### SECTION 1: WELL LOCATION INFORMATION

<table>
<thead>
<tr>
<th>Island</th>
<th>OAHU</th>
<th>Proposed Use</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquifer System</td>
<td>WAIANAE</td>
<td>Proposed Withdrawal</td>
<td>0</td>
</tr>
<tr>
<td>Aquifer Sector</td>
<td>#</td>
<td>System Sustainable Yield</td>
<td>4</td>
</tr>
</tbody>
</table>

### SECTION 2: WELL SECTION DATA  
(enter data in grey cells only)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation at top of casing</td>
<td></td>
</tr>
<tr>
<td>Ground Elevation</td>
<td></td>
</tr>
<tr>
<td>Cement Grout</td>
<td></td>
</tr>
<tr>
<td>Rock Packing</td>
<td></td>
</tr>
<tr>
<td>Hole Diameter</td>
<td></td>
</tr>
<tr>
<td>Total Depth</td>
<td></td>
</tr>
<tr>
<td>Estimated Head</td>
<td></td>
</tr>
<tr>
<td>Calculated Aquifer Thickness</td>
<td></td>
</tr>
<tr>
<td>County Water Supply (Y/N ?)</td>
<td></td>
</tr>
<tr>
<td>Solid Casing</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td></td>
</tr>
<tr>
<td>Designation</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td></td>
</tr>
<tr>
<td>Wall Thickness</td>
<td></td>
</tr>
<tr>
<td>Casing</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td></td>
</tr>
<tr>
<td>Designation</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td></td>
</tr>
<tr>
<td>Wall Thickness</td>
<td></td>
</tr>
<tr>
<td>Openings</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Depth</td>
<td></td>
</tr>
<tr>
<td>Theoretical Thickness of Aquifer</td>
<td>1025 ft.</td>
</tr>
<tr>
<td>1/4 Aquifer Thickness</td>
<td>256.3 ft.</td>
</tr>
<tr>
<td>Depth of Well below Sea Level</td>
<td>25 ft.</td>
</tr>
<tr>
<td>Well Casing</td>
<td></td>
</tr>
<tr>
<td>Minimum Wall Thickness</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>PVC</td>
</tr>
<tr>
<td>County or Non-County</td>
<td>non-county</td>
</tr>
<tr>
<td>Minimum Thickness per standards</td>
<td>0.237 in.</td>
</tr>
<tr>
<td>Wall Thickness Provided</td>
<td>0.406 in.</td>
</tr>
<tr>
<td>Minimum Length of Solid Casing</td>
<td>157.5 ft.</td>
</tr>
<tr>
<td>90% of ground to top of aquifer</td>
<td></td>
</tr>
<tr>
<td>Length of solid casing Provided</td>
<td>170 ft.</td>
</tr>
<tr>
<td>Casing Material</td>
<td>Sch 40</td>
</tr>
<tr>
<td>Annular Space</td>
<td></td>
</tr>
<tr>
<td>Depth of Grouting</td>
<td>122.5 ft.</td>
</tr>
<tr>
<td>Calculated Depth of Grouting</td>
<td></td>
</tr>
<tr>
<td>Depth of Grouting provided</td>
<td>165 ft.</td>
</tr>
<tr>
<td>Thickness of Annular Space</td>
<td>3 in.</td>
</tr>
</tbody>
</table>

Okay (refer to HWCPIS Section 2.2)
Okay (refer to HWCPIS Section 2.4 c)
Okay (refer to HWCPIS Section 2.4 d)
Okay (refer to HWCPIS Section 2.4 e)
Okay (refer to HWCPIS Section 2.6 c)
Okay (refer to HWCPIS Section 2.6 d)
December 8, 2004

Mr. Jon Fukuda
U.S. Army
DPW, Attn: APVG-GWV
U.S. Army Garrison
Schofield Barracks, HI 96857

Dear Mr. Fukuda:

Well Completion Reports for Well Nos. 3113-02 to 06, 3213-08 to 11

We received your Well Completion Reports Part I for the ERDC Monitor Wells (Well Nos. 3113-02 to 06, 3213-08 to 11) on December 2, 2004 and acknowledge that they are complete.

If you have any questions, please contact Lenore Y. Nakama of the Commission staff at 587-0218.

Sincerely,

YVONNE Y. IZU
Deputy Director

LYN:ss

c: Floyd A. Quintana, Colonel, US Army, Director of Public Works, US Army Garrison
Steve Turnbull, US Army Garrison
Directorate of Public Works

Ms. Lenore Nakama  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, HI 96809

Dear Ms. Nakama:

Please find enclosed signed well construction permits and well completion reports for monitoring wells installed at the Makua Military Reservation as part of the Environmental Impact Statement (EIS) Process. We are planning to submit the EIS document for public review in the near future.

Please note that by submitting these well permits and well construction logs the Army is not waiving sovereign immunity; rather, that we are providing the completed application for informational purposes to the State of Hawaii Department of Land and Natural Resources.

If you have any questions, please contact Mr. Stephen Turnbull at 808-656-2878 ext. 1042.

Sincerely,

Floyd A. Quintana  
Colonel, US Army  
Director of Public Works

Enclosure(s)
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
WELL COMPLETION REPORT - PART I
Well Construction

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

<table>
<thead>
<tr>
<th>1. State Well No.: 3113-02</th>
<th>Well Name: ERDC-MW-1</th>
<th>Island: Oahu</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Address: Makua Military Reservation</td>
<td>Tax Map Key: 8-2-01:24</td>
<td></td>
</tr>
<tr>
<td>3. Drilling Company: Valley Well Drilling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Drilling method used during construction: ☑ Rotary ☐ Percussion ☐ Other (describe)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Date Well Construction (drilled,cased,grouted) completed: 9/24/2002 Attach Driller's Log (7/26/99 DL Form)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In addition to the driller's log, if a geologic log was prepared, please submit with this form.

