CHECKLIST

Well Construction Permit _\  Pump Installation Permit _\ Water Use Permit Required Also

Well Name & Number: Wahikuli Irrigation Well (5440-01) Island: Maui
Applicant: HFDC  Landowner: State, DLNR

Date application received: 26 July 1993
Date acknowledged receipt/request more info: Not Applicable
Date filing fee deposited: Not Applicable

Application sent to following: Dept. of Health: Safe Drinking Water Branch
Dept. of Hawaiian Affairs: Wastewater Branch
Sierra Club Legal Defense Fund: Honolulu Board of Water Supply
Maui Dept. of Water Supply: Maui Dept. of Water Supply
Kauai Dept. of Water Supply: Kauai Dept. of Water Supply
Hawaii Dept. of Water Supply: Hawaii Dept. of Public Works
Koolauloa NB #28 (Oahu): Additional List (Molekai)
Eric Hirano/ Lyann Mizuno: Check w/Neal Wu. re status of drilling.

Date agenda due: 15 Sep 93
Date submittal due: Draft 15 Sep 93
Date submittal sent to applicant: 15 Sep 93
Date application _ approved OR _ disapproved: 15 Sep 93
Date applicant notified of decision: _\

Remarks: *Rec. Neal Wu (70538) HFDC wants to install ASAP to save
demol. costs.
### CHECKLIST

<table>
<thead>
<tr>
<th>WELL CONSTRUCTION PERMIT</th>
<th>PUMP INSTALLATION PERMIT</th>
</tr>
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<tbody>
<tr>
<td><strong>WELL NAME or LOCATION:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>WELL NUMBER:</strong></td>
<td>6-5446-01</td>
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<tr>
<td><strong>ISLAND:</strong></td>
<td>MAUI</td>
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<td><strong>Tax Map Key:</strong></td>
<td>4-5-71:03</td>
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<tr>
<th><strong>OWNER/OPERATOR:</strong></th>
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</tr>
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<tr>
<td>Firm Name:</td>
<td></td>
</tr>
<tr>
<td>Contact Person:</td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
</tr>
<tr>
<td>Phone:</td>
<td>587-0538</td>
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<table>
<thead>
<tr>
<th><strong>LANDOWNER:</strong></th>
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<td>Firm Name:</td>
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<tr>
<td>Contact Person:</td>
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<td>Address:</td>
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<td>Phone:</td>
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<table>
<thead>
<tr>
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<th>8-17-92</th>
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<td>8-31-92</td>
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<tr>
<td>Date application accepted</td>
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<tr>
<td>Suspense date (90 days)</td>
<td></td>
</tr>
<tr>
<td>Date filing fee deposited</td>
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<tbody>
<tr>
<td>Dept. of Hawn Home Lands</td>
<td></td>
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<tr>
<td>Dept. of Health</td>
<td></td>
<td></td>
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<tr>
<td>Office of Hawn. Affairs</td>
<td></td>
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<tr>
<td>State Hist Pres Div</td>
<td></td>
<td></td>
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<tr>
<td>Dept/Bd of Water Supply</td>
<td></td>
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</tr>
<tr>
<td>Sierra Club L. D. F.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Koolauloa RB #28 (Oahu)</td>
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<tr>
<td>Dept/Pub. Water (Hawaii)</td>
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</tr>
<tr>
<td>Additional List (Melokai)</td>
<td>Eric Havano / Lyann</td>
<td></td>
</tr>
<tr>
<td>[Signature]</td>
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<table>
<thead>
<tr>
<th>Date agenda due</th>
<th>10 Nov 72</th>
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<tr>
<td>Date submittal due</td>
<td>3-26-92</td>
</tr>
<tr>
<td>Date submittal sent to applicant</td>
<td>18 Nov 92</td>
</tr>
<tr>
<td>Date application approved or disapproved</td>
<td>7-14 Oct 92</td>
</tr>
<tr>
<td>Date applicant notified of decision</td>
<td>16 Dec 92</td>
</tr>
</tbody>
</table>

### REMARKS:

______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
STATE WELL NO. 5440-01  
WELL NAME ________________  
TAX MAP KEY ________________  
ISLAND Maui  

A. LOCATION  
Villages of Leali'i Subdivision  

B. WELL OWNER  
Housing Finance & Development Corp.  

C. DRILLING OR PUMP INSTALLATION CONTRACTOR  
Roscoe Moss Hawaii, Inc.  

D. TYPE OF RIG  
60L Cable tool  

E. DATE OF WELL COMPLETION  
12/08/93  

F. DATE OF PUMP INSTALLATION  
12/08/93  

G. GROUND ELEVATION (msl)  
Top of Drilling Platform (msl) 147 ft.  
Height of drilling platform above ground surface 4 ft.  
Bench mark and method used to determine ground elevation Surveyed Stake, 147.54 msl  

H. TOTAL DEPTH OF WELL BELOW GROUND  
162 ft.  

I. HOLE SIZE:  
16 inch dia. from 0 ft. to 162 ft. below ground  

J. CASING INSTALLED:  
10 in. I.D. x .593 in. wall solid section to 142 ft. below ground  

K. ANNUAL:  
Graveled from 0 ft. to 142 ft. below ground  

L. PERMANENT PUMP INSTALLATION:  
Pump make, serial No.  
Motor type, H.P., voltage, r.p.m.  
Depth of pump intake setting ft. below which elevation is ft.  
Depth of bottom of airliner ft. below which elevation is ft.  

M. PROPOSED USE  
Irrigation  

N. INITIAL WATER LEVEL  
147 ft. below ground.  

O. INITIAL CHLORIDE 240 ppm.  

P. PUMPING TESTS: Reference point (R.P.) used: Ground which elevation is 147.54 ft.  

Q. DRILLER'S LOG:  
Depth, ft.  
Rock Description & Remarks  
Water Level, ft.  
Depth, ft.  
Rock Description & Remarks  
Water Level, ft.  

