Elevation: ground surface 17 ft., top of casing 19 ft., rotary table 6 ft., referenced to benchmark.
2. Total depth of well 41 ft.; or 43 ft. elevation, msl
3. 6 in. solid casing to 36 ft. depth, perforated to 8 ft. depth
4. Static water level on Feb. 24, 1981: 15.6 ft. below ground surface, top of casing; or 4.97 ft. elevation msl measured by sounder method

Description of Pump and Pump Setting--
5. ___ type pump with ___ stage bowl assembly
6. Gasoline diesel, electric, power with ___ horsepower
7. Shaft speed: ___ rpm at ___ gpm flow
8. Depth of pump intake: ___ ft. below ___; or ___ ft. elev. msl
9. Depth of airline bottom: ___ ft. below ___; or ___ ft. elev. msl
10. Center of gage: ___ ft. elev., msl. Flow measured with ___
11. Test conducted by ___

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate (gpm)</th>
<th>Airline length (feet)</th>
<th>Drawdown (feet)</th>
<th>Chlorides (ppm)</th>
<th>Temp. (°F)</th>
<th>Cond. (mmhos 25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEBRUARY 24, 1981</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00</td>
<td>01</td>
<td>0</td>
<td>16.58</td>
<td>(STATIC)</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:05</td>
<td>1</td>
<td>30</td>
<td>22.83</td>
<td>6.15</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:20</td>
<td>30</td>
<td>22.44</td>
<td>6.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:05</td>
<td>30</td>
<td>22.54</td>
<td>6.96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:50</td>
<td>2</td>
<td>30</td>
<td>23.05</td>
<td>1.07</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:05</td>
<td>30</td>
<td>22.11</td>
<td>7.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:20</td>
<td>30</td>
<td>22.16</td>
<td>1.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:50</td>
<td>30</td>
<td>22.84</td>
<td>1.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:50</td>
<td>3</td>
<td>30</td>
<td>22.90</td>
<td>1.52</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:05</td>
<td>30</td>
<td>22.93</td>
<td>1.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:20</td>
<td>30</td>
<td>22.94</td>
<td>1.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30</td>
<td>30</td>
<td>22.98</td>
<td>7.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:50</td>
<td>4</td>
<td>30</td>
<td>22.91</td>
<td>7.40</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:05</td>
<td>30</td>
<td>23.05</td>
<td>1.47</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:20</td>
<td>30</td>
<td>27.06</td>
<td>1.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STOP PUMPING

Sheet No. 1 of 2 Sheets
# PUMPING TEST RECORD

for

**FERN GROTTO**  
Well **O221-01**  
(name)  
(No.)

**KOAUI** Island  
**94-KP-8** Project or Job No.  

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate (gpm)</th>
<th>Depth to water (feet)</th>
<th>Drawdown (feet)</th>
<th>Chlorides (ppm)</th>
<th>Temp. (°F)</th>
<th>Cond. (mmhos 25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEBRUARY 24, 1967</td>
<td>1</td>
<td>0</td>
<td>17.18</td>
<td>1.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>16.79</td>
<td>1.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>16.54</td>
<td>.96</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>16.33</td>
<td>.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>16.13</td>
<td>.51</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sheet No. 2 of 2 Sheets**
STATE OF HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT

FERN GROCHO 0221-01
WAIIKA, KAUAI, HAWAII

AS-BUILT SECTION
Driller: P.R. DRILLING COMPANY
Drilled: FEBRUARY 1986

NIPPLE

19.9 FT. MSL - TOP OF CASING * *
17.1 FT. MSL - FINISH GRADE *

* Approximate
As of 2-24-87

5 1/2 FT. MSL - PELON SURFACE
4.7 FT. ABOVE MSL 1-24-87

STATIC WATER LEVEL

Casing Guide

- 44 FT. MSL
BOTTOM OF WELL

NOT TO SCALE
FERN GROVE 022101
JANUARY 24, 1987
M.3.1NG TEST
PAIL CAP. 15 GALLS 1.75
TOTAL DEPTH = 300 FT
RATE APPROX. = 30 GPM