<table>
<thead>
<tr>
<th>6. Was the subject well cored?</th>
<th>☑ Yes ☐ No</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Initial water-level encountered: 7.5 ft. below ground Date and time of measurement: 9/14/02 10:15</td>
<td></td>
</tr>
<tr>
<td>8. Step-Drawdown Test completed?</td>
<td>☐ Yes ☑ No Attach Step-Drawdown Test form (12/17/97 SDPTD Form)</td>
</tr>
<tr>
<td>9. Constant Rate Aquifer Test completed?</td>
<td>☐ Yes ☐ No Attach Constant Rate Aquifer Test form (12/17/97 CRPTD Form)</td>
</tr>
</tbody>
</table>

Parameters prior to pump test:

| 10. Water-level: 4.35 ft. above msl Date and time of measurement: 4/3/2003 8:50 |
| 11. Chloride: 188 ppm Date and time of sampling: 12/18/02 11:55 |
| 12. Temperature: 79 °F Date and time of measurement: 12/18/02 11:55 |

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


15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)

16. Remarks: No pump installed. Well for sampling

Licensed Driller (print) Mike Sober C-57 Lic. No. 21358
Signature Date 11/16/04

Surveyor (print) L.P.L.S. Lic. No.
Signature Date

Permittee (print) COL Floyd A. Quintana, DPW, USAG-HI
Signature Date 10/27/04
13. AS-BUILT WELL SECTION

(Please attach as-built if different from diagram provided below)

Bench mark elevation:

ft., msl*

(Survey to nearest 0.01 ft.)

Cement Grout:

ft. (min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)

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

in.

Rock or Gravel Packing:

32 ft.

Material:

Crushed Basalt

Rounded Gravel

Water Level Elevation:

4.35 ft., msl*

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

Length:

6 ft.

Nominal Diameter:

4 in.

Well Thickness:

0.237 in.

Bottom Elevation:

3.95 ft., msl

Open Casing:

Perforated Screen

Length:

29 ft.

Nominal Diameter:

4 in.

Well Thickness:

0.237 in.

Bottom Elevation:

25.06 ft., msl

Open Hole:

Filled with gravel

Length:

1 ft.

Diameter:

10 ft.

Bottom Elevation:

-26.05 ft., msl

*msl = mean sea level

Solid Casing Material:

Carbon Steel: compliant with (check one or more):

ANSI/WWA C200

API Spec. 5L

ASTM A53

ASTM A139

Stainless Steel: (check one):

ASTM A409 (production wells)

ASTM A312 (monitor wells)

ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one)

Schedule 40

Schedule 80

PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one):

Schedule 40

Schedule 80

Thermoset Plastic: (check one)

Filament Wound Resin Pipe conforming to ASTM D2996

Centrifugally Cast Resin Pipe conforming to ASTM D2997

Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517

Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950

PTFE Fluorocarbon Tubing conforming to ASTM D3296

FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:

Carbon Steel: compliant with (check one or more):

ANSI/WWA C200

API Spec. 5L

ASTM A53

ASTM A139

Stainless Steel: (check one):

ASTM A409 (production wells)

ASTM A312 (monitor wells)

ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one)

Schedule 40

Schedule 80

PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one)

Schedule 40

Schedule 80

Thermoset Plastic: (check one)

Filament Wound Resin Pipe conforming to ASTM D2996

Centrifugally Cast Resin Pipe conforming to ASTM D2997

Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517

Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950

PTFE Fluorocarbon Tubing conforming to ASTM D3296

FEP Fluorocarbon Tubing conforming to ASTM D3296

Please refer to the HAWAII WELL CONSTRUCTION AND PUMP INSTALLATION STANDARDS to ensure that your as-built is in compliance with applicable standards.
Well Number: 3113-02

<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock description, Water level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 5</td>
<td>Sand with basalt cobbles,</td>
<td>9/19/02</td>
</tr>
<tr>
<td>5 to 20</td>
<td>Silty sand with basalt cobbles,</td>
<td>9/19/02</td>
</tr>
<tr>
<td></td>
<td>water level approx 7.5 ft</td>
<td></td>
</tr>
<tr>
<td>20 to 36</td>
<td>Sand with trace basalt fragments</td>
<td>9/19/02</td>
</tr>
</tbody>
</table>

Remarks:
HNu readings all background.
Monitoring Well Coordinates

Well MW-1 (3113-02)

Survey by R.M. Towill, Inc.
420 Waiakamilo Rd
Honolulu, HI 96817
Tel: 842-1133
Mr. Ryan Suzuki

Surveyed on June 30, 2003

Latitude (N): 21° 31' 37"
Longitude (W): 158° 13' 38"

Ground Elevation: 9.95 feet

Top of Casing Elevation: 12.90 feet

Coordinates are referred to the North American Datum of 1983 (NAD83)
Elevations are referred to Mean Sea Level (M.S.L.) being established from State Survey Monument 8-10 having an elevation of 17.83 feet.
**Drilling Log**

**Well No. 3113-02**

<table>
<thead>
<tr>
<th>Drilling agency:</th>
<th>Valley Drilling</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name of Driller:</strong></td>
<td>John Sunagad</td>
</tr>
<tr>
<td><strong>Manufacturer's designation of drill:</strong></td>
<td>Mobile B-90</td>
</tr>
<tr>
<td><strong>Total No. of overburden samples taken:</strong></td>
<td>Disturbed 3</td>
</tr>
<tr>
<td><strong>GPS Coord.</strong></td>
<td>N 21 deg. 31.614', W 138 deg. 13.828'</td>
</tr>
</tbody>
</table>

| **Total Depth of Hole:** | 35 ft |
| **Elevation ground water:** | 7.5 ft |

<table>
<thead>
<tr>
<th><strong>Depth</strong></th>
<th><strong>Lithology</strong></th>
<th><strong>Description</strong></th>
<th><strong>Blow Counts</strong></th>
<th><strong>Comments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SAND (SP) Black w/ basalt cobbles. Very hard drilling - bit chattered on rocks. Small amt of limestone cobbles present @ 2-3.0 ft</td>
<td>HNU - 0.0 SC:LL - 0 counts</td>
<td></td>
<td>HNU - 1.1 SC:LL - 0 counts (backs round)</td>
</tr>
<tr>
<td>-2</td>
<td>First clearance. No detect - drilling ahead.</td>
<td>HNU - 0.0 SC:LL - 0 counts</td>
<td></td>
<td>Note: Run 3 in PVC Pipe to 3.0 ft to clear. Run device inside PVC pipe to clear.</td>
</tr>
<tr>
<td>-4</td>
<td>Rock drilled through - very slow drilling</td>
<td>Rock drilled through - very slow drilling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-6</td>
<td>Silty sands (SP-SM), dark black w/ cobbles &amp; frags of basalt &amp; limestone (damp)</td>
<td>Second clearance. No detect - drilling ahead.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-8</td>
<td></td>
<td>HNU - 0.0 SC:LL - 0 counts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td>As above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-12</td>
<td>Third clearance. No detect - drilling ahead. HNU - 0.0 ppm SC:LL - 0 counts.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-14</td>
<td>AA - wet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fifth clearance. No detect - drilling ahead. HNU - 0.0 ppm SC:LL - 0 counts</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Vertical Hole No.: ERDC MW-1**