0 to 4  
Boulders  
66 to 90  
Broken Lava  

4 to 12  
Hard Blue Rock  
90 to 95  
Hard Rock  

12 to 21  
Black Rock  
95 to 104  
Clinkers Broken lava  

21 to 26  
Caving Material  
104 to 110  
Blue Rock  

26 to 30  
Hard Blue Rock  
110 to 130  
Broken Lava  

30 to 34  
Red Rock  
130 to 135  
Hard Rock  

34 to 40  
Black Broken Lava  
135 to 140  
Broken Lava  

40 to 44  
Grey Rock  
140 to 162  
Red & Black lava  147.1  

44 to 58  
Hard Grey & Black Rock  
162 to 216  
Rubble  

58 to 70  
Broken Lava  

70 to 86  
Hard Blue & Black Rock  

REMARKS:  

Submitted by (print)  
Tracy Runnells  

Title  
Field Superintendent  

Signature  
Tracy Runnells  

Date  12/10/93  

FOR OFFICIAL USE  
Latitude 20° 54' 12"  
Longitude 156° 40' 52"  
Well No. 5440-01
9. PROPOSED WELL SECTION

- **Elevation at top of casing**: 149 ft., msl.
- **Ground Elevation**: 147.54 ft., msl.
- **Current Grout**: 143 ft.
- **Solid Casing**: PVC Flush Joint
  - **Material**: PVC Flush Joint
  - **Length**: 142 ft.
  - **Diameter**: 10" in.
  - **Wall thickness**: .593
- **Rock Packing**: NA ft.
- **Hole Diameter**: 16 in.
- **Total Depth**: 162 ft.
- **Casing**: NA
  - **Material**: PVC Saw Slot
  - **Length**: 20 ft.
  - **Diameter**: 10" in.
  - **Wall thickness**: .593
  - **Openings**: 60 sq. in./LF.
- **Open Hole**:
  - **Length**: NA
  - **Diameter**: ________

*Approximate elevation at time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment reports.*
PUMPING TEST RECORD

for

Villages of Leialii, Well 1493-R

(Name) (No.)

Mauai Island Village of Leialii Project or Job No. 1493-R (1993) yr.

Description of Well--
1. Elevation: ground surface 435 ft., top of casing 48.4 ft., rotary table ______ ft., referenced to ______ benchmark.
2. Total depth of well 142 ft.; or ______ ft. elevation, msl
3. 10 in. solid casing to 142 ft. depth, perforated to ______ ft. depth
4. Static water level on ______ 1993: ______ ft. below ground surface, top of casing; or ______ ft. elevation msl

Description of Pump and Pump Setting--
5. 4" 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 ______ meter

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate (gpm)</th>
<th>Airline (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>7:00 AM</td>
<td>#1</td>
<td>250</td>
<td>4.50</td>
<td>4.50</td>
<td></td>
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<tr>
<td>7:15 AM</td>
<td></td>
<td>250</td>
<td>4.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:30 AM</td>
<td></td>
<td>250</td>
<td>4.45</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7:45 AM</td>
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<tr>
<td>8:30 AM</td>
<td></td>
<td>250</td>
<td>4.45</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>9:00 AM</td>
<td></td>
<td>250</td>
<td>4.80</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>10:00 AM</td>
<td></td>
<td>250</td>
<td>4.50</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00 AM</td>
<td></td>
<td>250</td>
<td>4.50</td>
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<td></td>
</tr>
<tr>
<td>12:00 PM</td>
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<td>250</td>
<td>4.50</td>
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<td>250</td>
<td>4.80</td>
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<tr>
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<td>250</td>
<td>4.45</td>
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</tr>
<tr>
<td>9:00 PM</td>
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<td>250</td>
<td>4.50</td>
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<tr>
<td>10:00 PM</td>
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<td>250</td>
<td>4.50</td>
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</tr>
<tr>
<td>11:00 PM</td>
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<td>250</td>
<td>4.50</td>
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10330 P.M. SHUTDOWN--COMPLAINTS

Nov. 15/93 OFFICE OF NOISE FROM RESIDENTS

Sheet No. 1 of ______ Sheets
<table>
<thead>
<tr>
<th>Time</th>
<th>GPM</th>
<th>Air Line</th>
<th>Clarity of water</th>
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<tbody>
<tr>
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<td>250</td>
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<td>Water Sample #1</td>
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<tr>
<td>7:15 AM</td>
<td>250</td>
<td>4.45</td>
<td>Clean</td>
</tr>
<tr>
<td>7:30 AM</td>
<td>250</td>
<td>4.45</td>
<td></td>
</tr>
<tr>
<td>7:45 AM</td>
<td>250</td>
<td>4.45</td>
<td></td>
</tr>
<tr>
<td>8:00 AM</td>
<td>250</td>
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<td></td>
</tr>
<tr>
<td>8:30 AM</td>
<td>250</td>
<td>4.45</td>
<td></td>
</tr>
<tr>
<td>9:00 AM</td>
<td>250</td>
<td>4.45</td>
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</tr>
<tr>
<td>9:30 AM</td>
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<tr>
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<td>250</td>
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<td></td>
</tr>
<tr>
<td>11:00 AM</td>
<td>250</td>
<td>4.45</td>
<td></td>
</tr>
<tr>
<td>12:00 NOON</td>
<td>250</td>
<td>4.45</td>
<td></td>
</tr>
<tr>
<td>1:00 PM</td>
<td>250</td>
<td>4.50</td>
<td>Water Sample #2</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>250</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>3:00 PM</td>
<td>250</td>
<td>4.50</td>
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</tr>
<tr>
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</tr>
<tr>
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<td>250</td>
<td>4.45</td>
<td></td>
</tr>
<tr>
<td>6:00 PM</td>
<td>250</td>
<td>4.45</td>
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</tr>
<tr>
<td>7:00 PM</td>
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<td>Water Sample #3</td>
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<tr>
<td>Recovery 7:00</td>
<td>0</td>
<td>4.50</td>
<td>Instant Recovery</td>
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</table>
Date: 11/9/93  
Job No: 1493  
Hole No: R  

**Driller:** Daniel L. Marks  
**Helper:** Bill Autiano  
**Driller's Hrs.:** 10½  
**Helper's Hrs.:** 10½  
**Rig #:** 60  

**Location:** Villages of Leilani  
**Elevation:** ______________ ft.  

**Arv. Job:** ______________  
**Lv. Job:** ______________  
**Hrs.:** ______________  
**Or. No.:** ______________

**Bit-Size:** ______________  
**Type:** ______________

**Casing-Size:** ______________ in., Length in hole ______________ ft.  
**Amt. Perforated:** ______________ ft. ______________ in.