- 350 ppm
- 200 ppm
- DRAWDOWN
- RECOVERY
- CHLORIDES X 100
- Time in Minutes

D = 12.35 FT. DTW REP. GROUND
<table>
<thead>
<tr>
<th>Time</th>
<th>Chloride</th>
<th>Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:50p.m</td>
<td>75 ppm</td>
<td>15' 7&quot;</td>
</tr>
<tr>
<td>1:05p.m</td>
<td>15 ppm</td>
<td>22' 6½&quot;</td>
</tr>
<tr>
<td>1:20p.m</td>
<td>22' 5½&quot;</td>
<td>22' 5½&quot;</td>
</tr>
<tr>
<td>1:35p.m</td>
<td>22' 6½&quot;</td>
<td>22' 6½&quot;</td>
</tr>
<tr>
<td>1:50p.m</td>
<td>22' 7½&quot;</td>
<td>22' 7½&quot;</td>
</tr>
<tr>
<td>2:05p.m</td>
<td>22' 8½&quot;</td>
<td>22' 8½&quot;</td>
</tr>
<tr>
<td>2:20p.m</td>
<td>22' 9½&quot;</td>
<td>22' 9½&quot;</td>
</tr>
<tr>
<td>2:35p.m</td>
<td>22' 10½&quot;</td>
<td>22' 10½&quot;</td>
</tr>
<tr>
<td>2:50p.m</td>
<td>22' 11½&quot;</td>
<td>22' 11½&quot;</td>
</tr>
<tr>
<td>3:05p.m</td>
<td>22' 12½&quot;</td>
<td>22' 12½&quot;</td>
</tr>
<tr>
<td>3:20p.m</td>
<td>22' 13½&quot;</td>
<td>22' 13½&quot;</td>
</tr>
<tr>
<td>3:35p.m</td>
<td>22' 14½&quot;</td>
<td>22' 14½&quot;</td>
</tr>
<tr>
<td>3:50p.m</td>
<td>22' 15½&quot;</td>
<td>22' 15½&quot;</td>
</tr>
<tr>
<td>4:05p.m</td>
<td>22' 16½&quot;</td>
<td>22' 16½&quot;</td>
</tr>
<tr>
<td>4:20p.m</td>
<td>22' 17½&quot;</td>
<td>22' 17½&quot;</td>
</tr>
<tr>
<td>4:35p.m</td>
<td>22' 18½&quot;</td>
<td>22' 18½&quot;</td>
</tr>
<tr>
<td>4:50p.m</td>
<td>22' 19½&quot;</td>
<td>22' 19½&quot;</td>
</tr>
</tbody>
</table>

**Notes:**
- Start: 2/24/81 30 ppm
- Shut-off: 1/4/81
- Elev. Grotto
- Well 1
Dr. John C. Lewin  
Director  
Dept of Health  
State of Hawaii  
Honolulu, Hawaii  

Dear Dr. Lewin:

Thank you for your letters of March 20, 1987, informing the Department of Land and Natural Resources of the requirements of the State's Drinking Water Regulations with regard to using wells drilled by the Division of Water and Land Development at Kaena Point State Park, Oahu (Makua Well 3213-07) and Wailua River State Park, Kauai (Fern Grotto Well 0221-01).

Very truly yours,

WILLIAM W. PATY  
Chairperson of the Board

ES:MT:dh  
bcc: Mr. Clyde Hosokawa, State Parks (w/enc.)
Mr. Manabu Tagomori, Head  
Division of Water and Land Development  
P. O. Box 373  
Honolulu, HI 96809

Dear Mr. Tagomori:

The Department of Health has been notified of your well drilling permit for Fern Grotto Well, State Well No. 0221-01, Waialua River State Park, Kauai. Please be aware that use of this well as a source of water will require compliance with the State's Drinking Water Regulations, Chapter 20, Title 11, Administrative Rules.

The Department of Health is vested with the responsibility to assure that public water systems in the State are providing water which is in compliance with the State's drinking water regulations known as Chapter 20, Title 11, Administrative Rules, and are in compliance with all other applicable terms and conditions of Chapter 20. A public water system is defined as a system serving 25 or more individuals at least 60 days per year or having a minimum of 15 service connections. In the event that the new well is intended to serve these minimum numbers of persons or service connections, please be advised that the well and distribution system will be subject to the terms of Section 11-20-29 and Section 11-20-30 of Chapter 20 respectively.

Section 11-20-29 of Chapter 20 requires all new sources of potable water serving public water systems to be approved by the Director of Health prior to their use to serve potable water. Such approval is based primarily upon the satisfactory submission of an engineering report which adequately addresses all concerns as set down in Section 11-20-29. The engineering report must be prepared by a registered professional engineer and bear his or her seal upon submittal.