<table>
<thead>
<tr>
<th><strong>Blow Counts</strong></th>
<th><strong>Comments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>MW-1 Sample 10.0' - 11.5' Bottom part of sample is wet. Water table is approx. 15.0'</td>
<td></td>
</tr>
<tr>
<td>MW-2 Sample 10.0' - 11.5' Bottom part of sample is wet. Water table is approx. 15.0'</td>
<td></td>
</tr>
</tbody>
</table>

**Dimensions:**
- **Page dimensions:** 846.2x809.5
- **Image size:** 310x764
<table>
<thead>
<tr>
<th>Depth (in feet)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-16</td>
<td>Smooth drilling. No chattering. Sand (SP) w/ trace of basalt frags from cuttings rec. from auger</td>
</tr>
<tr>
<td>-18</td>
<td>Sand (SP) black w/ trace of basalt frags. (from auger), wet. Some clay (CL) present. Drilling smooth.</td>
</tr>
<tr>
<td>-20</td>
<td>Sand (SP) black w/ trace of basalt frags. (from auger), wet. Some clay (CL) present. Drilling smooth.</td>
</tr>
<tr>
<td>-22</td>
<td>Sand (SP) from auger, wet w/ CL</td>
</tr>
<tr>
<td>-24</td>
<td>Sand (SP) from auger, wet w/ CL</td>
</tr>
<tr>
<td>-26</td>
<td>Drilling smooth</td>
</tr>
<tr>
<td>-28</td>
<td>Sand (SP) from auger, wet w/ CL</td>
</tr>
<tr>
<td>-30</td>
<td>AA drilling smooth</td>
</tr>
</tbody>
</table>

Note: Smooth drilling from 15' - 35' indicates sand with some CL present.
Steel, cement filled pickets (1 of 3)

Concrete Surface Seal

Bentonite Pellet Seal (Minimum 2' Thick)

Bentonite Concrete Grout Backfill

Borehole Diameter (10" Minimum)

#3 Sand

4" Diameter PVC Schedule 40 Slotted Screen (0.020" Slot Size)
WELL CONSTRUCTION PERMIT
ERDC-MW-1, Well No. 3113-02

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-1 (Well No. 3113-02) at Makua Military Reservation, Oahu, TMK 3-2-01-24, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1½-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002  Expiration Date: September 23, 2004

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

Permittee's Signature: ___________________________  Date: 10/26/04
Printed Name: COL Floyd A. Quintana  Firm or Title: Director of Public Works, USAG-HI
Driller's Signature: ___________________________  Date: 11/16/04
Printed Name: Mike Silver  C-57 License #: 21358

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

Attachment

USGS
Department of Health's Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
1. State Well No.: 3113-03  Well Name: ERDC-MW-4A  Island: Oahu
2. Address: Makua Military Reservation  Tax Map Key: 8-2-01:24
3. Drilling Company: Valley Well Drilling
4. Drilling method used during construction: □ Rotary  □ Percussion  □ Other (describe)
5. Date Well Construction (drilled,cased,grouted) completed: 9/30/02  Fill out attached Driller's Log
   In addition to the driller's log, if a geologic log was prepared, please submit with this form.
6. Was the subject well cored?  □ Yes  □ No
7. Initial water-level encountered ______ ft. below ground  Date and time of measurement: ____________
8. Step-Drawdown Test completed?  □ No  □ Yes  Attach Step-Drawdown Test form (12/17/97 SDPTD Form)
9. Constant Rate Aquifer Test completed?  □ No  □ Yes  Attach Constant Rate Aquifer Test form (12/17/97 CRPTD Form)
   Parameters prior to pump test:
10. Water-level: 4.02 ft. above msl  Date and time of measurement: 4/3/2003 8:30
11. Chloride: 186 ppm  Date and time of sampling: 4/3/2003 12:00
13. Fill in the as-built section on the other side of this sheet.
14. Fill in attached surveyor's report.
15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)
16. The proposed manufacturer's rated pump capacity is ______ gpm at a head of ______ ft.
17. Remarks: No pump installed, well for sampling

Licensed Driller (print) Mike Sobr  C-57 Lic. No. 31358
Signature ____________ Date 11/18/04

Permittee (print) COL Floyd A. Quintana, DPW, USAG-HI
Signature ____________ Date 1/23/04
13. AS-BUILT WELL SECTION (Please attach as-built if different from diagram provided below)

Elevation at top of casing: 10 ft., msl* (to nearest 0.01 ft.)

Ground Elevation: ______ ft., msl

Minimum of 2' Radius & 4" Thick Concrete Pad

Bench mark elevation:

Total Depth 46 ft.

Cement Grout: 13.5 ft. (min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)

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

Rock or Gravel Packing:

Water Level Elevation: 4.62 ft., msl*

Solid Casing: (≤ 90% x (Ground Elevation - Water Level Elevation))

Length: 16.5 ft.
Nominal Diameter: 4 in.
Wall Thickness: 0.317 in.
Bottom Elevation: 3.25 ft., msl

Open Casing: X Screen

Length: 30 ft.
Nominal Diameter: 4 in.
Wall Thickness: 0.317 in.
Bottom Elevation: -26.75 ft., msl

Open Hole:

Length: __________ ft.
Diameter: __________ in.
Bottom Elevation: __________ ft., msl

Solid Casing Material:
- Carbon Steel: compliant (check one or more):
  - ANSI/AWWA C200
  - API Spec. 5L
  - ASTM A53
  - ASTM A139
  - Type S
  - Grade B
  - Other
  
- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)

- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one):
  - Schedule 40
  - Schedule 80

- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one):
  - Schedule 40
  - Schedule 80
  - Other

- Thermoset Plastic: (check one)
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:
- Carbon Steel: compliant (check one or more):
  - ANSI/AWWA C200
  - API Spec. 5L
  - ASTM A53
  - ASTM A139
  - Type S
  - Grade B
  - Other

- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)

- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one):
  - Schedule 40
  - Schedule 80

- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one):
  - Schedule 40
  - Schedule 80
  - Other

- Thermoset Plastic: (check one)
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3296

*msl = mean sea level
### Geologic Log
#### Well No. 3113-03

<table>
<thead>
<tr>
<th>Drilling Log</th>
<th>DRAFT</th>
<th>Vertical Hole No.</th>
<th>ERDC MW-4A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Makua Military Reservation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Drilling agency:</strong> Valley Drilling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Name of Driller:</strong> John Sutigad</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>manufacturer's designation of drill:</strong> Mobile B-90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Date Started:</strong> 9/20/02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Datum for elevation shown:</strong> MSL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Completed:</strong> 9/20/02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total No. of overburden samples taken:</strong> Disturbed 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Undisturbed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GPS Coord. N 21 deg. 31.734’ W 158 deg. 13.570’</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Depth of Hole:</strong> 45 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Elevation ground water:</strong> 16.9’</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Lithology</th>
<th>Description</th>
<th>Blow Counts</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Fine sand (SM) Brown fill?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-2</td>
<td>Sand (SP) White, brown calcareous, well rounded, paleo-beach sand. Well sorted, coarse grained.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-4</td>
<td>First clearance, no detect OA</td>
<td>HNU - 0.0 ppm</td>
<td>10</td>
<td>Sampled w/ 2” sampler from 5.0’ to 6.5’ Sand (SP)</td>
</tr>
<tr>
<td>-6</td>
<td>Second clearance</td>
<td>HNU - 0.0 ppm SC: LL 18 total counts (only background)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>-8</td>
<td>A.A. (cuttings)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td>Third clearance NT/OA</td>
<td>HNU - 0.0 ppm SC: LL - 0 counts (only background)</td>
<td>7</td>
<td>Sampled w/ 2” sampler from 10.0’ to 11.5’ Sand (SP) w/ sorted, white, coarse grained</td>
</tr>
<tr>
<td>-12</td>
<td>Fourth clearance NT/OA</td>
<td>HNU - 0.0 ppm SC: LL - 0 counts (only background)</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>-14</td>
<td>Sand (SP) A/A, white to brown (cuttings)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fifth clearance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sand (SP) slightly damp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HNU - 0.0 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Layer</td>
<td>Description</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-16</td>
<td>SC LL - 18-20 counts (only background)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-18</td>
<td>16.9' Water Table</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>-18</td>
<td>Sand (SP) A/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-20</td>
<td>Sand (SP) White to brown, well-sorted, coarse grained, wet (auger cutting)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-22</td>
<td>Sand (SP) AA (cuttings)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-24</td>
<td>Sand (SP) AA (cuttings)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-26</td>
<td>Sand (SP) AA (cuttings)</td>
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<td></td>
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<tr>
<td>-30</td>
<td>Sand (SP) AA (cuttings)</td>
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</tr>
<tr>
<td>-32</td>
<td>Sand (SP) AA (cuttings)</td>
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</tr>
<tr>
<td>-34</td>
<td>Sand (SP) AA (cuttings)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-36</td>
<td>Sand (SP) AA (cuttings)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Drilling ahead to 20.0' - let hole set for 20 minutes to see if water comes back into hole. Measured 16.9' w/electrical tape.

HNU - 0.0 ppm, SC LL 18-20 counts (only background)
Sand (SP) AA (cuttings)
Well Number: 3113-03

<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock description, Water level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 3.5</td>
<td>Fine brown sand</td>
<td>9/20/02</td>
</tr>
<tr>
<td>3.5 to 20</td>
<td>Sand, white with brown calcareous</td>
<td>9/20/02</td>
</tr>
<tr>
<td></td>
<td>fragments, paleo beach sand.</td>
<td></td>
</tr>
<tr>
<td>20 to 45</td>
<td>Sand, white to brown, well-sorted</td>
<td>9/20/02</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
Steel, cement filled pickets (1 of 3)

Concrete Surface Seal

Elevation = 19.3 ft.

Borehole Diameter (10" Minimum)

Water Level

#3 Sand

4" Diameter PVC Schedule 40 Riser Pipe

Bentonite Pellet Seal (Minimum 2' Thick)

4" Diameter PVC Schedule 40 Slotted Screen (0.020" Slot Size)
Monitoring Well Coordinates
Well MW-4A (3113-03)

Surveyed on June 30, 2003

Latitude (N): 21° 31’ 44” Longitude (W) 158° 13’ 34”

Ground Elevation: 19.25 feet
Top of Casing Elevation: 22.23 feet

Coordinates are referred to the North American Datum of 1983 (NAD83)
Elevations are referred to Mean Sea Level (M.S.L.) being established from State
Survey Monument 8-10 having an elevation of 17.83 feet.
WELL CONSTRUCTION PERMIT
ERDC-MW-4A, Well No. 3113-03

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management’s Administrative Rules, Section 13-168, entitled “Water Use, Wells, and Stream Diversion Works”, this document permits the construction and testing of ERDC-MW-4A (Well No. 3113-03) at Makua Military Reservation, Oahu, TMK 8-2-01:24, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1/4-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

Permittee’s Signature: ___________________________ Date: __________
Printed Name: COL Floyd A. Quintana Firm or Title: Director of Public Works, USAG-HI

Driller’s Signature: ___________________________ Date: __________
Printed Name: Mike Solari C-57 License #: 21358 Firm or Title: Valley Well Drilling

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

Attachment

USGS Department of Health Safe Drinking Water, Wastewater, and Clean Water Branches Honolulu Board of Water Supply
**State of Hawai‘i**  
**COMMISSION ON WATER RESOURCE MANAGEMENT**  
Department of Land and Natural Resources  
**WELL COMPLETION REPORT - PART I**  
Well Construction

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

<table>
<thead>
<tr>
<th>1. State Well No.:</th>
<th>3113-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Well Name:</td>
<td>ERDC-MW-4B</td>
</tr>
<tr>
<td>3. Island:</td>
<td>Oahu</td>
</tr>
<tr>
<td>4. Drilling Company:</td>
<td>Valley Well Drilling</td>
</tr>
<tr>
<td>5. Date Well Construction (drilled, cased, grouted) completed:</td>
<td>9/21/02</td>
</tr>
</tbody>
</table>