**Depth Start:** ______________ ft.  
**Depth Stop:** ______________ ft.  
**Feet Drilled:** ______________

**Water Levels, Time:** M ______________ ft., Time ______________ M ______________ ft.

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<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
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<tbody>
<tr>
<td>400</td>
<td>Chlorinated well</td>
<td>Laid 4&quot; show line</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>Chlorinated well</td>
<td>to point of discharge</td>
<td></td>
</tr>
<tr>
<td>7:00 Am</td>
<td>Chlorinated well</td>
<td>picked up new shaft</td>
<td></td>
</tr>
<tr>
<td>430</td>
<td>Chlorinated well</td>
<td>at airport</td>
<td></td>
</tr>
<tr>
<td>5:00 D&amp;D initial</td>
<td>Chlorinated well</td>
<td>finished adjusting lateral</td>
<td></td>
</tr>
<tr>
<td>Drawdown test</td>
<td>Chlorinated well</td>
<td>on pump at</td>
<td></td>
</tr>
<tr>
<td>Static: water 4.50</td>
<td>Chlorinated well</td>
<td>11:00 Am started surging well</td>
<td></td>
</tr>
<tr>
<td>5:00</td>
<td>4.50</td>
<td>9 pm Air line</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>4.50</td>
<td>5:00 Am started surging well</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>4.50</td>
<td>Sent Bill for fuel for</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>4.50</td>
<td>test</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>4.50</td>
<td>at 4:30 the well is pumping</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>4.45</td>
<td>clear water</td>
<td></td>
</tr>
<tr>
<td>5:30</td>
<td>4.45</td>
<td>went and barrowed 80' 1/2&quot;</td>
<td></td>
</tr>
<tr>
<td>every</td>
<td>4.45</td>
<td>went and barrowed 80' 1/2&quot;</td>
<td></td>
</tr>
<tr>
<td>thing</td>
<td>4.45</td>
<td>went and barrowed 80' 1/2&quot;</td>
<td></td>
</tr>
<tr>
<td>Ready for test</td>
<td>4.45</td>
<td>went and barrowed 80' 1/2&quot;</td>
<td></td>
</tr>
<tr>
<td>the</td>
<td>4.45</td>
<td>went and barrowed 80' 1/2&quot;</td>
<td></td>
</tr>
<tr>
<td>Bank on discharge area</td>
<td>4.45</td>
<td>went and barrowed 80' 1/2&quot;</td>
<td></td>
</tr>
</tbody>
</table>

**Measurements:**

**Remarks:**

---

**Signed:** __________________  
**Date:** __________________  
**19**
STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN ST. SUITE 300
HONOLULU, HAWAII 96813
FAX (808) 587-0600

TO
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

DATE
October 7, 1993

ATTENTION:
Ed Sakoda

RE
Villages of Leiali'i, L74

WE ARE SENDING YOU ☑ Attached
☐ Under separate cover via ........................................................................................................ the following items:

<table>
<thead>
<tr>
<th>COPIES</th>
<th>DATE</th>
<th>NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>Fully executed copy of Pump Installation Permit</td>
</tr>
</tbody>
</table>

THese ARE TRANSMitted as checked below:

☐ For approval
☐ Approved as submitted
☐ Resubmit........... copies for approval

☐ For your use
☐ Approved as noted
☐ Submit............ copies for distribution

☐ As requested/required
☐ Returned for corrections
☐ Return.............. corrected prints

☐ For review and comment

☐ FOR BIDS DUE ...................................... 19
☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS
Fully executed copy of Wahikuli Irrigation Well Pump Installation Permit.

IF THERE ARE ANY QUESTIONS PLEASE CONTACT:
Rick Stack
TELEPHONE NO. 587-0552

SIGNED: [Signature]

COPY TO

IF ENCLOSURES ARE NOT AS NOTED, KINDLY NOTIFY US AT ONCE.

HFDC 3003 (REV. 9/92)
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 pump installation.

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

7. The permit application and staff submittal approved by the Commission at its meeting on September 15, 1993 shall be incorporated herein by reference.

8. The 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.

KEITH W. AHUE, Chairperson
Commission on Water Resource Management

SEP 29 1993
Date of Issuance

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: [Signature]
Date: [Date]

Printed Name: Joseph K. Conant

Firm or Title: Executive Director, Housing Finance and Development Corp.

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

cc: USGS
   Department of Health
   Safe Drinking Water Branch
   Ground Water Protection Program
   Maui Department of Water Supply
PUMP INSTALLATION PERMIT

for

Wahikuli Irrigation Well
Well No. 5440-01
Wahikuli, Maui

TO: Housing Finance and Development Corp.
667 Queen Street, Suite 300
Honolulu, HI 96813

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 Wahikuli Irrigation Well (Well No. 5440-01), for landscape irrigation use, is approved subject to the following conditions:

1. The Commission shall be notified before work commences.

2. The permit shall be for installation of up to a 200 gpm capacity pump in the well, as determined by the pumping test results. The applicant shall submit to the Commission the test results and proposed permanent pump information, based on the test, for approval by the Chairperson. No permanent pump may be installed and no water used from the well without the Chairperson's approval.

3. The proposed uses 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 pump installation.

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

7. The permit application and staff submittal approved by the Commission at its meeting on September 15, 1993 shall be incorporated herein by reference.

8. The 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.

KEITH W. AHUE, Chairperson
Commission on Water Resource Management
SEP 29 1993
Date of Issuance

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.

cc: USGS
Department of Health
   Safe Drinking Water Branch
   Ground Water Protection Program
Maui Department of Water Supply
TO:Neal Wu
Housing Finance and Development Corporation

FROM:Rae M. Loui, Deputy Director
Commission on Water Resource Management

SUBJECT:Wahikuli Irrigation Well (Well No. 5440-01) Pump Installation Permit

AUG - 3 1993

We acknowledge receipt of your application for a pump installation permit for the Wahikuli Irrigation Well. We understand that though the drilling and testing is not yet complete, you would like us to expedite the permit process. We will send your application to our reviewing agencies assuming that the requested pump capacity is 200 gpm. Our final recommendation to the Commission will of course be based on the actual aquifer test results.

Please keep us informed as to the progress of the work and let us know when the aquifer test is approaching so we can coordinate it with your staff, as required by Condition 2 of the well construction permit.