Section 11-20-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director of Health. Such approval depends upon the submission of plans and specifications for the project prior to construction and the demonstration that the new or modified portions of the system are capable of delivering potable water in compliance to all maximum contaminant levels as set down in Chapter 20 once the distribution system or modification is completed.

In the event that the proposed well is solely intended to serve irrigation or other nondomestic purposes, or if the proposed well will not serve the minimum number to qualify as a public water system as defined earlier, then the new well and distribution system are not subject to Chapter 20 requirements. However, if at some point in the
future, the decision is made to use the water for potable purposes, or if the system expands to meet the minimum service population or number of service connections, the source and distribution system will be subject to Section 11-20-29 and Section 11-20-30 respectively prior to their use to serve the new public water system.

I hope this information will be of use to you. Should you have any questions regarding Chapter 20, Title 11, Administrative Rules, please contact the Drinking Water Program at 348-2235.

Sincerely,

JOHN C. LEWIN, M. D.
Director of Health
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT

FERN GROTTO DR21-01
WAILUA, KAUAI, HAWAII

AS-BUILT SECTION

Driller: P.R. DRILLING COMPANY
Drilled: FEBRUARY 1980

NIPPLE 19.40 FT. MSL - TOP OF CASING
1.01 FT. MSL - FINISH GRADE

TOTAL DEPTH DRILLED HOLE, 6 DIAMETER

3½ Feet SOLID CASING 5 I.D.x

6 Feet FULL-FLO SHUTTER SCREEN WALL

CEMENT GROUT

12.4 FT. BELOW GR. SURFACE
FT. ABOVE MSL 1-24-87

STATIC WATER LEVEL

Casing Guide

BOTTOM OF WELL

NOT TO SCALE
INDEX

DESCRIPTION
TITLE SHEET
SITE PLAN
SITE PLAN AND DETAILS
WATER SYSTEM DETAILS
GLASS-COATED STEEL TANK DETAILS
ELECTRICAL SITE PLAN
PUMP BUILDING ELECTRICAL & DETAILS
COMFORT STATION FLOOR PLAN & FOUNDATION PLAN & DETAILS
SECTION & INTERIOR ELEVATIONS
NOTICE OF INTENT TO DRILL

WELL OR PROJECT NAME: Comfort Station & Park Improvements, Fern Grotto, Wailua River State Park, ISLAND: Kauai

OWNER OF WELL: State of Hawaii, Department of Land & Natural Resources
Mailing Address: Division of Water & Land Development, Honolulu, Hawaii

DRILLING COMPANY: PR Drilling Co., Inc.
Mailing Address: 98-710A Kualoa Pl., Pearl City, HI 96782
Proposed Construction Date: 1/12/87 Proposed Completion Date: 2/6/87 Proposed Depth: 50'

PROPOSED USE OF WELL:
(a) Domestic ............................................................... (e) Waste Disposal (type) ...........................................
(b) Irrigation ............................................................... (f) Soils Invest. ...................................................
(c) Industrial (type) .................................................... (g) Foundation Invest. ...........................................
(d) Cooling (type) ....................................................... (h) Others (specify) Comfort Station Water System

LOCATION OF WELL: (Attach copy of tax map, USGS topographic map, plantation field map, road map, or prepared drawing showing exact location. If not available, prepare a hand-drawn sketch map (not necessarily to scale) in the space below showing sufficient landmarks, distances, and directions for location in the field)

TAX MAP KEY: Unknown
(see attached)

January 26, 1987
Date Submitted

Signature of Contractor

President

Title (If Applicable)

FOR OFFICIAL USE
Latitude
Longitude
Well No.

FOR DRILLER'S USE
Job Name: Same
Job No.: 86-47

INSTRUCTIONS: Send three (3) copies to: Manager-Chief Engineer, Division of Water and Land Development, P. O. Box 373, Honolulu, HI 96809.

WELL DRILLING PERMIT

for

Fern Grotto Well
State Well No. 0221-01
Wailua River State Park, Kauai

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

In accordance with Chapter 166 of Title 13, "Rules for the Control of Ground Water Use in the State of Hawaii", your application to drill a well to provide water for Wailua River State Park, State Well No. 0221-01, is approved subject to all applicable laws, rules and ordinances.

FEB 13 1987
Date of Issuance

cc: USGS
Dept. of Health, Drinking Water Program
Kauai Dept of Water

WILLIAM W. PATY
Chairperson of the Board