**Fill out attached Driller’s Log**  
*In addition to the driller’s log, if a geologic log was prepared, please submit with this form.*

| 6. Was the subject well cored? | Yes |
| 7. Initial water-level encountered | 16.5 ft. below ground |
| 8. Step-Drawdown Test completed? | Yes |
| 9. Constant Rate Aquifer Test completed? | Yes |

**Parameters prior to pump test:**

| 10. Water-level: | 4.02 ft. above msl |
| 11. Chloride: | 168 ppm |
| 12. Temperature: | 70°F |

| 13. Fill in the as-built section on the other side of this sheet. |
| 14. Fill in attached surveyor’s report. |
| 15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.) |
| 16. The proposed manufacturer’s rated pump capacity is _______ gpm at a head of _______ ft. |
| 17. Remarks: | No pump installed. Well for sampling |

**Licensed Driller (print):** Mike Saber  
**C-57 Lic. No.:** 21358  
**Signature:**  
**Date:** 11/16/04

**Permittee (print):** COL Floyd A. Quintana, DPW, USAG-HI  
**Signature:**  
**Date:** 10/30/04
13. AS-BUILT WELL SECTION (Please attach as-built if different from diagram provided below)

Elevation at top of casing: __ ft., msl* (to nearest 0.01 ft.)

Minimum of 2' Radius & 4" Thick Concrete Pad

Ground Elevation: __ ft., msl

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

Cement Grout: __ ft. (min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)

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

Rock or Gravel Packing: __ ft.

Material: __

- Crushed Basalt
- Rounded Gravel

Water Level Elevation: __.0 ft., msl*

Total Depth: __ ft.

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

Length: __ ft.

Nominal Diameter: __ in.

Wall Thickness: __ in.

Bottom Elevation: __ ft., msl

Open Casing: □ Perforated □ Screen

Length: __ ft.

Nominal Diameter: __ in.

Wall Thickness: __ in.

Bottom Elevation: __ ft., msl

Open Hole: __ ft.

Length: __ ft.

Diameter: __ in.

Bottom Elevation: __ ft., msl

Solid Casing Material: __

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

And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other

Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)

ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80

PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120

Thermoset Plastic: (check one)

□ Filament Wound Resin Pipe conforming to ASTM D2996

□ Centrifugally Cast Resin Pipe conforming to ASTM D2997

□ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517

□ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950

□ PTFE Fluorocarbon Tubing conforming to ASTM D3296

□ FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:

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

And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other

Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)

ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80

PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120

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□ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950

□ PTFE Fluorocarbon Tubing conforming to ASTM D3296

□ FEP Fluorocarbon Tubing conforming to ASTM D3296

*msl = mean sea level

Solid Casing Material: 9.3113-0A ERDC-MW-AB
<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock description, Water level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 5</td>
<td>Fine sand, brown</td>
<td>9/21/02</td>
</tr>
<tr>
<td>5 to 70</td>
<td>Sand, brown to white, well sorted</td>
<td>9/21/02</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
# Geologic Log

**Well No. 3113-04**

## Drilling Log

**Makua Military Reservation**

**Drilling agency:** Valley Drilling

**Name of Driller:** John Suriaad

**Manufacturer's designation of drill:** Mobile B-90

**Total No. of overburden samples taken:** Disturbed 2

**GPS Coord:** N 21 deg 31.742' W 156 deg 57.3' (Acc. 19')

<table>
<thead>
<tr>
<th>Depth</th>
<th>Lithology</th>
<th>Description</th>
<th>Blow Counts</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>First clearance. ND/DA.</td>
<td>20, 30</td>
<td></td>
</tr>
<tr>
<td>-2</td>
<td></td>
<td>End of fill. Sand (SP) brown to white. Very well sorted.</td>
<td>15, 20</td>
<td></td>
</tr>
<tr>
<td>-4</td>
<td></td>
<td>Second clearance. ND/DA.</td>
<td>15, 20</td>
<td></td>
</tr>
<tr>
<td>-6</td>
<td></td>
<td>Sand (SP) cuttings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-8</td>
<td></td>
<td>Third clearance. HNU - 0 ppm SC:LL - 18 - 20 counts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td></td>
<td>Fourth clearance. ND/DA. Sand (SP) brown to white (cuttings).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-12</td>
<td></td>
<td>Fifth clearance. HNU - 0 ppm SC:LL - 18 - 20 counts Sand (SP) A/A. Water table at 16.8'</td>
<td></td>
<td>Note: Drilled hole to 20', let set 20 min to check water level.</td>
</tr>
<tr>
<td>-14</td>
<td></td>
<td>Sand (SP) A/A.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-16</td>
<td></td>
<td>Sand (SP) A/A (cuttings)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-18</td>
<td></td>
<td>Sand (SP) A/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-20</td>
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<td>Sand (SP) A/A (cuttings)</td>
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</tr>
<tr>
<td>-22</td>
<td></td>
<td>Sand (SP) A/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-24</td>
<td></td>
<td>Sand (SP) A/A (cuttings)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-26</td>
<td></td>
<td>Sand (SP) A/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-28</td>
<td></td>
<td>Sand (SP) A/A (cuttings)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-30</td>
<td></td>
<td>Sand (SP) A/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Datum for elevation shown:** MSL

**Date Started:** 9/20/02

**Completed:** 9/20/02

**Total Depth of Hole:** 70 ft

**Elevation ground water:** 16.8'

**Vertical Hole No.:** ERDC MW-4B

**Size and Type of Bit:** 7' 3 way

**Note:** Drilled hole to 20', let set 20 min to check water level.
<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-32</td>
<td>Sand (SP) A/A (cuttings)</td>
</tr>
<tr>
<td>-34</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-36</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-38</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-40</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-42</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-44</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-46</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-48</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-50</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-52</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-54</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-56</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-58</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-60</td>
<td>Rock at 59 to 60°, then back into sand (SP) A/A</td>
</tr>
<tr>
<td>-62</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-64</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-66</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-68</td>
<td>Sand (SP) A/A</td>
</tr>
<tr>
<td>-70</td>
<td>Not as hard, last two feet.</td>
</tr>
</tbody>
</table>

Note: Removed hard black material from auger bit.
Steel, cement filled pickets (1 of 3)

Concrete Surface Seal

Elevation = 19.3 ft.