Call Ed Sakoda at 587-0225 if you have any questions.
APPLICATION FOR

X 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 315, Honolulu, Hawaii 96808. Application must be accompanied by a non-refundable filing fee of $15.00 payable to the Department of Land and Natural Resources. (Filing fee waived for government agencies.) If necessary, phone 144-1412. Hydrology/Geology Section for assistance.

1. WELL LOCATION

Island Maui

Tax Map Key 4-5-21:03

Address Lahaina, Hawaii

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

2. WELL OWNER

Firm Name Housing Finance and Development Corporation

Contact Person Neal Wu

Address 677 Queen Street Suite 300

Honolulu, Hawaii 96813

Phone 587-0538

3. PROPOSED CONTRACTOR FOR:

☐ Well Drilling ☐ Pump Installation

Name ROSCOE MOSS HAWAII, INC.

Address 91-239 A Oaii Street

Ewa Beach, Hawaii 96707

Phone 682-3856

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 (industrial, noncommercial water systems) ☐ Industrial

☐ Irrigation (specify) ☐ of landscaping ☐ Other (specify)

subdivision streets

6. PROPOSED AMOUNT OF WITHDRAWAL 200,000 gallons per day.

7. PROPOSED PUMP INFORMATION

Pump Type: ☐ Vertical Turbine ☐ Submersible

☐ Centrifugal

Motor: ☐ Diesel ☐ Gas ☐ Electric: 25

Rated Pump Capacity 200 gallons per minute (gpm)

Well Owner (print) Housing Finance and Development Corporation

Signature Date

Landowner (print) Department of Land and Natural Resources

Signature Date

For Official Use Only:

Field Checked By Latitude

Date Hydrologic Unit

State Well No.
Briefly describe the proposed work:

PROPOSED SECTION OF WELL

Elevation at top of casing ft., msl.

Ground Elev. ft., msl*

Cement Grout ft.

Solid Casing:
Material
Length ft.
Diameter in.
Wall thickness in.

Hole Dia. in.

Casing: / /Perforated / /Screen
Material
Length ft.
Diameter in.
Wall thickness in.
Openings sq. in./L.F.

Total Depth ft.

Rock Packing ft.

Open Hole:
Length
Diameter 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.
WELL CONSTRUCTION PERMIT
X 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 371, 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 548-1543. Hydrology/Geology Section for assistance.

1. WELL LOCATION
   Island Maui Tax Map Key 4-5-21:03
   Address Lahaina, 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 Housing Finance and Development Corporation
   Contact Person Neal Wu
   Address 677 Queen Street Suite 300
   Honolulu, Hawaii 96813
   Phone 887-0538

3. PROPOSED CONTRACTOR FOR:
   □ Well Drilling  □ Pump Installation
   Name ROYCE MOSS HAWAII, INC.
   Address 91-259 A Olal Street
   Ewa Beach, Hawaii 96707
   Phone 682-5856
   Contractor's License No. C-16437

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) of landscaping along subdivision streets  □ Other (specify)

6. PROPOSED AMOUNT OF WITHDRAWAL 200,000 gallons per day

7. PROPOSED PUMP INFORMATION
   Pump Type: □ Vertical Turbine  □ Submersible  □ Centrifugal
   Motor: □ Diesel  □ Gas  □ Electric: 25 Rated Horsepower
   Rated Pump Capacity 200 gallons per minute (gpm)

Well Owner (print) Housing Finance and Development Corporation
Signature Date

For Official Use Only:
Field Checked By
Latitude
Longitude
State Well No.
Briefly describe the proposed work:

PROPOSED SECTION OF WELL

Elevation at top of casing ft., msl.

Cement Grout ft.

Hole Dia. in.

Total Depth ft.

Rock Packing ft.

Ground Elev. ft., msl*

Solid Casing:
- Material
- Length ft.
- Diameter in.
- Wall thickness in.

Casing: / /Perforated / /Screen
- Material
- Length ft.
- Diameter in.
- Wall thickness in.
- Openings sq. in./L.F.

Open Hole:
- Length
- Diameter 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.
To: The Honorable Keith W. Ahue, Chairperson
Commission on Water Resource Management

From: Joseph K. Conant, Executive Director
Housing Finance and Development Corporation

Subject: Well Pump Installation Permit for Wahikuli Irrigation
Well - Well No. 5440-01, Wahikuli, Maui

Enclosed is one copy of a Well Pump Installation Permit Application for the subject irrigation well. Please be informed that our schedule requires the installation of a submersible pump to provide non-potable water for the irrigation of landscaping and grassed areas within Phase 1-A of the Villages of Leiali'i project. We have also enclosed a set of plans and specifications which details design data on the submersible pump unit.

If there are any questions, please contact Neal Wu at 587-0538.

Enclosures
ADDENDUM NO. 1

PLANS, SPECIFICATIONS, AND PROPOSAL

FOR

VILLAGES OF LEIALI'I

IRRIGATION WELL, PUMP, CONTROLS AND APPURTEANCES

LAHAINA, MAUI, HAWAII

STATE OF HAWAII
HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 Queen Street
Suite 300
Honolulu, Hawaii 96813

PROPOSAL NO. DEV 4-93

APPROVED:

JOSEPH K. CONANT, Executive Director
Housing Finance and Development Corporation

DATE: May 14, 1993
STATE OF HAWAII
HOUSING FINANCE AND DEVELOPMENT CORPORATION

ADDENDUM NO. 1

TO THE

PLANS, SPECIFICATIONS, AND PROPOSAL

FOR

VILLAGES OF LEIALI'I
IRRIGATION WELL, PUMP, CONTROLS AND APPURTEANCES
LAHAINA, MAUI, HAWAII

PROPOSAL NO. DEV-4-93

May 14, 1993

The following Amendments shall be made in the Bid Documents:

A. PLANS.

1. Sheet 3 of plans dated 2/25/93 is amended as shown on attached plans revised 5/14/93.
January 27, 1993

TO: The Honorable William Paty, Chairperson
Commission on Water Resource Management

FROM: Joseph K. Conant, Executive Director
Housing Finance and Development Corporation

SUBJECT: Well Construction Permit for Wahikuli Irrigation
Well - Well No. 5440-01, Wahikuli, Maui

This is to acknowledge receipt of your Well Construction Permit for the subject irrigation well. In accordance with your instructions, we are returning one signed copy to you.

Thank you for your assistance in this matter.
TO: Housing Finance and Development Corp.
667 Queen Street, Suite 300
Honolulu, HI 96813

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 Wahikuli Irrigation Well (Well No. 5440-01), for landscape irrigation 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 construction and testing of the well only. The pumping test shall be coordinated with the Commission staff. No permanent pump may be installed and no water withdrawn from the well without first obtaining a pump installation permit from the Commission.

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

4. The grouted annulus of the well shall be from 0 to 140 ft. instead of from 0 to 50 ft. as proposed.

5. The following shall be submitted to the Commission within 30 days after completion of the work:
   a. Well Completion Report.
WELL CONSTRUCTION PERMIT
Well No. 5440-01

b. As-built sectional drawing of the well.

c. Plot plan and map showing the exact location of the well.

d. Complete pumping test record; including time, pumping rate, drawdown, chloride content, and water quality data.

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.

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: 1/27/93

Printed Name: Joseph K. Conant

Firm or Title: Executive Director
Housing Finance and Development Corp.

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

cc: USGS
Department of Health
Safe Drinking Water Branch
Ground Water Protection Program
Maui Department of Water Supply
WELL CONSTRUCTION PERMIT

for

Wahikuli Irrigation Well
Well No. 5440-01
Wahikuli, Maui

TO: Housing Finance and Development Corp.
667 Queen Street, Suite 300
Honolulu, HI 96813

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 Wahikuli Irrigation Well (Well No. 5440-01), for landscape irrigation use, is approved subject to the following conditions:

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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.

cc: USGS
    Department of Health
    Safe Drinking Water Branch
    Ground Water Protection Program
    Maui Department of Water Supply
Honorable William W. Paty, Chair
Board of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai'i 96809

RE: Application for Water Use Permit
Applicant: Housing Finance and Development Corp
Request: Drill new well
TMK: 4-5-21:03
Location: Lahaina, Maui, Hawaii

Dear Mr. Paty:

We have received a copy of the above-referenced Water Use Permit Application. Thank you for the opportunity to review this application. At this time, we have no comments or concerns on this matter.

If you have any questions, please contact Lynn J. Lee in our Land and Natural Resources Division at 586-3777.

Sincerely,

Richard K. Paglinawan
Administrator

cc: Clayton Hee
Chair, Board of Trustees
Mr. Neal Wu  
Housing Finance & Development Corp.  
667 Queen Street, Suite 300  
Honolulu, HI 96813

Dear Mr. Wu:

We have received your application for a permit to construct Wahikuli Irrigation Well (Well No. 5440-01) at Wahikuli, Maui, (TMK 4-5-21:03). We are reviewing the application for completeness.

Should you have questions, please call the Commission on Water Resource Management staff at 587-0225.

Sincerely,

[Signature]

RAE M. LOUI  
Deputy Director

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

Dear Mr. Hee:

Well Construction and Pump Installation Permit Applications

Transmitted for your review and comment are copies of the following permit applications:

<table>
<thead>
<tr>
<th>Island</th>
<th>Well Name</th>
<th>Well No.</th>
<th>Applicant Type</th>
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<tbody>
<tr>
<td>Maui</td>
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<td>5228-07</td>
<td>Pump Installation</td>
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<td>Maui</td>
<td>Wahikuli Irrigation</td>
<td>5440-01</td>
<td>Well Construction</td>
</tr>
</tbody>
</table>

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

Should you have any questions, please contact Rae M. Loui, Deputy Director, at 587-0214.

Very truly yours,

WILLIAM W. PATY

JZ:ky
Enc.
Honorable Hoaliku Drake
Director
Department of Hawaiian Home Lands
State of Hawaii
P.O. Box 1879
Honolulu, Hawaii 96805

Dear Ms. Drake:

Well Construction and Pump Installation Permit Applications

Transmitted for your review and comment are copies of the following permit applications:

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

Should you have any questions, please contact Rae M. Loui, Deputy Director, at 587-0214.

Very truly yours,

WILLIAM W. PATY

JZ:ky
Enc.
MEMORANDUM

TO: Don Hibbard, Director
   Historic Preservation Program

FROM: Rae M. Loui, Deputy Director
       Commission on Water Resource Management

SUBJECT: Well Construction and Pump Installation Permit Applications

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

Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

JZ:ky
Enc.
Mr. Thomas Arizumi, Chief
Environmental Management Division
State Department of Health
Five Waterfront Plaza
500 Ala Moana Blvd., Suite 250
Honolulu, Hawaii 96813

Attn: Mr. William Wong

Dear Mr. Arizumi:

Well Construction and Pump Installation Permit Applications

Transmitted for your review and comment are copies of the following permit applications:

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

Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

RAE M. LOUI
Deputy Director

JZ:ky
Enc.
Ms. Marjorie Ziegler
Sierra Club Legal Defense Fund, Inc.
212 Merchant Street, Room 202
Honolulu, Hawaii 96813

Dear Ms. Ziegler:

**Well Construction and Pump Installation Permit Applications**

Transmitted for your information are copies of the following permit applications:

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<td>Well Construction</td>
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</tbody>
</table>

Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

[Signature]

RAE M. LOUI
Deputy Director

JZ:ky
Enc.
Mr. David Craddick, Director  
Department of Water Supply  
County of Maui  
200 South High Street  
Wailuku, Maui, Hawaii 96793

Dear Mr. Craddick:

Well Construction and Pump Installation Permit Application

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

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

Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

RAE M. LOUI  
Deputy Director

Enc.
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources

APPLICATION FOR PERMIT
☐ Well Construction or ☐ Pump Installation

Instructions: Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, State of Hawaii, P.O. Box 525, Honolulu, HI 96807. Application must be accompanied by a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 587-0225.

1. APPLICANT: (may be a, b, or c, but all must be filled in)
   (a) WELL OWNER
   Firm/Name: Housing Finance and Development Corp.
   Contact Person: Neal Yo
   Address: 667 Queen Street, Suite 300
   Honolulu, Hawaii 96813
   Ph: 587-0538

   (b) LANDOWNER
   Firm/Name: State of Hawaii
   Contact Person: Glen Abe
   Address: 1151 Punchbowl Street, Room 210
   Honolulu, Hawaii 96813
   Ph: 587-0414

   (c) CONTRACTOR
   Firm/Name: To be determined
   Ph: 
   Address:
   Contractor's C-57 License No. 