4" Diameter PVC Schedule 40 Riser Pipe

Water Level

Borehole Diameter (10" Minimum)

Bentonite Concrete Grout Backfill

Bentonite Pellet Seal (Minimum 2' Thick)

#3 Sand

4" Diameter PVC Schedule 40 Slotted Screen (0.020" Slot Size)
Monitoring Well Coordinates

Well MW-4B (3113-04)

Survey by R.M. Towill, Inc.
420 Waiakamilo Rd
Honolulu, HI 96817
Tel: 842-1133
Mr. Ryan Suzuki

Surveyed on June 30, 2003

Latitude (N): 21° 31' 44"
Longitude (W) 158° 13' 34"

Ground Elevation: 19.27 feet

Top of Casing Elevation: 22.16 feet

Coordinates are referred to the North American Datum of 1983 (NAD83)
Elevations are referred to Mean Sea Level (M.S.L.) being established from State
Survey Monument 8-10 having an elevation of 17.83 feet.
In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-4B (Well No. 3113-04) at Makua Military Reservation, Oahu, TMK 8-2-01:24, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1-1/4-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pumping testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

9. The well construction permit application is incorporated into this permit by reference and is subject to the Hawaii Well Construction & Pump Installation Standards (January 23, 1987; HWCPIS). If the HWCPIS are not followed and as a consequence water is wasted or contaminated, a lien on the property may result.

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

Permittee's Signature: [Signature]
Printed Name: COL Floyd A. Quintana
Firm or Title: Director of Public Works, USAG-HI
Driller's Signature: [Signature]
C-57 License #: A1358
Date: 11/16/04
Printed Name: Mike Sobier
Firm or Title: Valley Well Drilling

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

Attachment
C: USGS
Department of Health/ Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
## State of Hawaii
**COMMISSION ON WATER RESOURCE MANAGEMENT**
Department of Land and Natural Resources

### WELL COMPLETION REPORT - PART I

**Well Construction**

**Instructions:** Please print in ink or type and send completed report (with attachments, if applicable) to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. The Commission may not accept incomplete reports. This form shall be submitted within 60 days of the completion of work. For assistance, please consult the Hawaii Well Construction and Pump Installation Standards or call the Regulation Branch at 808-687-0225. For updates to this form or additional information, please visit our website at [http://www.state.hi.us/dlnr/cwrm/](http://www.state.hi.us/dlnr/cwrm/).

### Part I: Well Completion Report

1. **State Well No.:** 3113-05  
   **Well Name:** ERDC-MW-4C  
   **Island:** Oahu

2. **Address:** Makua Military Reservation  
   **Tax Map Key:** 8-2-01:24

3. **Drilling Company:** Valley Well Drilling

4. **Drilling method used during construction:**  
   - [X] Rotary  
   - [ ] Percussion  
   - [ ] Other (describe)

5. **Date Well Construction (drilled, cased, grouted) completed:** 1/6/02  
   **Fill out attached Driller's Log**

   In addition to the driller's log, if a geologic log was prepared, please submit with this form.

6. **Was the subject well cored?**  
   - [X] Yes  
   - [ ] No

7. **Initial water-level encountered:** 15 ft. below ground  
   **Date and time of measurement:** 1/6/02 14:30

8. **Step-Drawdown Test completed?**  
   - [X] No  
   - [ ] Yes
   **Attach Step-Drawdown Test form (12/1997 SDPTD Form)**

9. **Constant Rate Aquifer Test completed?**  
   - [ ] No  
   - [X] Yes
   **Attach Constant Rate Aquifer Test form (12/1997 CRPTD Form)**

**Parameters prior to pump test:**

10. **Water-level:** 4.05 ft. above msl  
    **Date and time of measurement:** 4/3/03 16:00

11. **Chloride:** 180 ppm  
    **Date and time of sampling:** 4/3/03 15:00

12. **Temperature:** 75 °F  
    **Date and time of measurement:** 4/4/03 15:30

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

14. **Fill in attached surveyor's report.**

15. **If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)**

16. **The proposed manufacturer's rated pump capacity is __________ gpm at a head of ________ ft.**

17. **Remarks:** No pump installed, well for sampling

---

**Licensed Driller (print):** Mike Saban  
**C-57 Lic. No.:** 21358

**Signature:**  
**Date:** 1/6/04

**Permittee (print):** COL Floyd A. Quintana, DPW, USAG-HI

**Signature:**  
**Date:** 1/7/04
**Solid Casing Material:**
- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- Stainless Steel: (check one): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 120
- Thermoset Plastic: (check one)
  - □ Filament Wound Resin Pipe conforming to ASTM D2996
  - □ Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - □ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - □ PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - □ FEP Fluorocarbon Tubing conforming to ASTM D3296

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

*msl = mean sea level

**Section Number:** 3-313-05

**ERDC-MU-4C**
<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock description, Water level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 55</td>
<td>Sand, brown clayey, silty, sand, loose from cutting. Smooth drilling</td>
<td>12/03/02</td>
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<tr>
<td>55 to 66</td>
<td>Dark brown sandy, silty clay and basaltic rock</td>
<td>12/03/02</td>
</tr>
<tr>
<td>66 to 92</td>
<td>Dark brown sandy few, silty clay, few basaltic fine to coarse gravel</td>
<td>12/04/02</td>
</tr>
<tr>
<td>92 to 105</td>
<td>Dark brown sandy, silty, clay, few basaltic fine to coarse gravel</td>
<td>12/04/02</td>
</tr>
</tbody>
</table>

Remarks:
### Drilling Log

**Makua Military Reservation**

**Drilling agency:** Valley Drilling  
**Name of Driller:** John Surigad  
**Manufacturer's designation of drill:** Mobile B-90  
**Total No. of overburden samples taken:** Disturbed 0, Undisturbed 0

<table>
<thead>
<tr>
<th>Depth</th>
<th>Lithology</th>
<th>Description</th>
<th>Blow Counts</th>
<th>Comments</th>
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<td>0</td>
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<tr>
<td>-4</td>
<td></td>
<td>Approximate water table.</td>
<td></td>
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</tr>
<tr>
<td>-6</td>
<td></td>
<td>End UXO clearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-8</td>
<td></td>
<td>(SC) Brown, clayey, silty, sand w/ trace line to coarse basaltic gravel from drill cuttings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td></td>
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<tr>
<td>-46</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Vertical Hole No.** ERDC MW-4C  
**Size and Type of Bit:** 10" Tri-cone, Mud rotary  
**Datum for elevation shown:** MSL - 235.36'  
**Date Started:** 12/04/02  
**Completed:**

**Total Depth of Hole:** 105 ft  
**Elevation ground water:** 15' bgs

Drilling performed initially using 6" diameter hollow stem auger to facilitate UXO clearance. UXO clearance conducted every 3' down to 21' bgs. HNU and scintillator readings taken on drill cuttings at the same time as UXO clearances (every 3 feet).  
HNU - 8.0  

36' bgs encountered cavities or void, slow drilling due to borehole instability and drilling mud loss.
(CL) Dark brown sandy, silty, clay and basaltic rock.