2. WELL LOCATION/NAME: Wahikuli
   Island: Maui
   Address: Lahaina, Hawaii
   Tax Map Key: 4-5-21:03

3. (a) PROP
   Pumping System: Honolulu = 8 mgl/sy
   Location: Lahaina = 40 mgl/sy

   (b) WELL
   1967 Withdrawal = 7.1
   1997 = 27.9 mgl/sy

4. PROPOSED USE
   Pump: E for Lahaina Master Planned Project
   Demand: EB for Lahaina Master Planned Project
   Rechlorination: reclaimed water will be permanently established as the golf course is constructed on the site.
   HPDC: demand for Wahikuli = 3.0 mgl/ce (estimated) gallons per minute
   Recharge of 25

5. PROPOSED USE:
   ☐ Municipal (including hotels, stores, etc.)
   ☐ Military
   ☐ Other
   ☐ For Verbal Presentation

6. (a) PR
   (b) ME
   Need to coordinateeffects of major surveys (DN/HPDC) and Water Supply Development.
   Kamehameha Kapalua (Pioneer Mill) in December

7. PENDING
   ☐ Oral
   ☐ Written (explain)

8. REMARKS
   (e.g., correction, explanations)

   Contract
   Signature
   Date

   APPLICANT
   Name
   Address

   LANDOWNER
   Name
   Address

   CONTRACTOR
   Name
   Address

   For Official Use Only:
   Date Received
   Date Accepted
   Field Checked By
   Date
   Longitude
   Latitude
   Aquifer System Name
   State Well No.
Elevation at top of casing: 146 ft. rel.

Ground Elevation:

Open Hole:
Length: 0 ft.

5.5 ft. in. Solid Casing: PVC Schedule 80
Length: 145 ft.
Diameter: 10 in.
Wall thickness: 0.593 in.

Slotted Well Casing: Porous Screen
Length: 15 ft.
Diameter: 10 in.
Opening: 1/4 in./L.F.

Rock Packing: 95 ft.

Cement Grout: 50 ft.

Hole Diameter: 16 in.

Gross Depth: 360 ft.

8. PROPOSED WELL SECTION

Approximate elevation at time of filing application. Ground elevation above mean sea level (MSL) by a surveyor licensed by the State must be submitted as part of construction. Final elevation of well components shall be submitted in the well completion/well abandonment report.
<table>
<thead>
<tr>
<th>TO:</th>
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<th>PLEASE:</th>
<th>REMARKS:</th>
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<td>G. Matsumoto</td>
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<td>E. Sakoda</td>
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<td>Y. Shiroma</td>
<td>Review &amp; Comment</td>
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<td>E. Hirano</td>
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FOR YOUR:

|     | R. LOUI | Approval |          |
|     | S. Kokubun | Signature |          |
|     | _______ | _______ | Information |
TO Commission on Water Resource Management

P.O. Box 620
Honolulu, Hawaii 96809

RE Lahaina Master Plan

WE ARE SENDING YOU

☑️ Attached

☐ Under separate cover via

The following items:

<table>
<thead>
<tr>
<th>COPIES</th>
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<td>Application for Permit for Well Construction</td>
</tr>
</tbody>
</table>

These are transmitted as checked below:

☑️ For approval
☑️ Approved as submitted
☐ Resubmit... copies for approval

☐ For your use
☑️ Approved as noted
☐ Submit... copies for distribution

☐ As requested/required
☐ Returned for corrections
☐ Return... corrected prints

☐ For review and comment

FOR BIDS DUE: 19

☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

IF THERE ARE ANY QUESTIONS PLEASE CONTACT: Neal Wu

TELEPHONE NO: 587-0538

SIGNED: [Signature]

COPY TO

Dev. 22100.00

IF ENCLOSURES ARE NOT AS NOTED, KINDLY NOTIFY US AT ONCE.
APPLICATION FOR PERMIT

1. APPLICANT: (may be a, b, or c, but all must be filled in)
   (a) WELL OWNER
      Firm/Name: Housing Finance and Development Corp.
      Contact Person: Neal We, Ph: 587-0538
      Address: 657 Queen Street, Suite 300
      Honolulu, Hawaii 96813
   (b) LANDOWNER
      Firm/Name: State of Hawaii
      Contact Person: Glenn Abe, Ph: 587-0414
      Address: 1151 Punchbowl Street, Room 210
      Honolulu, Hawaii 96813
   (c) CONTRACTOR
      Firm/Name: To be determined
      Ph: Contractor's C-57 License No.
      Address

2. WELL LOCATION/NAME: Wahikuli
   Island: Maui
   Address: Lahaina, Hawaii
   Tax Map Key: 4-5-2103

3. (a) PROPOSED WORK:
    - Drill New Well
    - Modify Existing Well
    - Install New Pump
    - Replace Pump
    - Modify Pump
    - * Alter Location
    - Deepen
    - * Abandon/Seal
    - * Be sure to complete and submit well abandonment report upon completion of work.

4. PROPOSED PUMP INFORMATION:
   - Rated Pump Capacity: 200 gallons per minute
   - Pump Type:
     - Deep Well Turbine
     - Submersible
     - Centrifugal
   - Motor:
     - Propeller
     - Impulse
     - Electric, rated horsepower of

5. PROPOSED USE:
   - Domestic (individual, noncommercial water sys.)
   - Irrigation (agric) Land/acre
   - State Land Use District:
   - Urban
   - Agriculture
   - Rural
   - Conservation
   - Lahaina Master Planned Community

6. (a) PROPOSED AMOUNT OF WITHDRAWAL: 200,000 gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
      - Flow-meter
      - Open-pipe
      - Office Plate
      - Wair

7. PENDING ACTIONS:
   - CDUA
   - SMA
   - EIS
   - EA
   - NONE
   - Other (explain)

8. REMARKS, EXPLANATIONS:
   Final EIS for Lahaina Master Planned Project addressed the
   use of brackish water for irrigation of golf course public areas.

   (If more space is needed, continue below remarks, explanations.)