Basaltic rock layer, hard @ appx. 66' to 92' bgs.

(CL) Dark brown sandy, silty, clay, few basaltic fine to coarse gravel.

Overdrilled to 105' bgs. Bottom of well casing set at appx. 100' bgs.
Monitoring Well Coordinates

Well MW-4C (3113-X) 05

Survey by R.M. Towill, Inc.
420 Waiakamilo Rd
Honolulu, HI 96817
Tel: 842-1133
Mr. Ryan Suzuki

Surveyed on June 30, 2003

Latitude (N): 21° 31' 44"
Longitude (W) 158° 13' 34"

Ground Elevation: 19.71 feet

Top of Casing Elevation: 22.67 feet

Coordinates are referred to the North American Datum of 1983 (NAD83)
Elevations are referred to Mean Sea Level (M.S.L.) being established from State
Survey Monument 8-10 having an elevation of 17.83 feet.
WELL CONSTRUCTION PERMIT
ERDC-MW-4C, Well No. 3113-05

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-4C (Well No. 3113-05) at Makua Military Reservation, Oahu, TMK 8-2-01:24, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

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

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

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

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Expiration Date: September 23, 2004

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

Permittee's Signature: ___________________________ Date: __/__/____
Printed Name: COL Floyd A. Quintana Firm or Title: Director of Public Works, USAG-HI

Driller's Signature: ___________________________ Date: __/__/____
Printed Name: Mike Soba C-57 License #: 21358

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

Attachment:

C:

USGS
Department of Health, Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
1. State Well No.: 3113-06  
   Well Name: ERDC-MW-5  
   Island: Oahu

2. Address: Makua Military Reservation  
   Tax Map Key: 8-2-01:20

3. Drilling Company: Valley Well Drilling

4. Drilling method used during construction: \(\square\) Rotary  \(\square\) Percussion  \(\square\) Other (describe)

5. Date Well Construction (drilled, cased, grouted) completed: 12/11/02  
   Fill out attached Driller's Log

6. Was the subject well cored? \(\square\) Yes  \(\square\) No

7. Initial water-level encountered: 223 ft. below ground  
   Date and time of measurement: 12/09/2002 8:00

8. Step-Drawdown Test completed? \(\square\) Yes  \(\square\) No  
   Attach Step-Drawdown Test form (12/17/97 SDPTD Form)

9. Constant Rate Aquifer Test completed? \(\square\) Yes  \(\square\) No  
   Attach Constant Rate Aquifer Test form (12/17/97 CRPTD Form)

Parameters prior to pump test:

10. Water-level: 15.35 ft. above msl  
    Date and time of measurement: 4/3/2003 10:30

11. Chloride: 152 ppm  
    Date and time of sampling: 4/17/2003 13:30

12. Temperature: 77 \(^\circ\)F  
    Date and time of measurement: 4/17/2003 14:00

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

14. Fill in attached surveyor's report.

15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)

16. The proposed manufacturer's rated pump capacity is ______ gpm at a head of ______ ft.  
   (Attach pump specifications and rating curve)

17. Remarks: No pump installed. Well for sampling

Licensed Driller (print) Mike Sobor  
C-57 Lic. No. 21358

Signature  Date 11/06/04

Permittee (print) COL Floyd A. Quintana, DPW, USAG-HI

Signature  Date 12/20/04
### DRILLER'S LOG

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

**DRILLER'S LOG**

**Well Number:** 3113-06

<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock description, Water level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 25</td>
<td>Dark brown clayey silt to silty clay. Few basaltic rocks.</td>
<td>12/04/02</td>
</tr>
<tr>
<td>25 to 55</td>
<td>Basaltic rock layers mixed with dark brown clayey silt.</td>
<td>12/04/02</td>
</tr>
<tr>
<td>55 to 110</td>
<td>Dark brown clayey silt.</td>
<td>12/04/02</td>
</tr>
<tr>
<td>110 to 210</td>
<td>Brown clayey silt, void of boulders of basaltic rock pieces.</td>
<td>12/05/02</td>
</tr>
<tr>
<td>140 to 210</td>
<td>Light brown clayey silt</td>
<td>12/05/02</td>
</tr>
<tr>
<td>220 to 260</td>
<td>Fine grained silty sand. Very fine grained, poorly sorted.</td>
<td>12/05/02</td>
</tr>
<tr>
<td>260 to 303</td>
<td>Fine grained silty sand. Some clay lenses, very thin. Light brown</td>
<td>12/06/02</td>
</tr>
<tr>
<td>303 to 360</td>
<td>Clayey gravel. Loose gravel 2-5 cm in size. Well-rounded, poorly sorted</td>
<td>12/06/02</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock description, Water level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