---

STATE OF HAWAII
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources

For Official Use Only:
Date Received
Date Accepted
Field Checked By
Date

Longitude
Aquifer System Name
State Well No.

For Official Use Only:
Date Received
Date Accepted
Field Checked By
Date
9. PROPOSED WELL SECTION

- Elevation at top of casing: 146 ft., msl.
- Ground Elevation: 145 ft., msl*
- Cement Grout: 50 ft.
- Rock Packing: 95 ft.
- Hole Diameter: 16 in.
- Total Depth: 160 ft.

Solid Casing:
- Material: PVC Schedule 80
- Length: 145 ft.
- Diameter: 10 in.
- Wall thickness: 0.593 in.

Slotted Well Casing:
- Material: PVC
- Length: 15 ft.
- Diameter: 10 in.
- Wall thickness: 0.593 in.
- Openings: 0.593 sq. in./L.F.

Open Hole:
- Length: 0 ft.
- Diameter: N/A in.

*Approximate elevation at time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment report.
2.2 GROUNDWATER, HYDROLOGY, SURFACE WATER AND DRAINAGE

2.2.1 Groundwater and Hydrology

2.2.1.1 Existing Conditions

The groundwater and hydrology of the project area have been analyzed specifically for the proposed project (Mink, 1989). Estimates of groundwater flow toward the shoreline of the area makai of the project site are in the range of 4.5 to 5.0 million gallons per day (mgd) per mile of coastline (Mink, 1989). In general, the groundwater aquifer below the project site is highly permeable and groundwater flow is not impeded by a caprock at the coast (Figure IV-5). The groundwater floats as a basal lens on sea water and, as noted above, discharges in a narrow band along the coast. Evidence of the freshwater lens along the coastline is seen in the salinity measurements taken as part of the marine survey performed for this project (see Section 3.3 below). To the north and south of the project site, small coastal plains of alluvium weakly retard groundwater outflow.

The groundwater lens is unconfined and the water table increases parabolically until the basal lens meets the high level dike compartment aquifers of the rift zone about at the Forest Reserve line. The groundwater head rises from near zero at the coastline to approximately 5 feet at a distance of about 11,000 feet inland. At the inland boundary of the project site property, the groundwater head is about 4 feet.

Groundwater development in the project area includes county (Kanaha and Waipuka wells) and private wells or pumps (Kaanapali Resort and Pioneer Mill Co. respectively). There are no wells presently located on the project property. In general, the county wells, which supply the town of Lahaina, provide good quality potable water. However, on occasion, water from the Kanaha wells is more saline than desirable, partially because of an oversize pump [900 gallons per minute (gpm)] on one well and an unusual depth of penetration (95 feet below sea level) of the other well.

The Pioneer Mill pump station (Pump M) is a principal supply station for the plantation and has a pumping capacity of 10.4 mgd and an averaged output of 7 to 9 mgd. The salinity reaches about 1,000 mg/l chloride, which is acceptable for irrigation purposes but not for potable water purposes. The Kaanapali Resort wells provide irrigation water that is moderately saline. Total quantities pumped are not known but the three wells are fitted with 1,000, 450 and 625 gpm pumps respectively.

2.2.1.2 Probable Impacts

Based on engineering analyses, average potable water demand for the completed Lahaina Master Planned Project is estimated to be about 4.2 mgd, equivalent to about 900 gpd/unit (see Section 6.5). Brackish groundwater and/or surface water will be used for irrigation of the golf course, parks and street landscaping. Existing supply sources cannot provide water to the proposed
LEGEND

- Basal water lenses
- Basal water in sediments
- Water confined by dikes
- Tunnel recirculating confined water between dikes
- Basal water table contour

Source:
Geology and Ground-Water Resources of the Island of Maui, Hawaii, 1942

PREPARED FOR:
Housing Finance and Development Corporation
Prepared by: PBR HAWAII

Figure IV-5
Geologic Section
Haina Master Planned Project
Environmental Impact Statement
project. Therefore, new water development will be required. Based on the preliminary analyses performed, the most feasible potable water source will be groundwater pumped from the basal lens in state and/or private land about 1.7 miles inland of the coastline at about the +880 to +900-foot [above mean sea level (MSL)] elevation. Groundwater opportunities reasonably close to the project site are constrained by allowable pump capacity. A single well would be limited to a capacity of 400 to 450 gpm and will require drilling from ground elevation of +1050 feet MSL to +35 feet MSL. It is estimated that six wells rated at 400 to 450 gpm will be needed for the project and two additional wells will be required for standby purposes. Individual capacities greater than 450 gpm will almost certainly lead to salinities that are unacceptable for domestic purposes. Brackish groundwater for golf course, etc. irrigation purposes would be developed on-site by the golf course operator.

2.2.1.3 Mitigation Measures

Given the existing quantity of groundwater flux (4.5 to 5.0 mgd per mile of coastline), the development of additional wells to supply the proposed project is not expected to adversely affect existing water supplies. As such, measures to minimize potential adverse impacts are not warranted. Detailed engineering analyses and design studies will be performed prior to construction of the proposed housing units and/or infrastructural components to assure that adequate groundwater is available for potable and golf course/parks irrigation purposes.

2.2.2 Surface Water and Drainage

2.2.2.1 Existing Conditions

Engineering analyses of present and future surface water and drainage patterns have been performed specifically for the proposed project (Unemori Engineering, Inc., 1989). In addition, a Flood Insurance Rate map (FIRM) for the project area has been produced by the Federal Emergency Management Agency (FEMA) (Figure IV-6). As shown on Figure IV-6, with the exception of a small area near the Lahaina Civic Center, the project site is absent of flood hazards. Flooding does, however, occur in the gullies and gulches on the northerly and southerly sides of the project site. As indicated in the engineering report (Unemori Engineering, Inc., 1989), and in preceding sections of this EIS, sugar cane is currently grown on nearly all of the project site. Sugar cane is also being cultivated on the slopes approximately 8000 feet above site. This cultivation limits surface water runoff from the project site. A small drainage gully on the north borders the project site. Kahoma Stream represents its southerly demarcation (Figure IV-7). Two large irrigation reservoirs for Pioneer Mill Company are also situated at the southeast corner of the site, adjacent to Kahoma Stream. Two other drainageways bisect the project site is a east to west (mauka-makai) direction. These gullies converge south of the Lahaina Civic Center. Flows in these gullies are presently conveyed across Honoapiilani Highway into the ocean by three 48-inch reinforced concrete culverts (RCP). The combined capacity of the three culverts is estimated to be 210 cubic feet per second (cfs).
located mauka of the Napili Community and referred to as Napili Wells 1, 2 and 3 and Honokahau Well A also feed into the West Maui municipal system. The amount of water withdrawn from each source in Fiscal Year 1987 is shown in Appendix C, Table I. The total surface and ground water used in 1987 average 5.61 million gallons per day (mgd).

Transmission System: The Napili and Kanaha sources are interconnected by approximately 13 miles of 8, 12 and 16 inch lines. Due to the limited productive capacity of the Kanaha sources, all areas north of Dickenson Street in Lahaina Town to Napili are currently served by the Napili sources. Only areas south of Dickenson Street are fed by the Kanaha sources.

Storage Facilities: Storage for the West Maui municipal water system is provided by a 1.0 MG tank at Alaeloa, a 1.5 MG tank above Wahikuli and another 1.0 MG tank above Lahainaluna north of Lahainaluna Road. There are several other tanks located near the wells and intakes at Napili and Kanaha. These range in size between 100,000 gallons to 500,000 gallons. They serve primarily as control tanks.

6.5.2 Probable Impacts

Water Demand: Assuming a "worst case" scenario, estimates indicate that a 4,800 residential unit project could be expected to require an average daily demand of 2.8 million gallons per day (mgd). This is based on an average daily demand of 560 gallons per unit per day (gpd) for multifamily low rise project and 600 gpd for single family or duplex units. The maximum daily demand is estimated to be 150 percent of average daily demand. This translates to an estimated 4.2 mgd. These figures do not include water demand for schools or commercial zoned areas. Therefore they will have to be updated when detailed design and engineering studies for the entire project are finalized. The golf course, parks and streetscape areas will be watered with brackish water that is developed on-site.

Source: In order to satisfy the maximum projected water demand of the project, a new groundwater source will have to be developed. To produce the needed 4.2 mgd, six wells rated at 400 to 450 gpm will be required. Two additional standby wells also will be necessary. These wells can be developed in pairs at interval of three years to stay abreast of the project’s implementation. The locations of these wells is shown on Figure IV-19.

Storage: The project site rises from an elevation of 14 feet above sea level at Honoapiilani Highway to about 680 feet at the northeast corner. The existing 1.5 MG Department of Water Supply Wahikuli storage reservoir at elevation 235 feet can serve the area between Honoapiilani Highway and elevation 130 feet. The area above elevation 130 feet will require two storage reservoirs, a 2.5 MG reservoir at approximate elevation 550 feet and a 1.0 MG reservoir at approximate elevation 1,100 feet in vicinity of the proposed well field. It is noted that at the time detailed design and engineering studies are prepared for the various phases of the project, water storage requirements will be reanalyzed to assure that adequate storage facilities are provided. The locations of the storage tanks are shown on Figure IV-19.
Transmission System: Approximately 8,000 feet of 16-inch diameter transmission line will be required to convey water from the proposed well source to the project and the 1.5 MG County reservoir at Wahikuli. This transmission system will have to be installed in conjunction with the first phase of the project. The project will require that an easement for the transmission system will be required and obtained from the property owner(s). Negotiations between HFDC and property owners are currently underway and will be completed prior to installation of new water system components.

HFDC has been and will continue to work with the County Department of Water Supply and private property owners to ensure that the project potable water system meets the requirements of the project, is developed in compliance with state and county standards and does not deny existing or other planned residential projects adequate water supplies (see Chapter IX).

6.5.3 Mitigation Measures

The project's required new wells, pumping system, storage tanks/reservoirs and transmission lines connecting the new water source to the Wahikuli Tank must be completed before occupancy of the project's first homes. Plans and an implementation schedule would be prepared in coordination with the County and Department of Water Supply. Based on preliminary analyses, it appears that the island's groundwater resources are adequate to supply the required potable and brackish water demand. Detailed analyses will be performed prior to construction of individual phases to assure adequate supplies of both potable and brackish water are provided to the project site. All potable water system improvements and enhancements will be designed engineered and constructed in compliance with applicable State Department of Health and Water Resources Development Commission rules and regulations and permit requirements.

6.6 WASTEWATER TREATMENT AND DISPOSAL

6.6.1 Existing Conditions

Wastewater Transmission System: The existing wastewater transmission system between the proposed HFDC project site and the Lahaina Wastewater Treatment Plant (WWTP) at north Kaanapali consists of three major sewage pump stations and force mains and two gravity transmission sewers. Wastewater from the Lahaina Town area is pumped by County Sewage Pump Station (SPS) No. 3 to a manhole at the upstream end of Sewer Line B. Sewer B conveys the wastewater by gravity to SPS No. 2 located east of the Kaanapali Parkway/Honoapiilani Highway intersection. Wastewater from the Kaanapali and Lahaina areas is pumped by SPS No. 2 to a manhole at the upstream end of Sewer Line C. Sewer line C then conveys the combined wastewater flows by gravity to SPS No. 1. The wastewater is then pumped by SPS No. 1 via a 20-inch force main to the headworks of the Lahaina WWTP.

IV-93
July 31, 1992

Warren S. Unemori
2145 Wails St. Ste. 403
Wailuku, HI 96817

Dear Warren:

The proposed Wahikuli irrigation well to be located about 2100 feet in from the coast should encounter basal groundwater having a head of about 2 feet. At an instantaneous pump rate of less than 200 gpm, a well drilled to 15 feet below sea level should yield water with less than 750 mg/l chloride, which is acceptable for most irrigation purposes.

A short pump test should be conducted before the permanent pump size is selected. I suggest you conduct an 8 hour test at rates of 50, 100, 150, 200 and 250 gpm, one hour per rate. The probable selection will be in the range 150 to 200 gpm.

Specifications for the well should be simple. Terminate the well at 15 feet below sea level, then conduct the pump test. The completed well will have blank casing from the ground surface to sea level (145 feet) and 15 feet of screen below. An 8 inch diameter casing should be able to hold the pump.

Let me know when the well will be drilled. I would like to supervise the pump test.

Sincerely,

John F. Mink
Wahikuli
(Well No. 5440-01)

ISLAND OF MAUI