**Remarks:**

DL Form 06/24/2004
# Geologic Log

## Well No. 3113-06

<table>
<thead>
<tr>
<th>Depth</th>
<th>Lithology</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>Air rotary drilling.</td>
</tr>
<tr>
<td>-10</td>
<td>(ML) dk brown clayey silt to silty clay,</td>
<td>From drill cuttings HNU: 0 SC: LL - BG</td>
</tr>
<tr>
<td></td>
<td>moist. Few basaltic rocks.</td>
<td></td>
</tr>
<tr>
<td>-20</td>
<td>Basaltic rock layers mixed with dk</td>
<td>From drill cuttings HNU: 0 SC: LL - BG</td>
</tr>
<tr>
<td></td>
<td>brown clayey silt (ML)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drilled through rock layers mixed with</td>
<td>From drill cuttings HNU: 0 SC: LL - BG</td>
</tr>
<tr>
<td></td>
<td>dk brown clayey silt (ML), dry.</td>
<td></td>
</tr>
<tr>
<td>-30</td>
<td>Basaltic rock layers mixed with dk</td>
<td>From drill cuttings HNU: 0 SC: LL - BG</td>
</tr>
<tr>
<td></td>
<td>brown clayey silt (ML).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drilled through rock layers mixed with</td>
<td>From drill cuttings HNU: 0 SC: LL - BG</td>
</tr>
<tr>
<td></td>
<td>dk brown clayey silt (ML), dry.</td>
<td></td>
</tr>
<tr>
<td>-40</td>
<td>(ML) dk brown clayey silt, dry.</td>
<td>From drill cuttings HNU: 0 SC: LL - BG</td>
</tr>
<tr>
<td></td>
<td>Drilling smooth.</td>
<td></td>
</tr>
<tr>
<td>-50</td>
<td>(ML) Dk brown clayey silt, dry.</td>
<td>From drill cuttings HNU: 0 SC: LL - BG</td>
</tr>
<tr>
<td></td>
<td>Drilling smooth.</td>
<td></td>
</tr>
<tr>
<td>-60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-80</td>
<td></td>
<td></td>
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<tr>
<td>-90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Drilling Log**

**Makua Military Reservation**

**Drilling agency:** Valley Drilling

**Name of Driller:** John Suriaad

**Manufacturer's designation of drill:** Mobile B-90

**Total No. of overburden samples taken:** Disturbed 0, Undisturbed 0

**Datum for elevation shown:** MSL-235.36'

**Date Started:** 12/04/02

**Completed:**

**Total Depth of Hole:** 360 ft

**Elevation ground water:** 15' bgs

**Size and Type of Bit:** 10' Tri-cone, Mud rotary

**Notes:**

- Air rotary drilling.
- Air volume 1,000
(ML) Brown clayey silt. Drilling smooth.


Same as above.

(ML) Light brown clayey silt.

(SM) Fine grained silty sand. Very fine grained, poorly sorted.

HNU.0
Scintillometer - 33.5

HNU - 0
Scintillometer - 32.5

HNU - 0
Scintillometer - 33.4

HNU - 0

Scintillometer - 31.7

HNU - 0

Scintillometer - 33.6

HNU - 0

Scintillometer - 39.0

HNU - 0
Fine grained silty sand. Some clay lenses, very thin. Light brown in color. Poorly sorted.

Same as above.

Silty gravels. Gravel size 1-2 cm. Some silt matrix, appx. 25%. Poorly sorted.

Clayey gravel. Loose gravel 2-5 cm in size. Well-rounded, poorly sorted. Some clay matrix, 10-15%.

Same as above.
Monitoring Well Coordinates

Well MW-5 (3113-06)

Survey by R.M. Towill, Inc.
420 Waiakamilo Rd
Honolulu, HI 96817
Tel: 842-1133
Mr. Ryan Suzuki

Surveyed on December 12, 2002

Latitude (N): 21° 31’ 42”  Longitude (W) 158° 12’ 43”

Ground Elevation: 235.40 feet

Top of Casing Elevation: 235.22 feet

Coordinates are referred to the North American Datum of 1983 (NAD83)
Elevations are referred to Mean Sea Level (M.S.L.) being established from State
Survey Monument 8-10 having an elevation of 17.83 feet.
WELL CONSTRUCTION PERMIT
ERDC-MW-5, Well No. 3113-06

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-5 (Well No. 3113-06) at Makua Military Reservation, Oahu, TMK 8-2-01:20, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1/4-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: October 28, 2002
Expiration Date: October 28, 2004

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

Permittee's Signature: ________________________________ Date: ____________________________
Printed Name: COL Floyd A. Quintana Firm or Title: Director of Public Works, USAG-HI

Driller's Signature: ________________________________ Date: ____________________________
Printed Name: Mike Saber Firm or Title: Valley Well Drilling

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

Attachment

C: USGS Department of Health's Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
State of Hawaii, Department of Land and Natural Resources
1. State Well No.: 3213-08    Well Name: ERDC-MW-2    Island: Oahu
2. Address: Makua Military Reservation
3. Drilling Company: Valley Well Drilling
4. Drilling method used during construction: □ Rotary  □ Percussion  □ Other (describe)
5. Date Well Construction (drilled, cased, grouted) completed: 10/16/02
6. Was the subject well cored?  □ Yes  X No
7. Initial water-level encountered 11.7 ft. below ground  Date and time of measurement: 10/16/02 9:45
8. Step-Drawdown Test completed?  □ No  □ Yes  Attach Step-Drawdown Test form (12/17/97 SDPTD Form)
9. Constant Rate Aquifer Test completed?  □ No  □ Yes  Attach Constant Rate Aquifer Test form (12/17/97 CRPTD Form)
10. Water-level: 4.99 ft. above msl  Date and time of measurement: 10/11/02 10:15
11. Chloride: 231 ppm  Date and time of sampling: 4/11/03 11:19
12. Temperature: 80°F  Date and time of measurement: 4/11/03 11:19
13. Fill in the as-built section on the other side of this sheet.
14. Fill in attached surveyor’s report.
15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)
16. The proposed manufacturer’s rated pump capacity is _______ gpm at a head of _______ ft.
17. Remarks: No pump installed. Well is for sampling only.

Licensed Driller (print) Mike Sober  C-57 Lic. No. A1358

Permittee (print) COL Floyd A. Quintana, DPW, USAC–HI

WCR1 Form 9/12/01 Page 1 of 4
13. AS-BUILT WELL SECTION

(Please attach as-built if different from diagram provided below)

Bench mark elevation:

(Survey to nearest 0.01 ft.)

Cement Grout: 4.5 ft. (min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)

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

3 in.

Rock or Gravel Packing:

31.5 ft.

Material:

 Crushed Basalt
 Rounded Gravel

Water Level Elevation:

4.19 ft., msl*

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

Length: 6 ft.
Nominal Diameter: 4 in.
Wall Thickness: 0.337 in.
Bottom Elevation: -3.81 ft., msl

Open Casing: □ Perforated □ Screen

Length: 29 ft.
Nominal Diameter: 4 in.
Wall Thickness: 0.337 in.
Bottom Elevation: -24.19 ft., msl

Open Hole:

Length: 1 ft.
Diameter: 10 in.
Bottom Elevation: -25.1 ft., msl

*msl = mean sea level

Solid Casing Material:
Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
And compliant with (check one or more): □ ASTM A422 □ Type E □ Type S □ Grade B □ Other
Stainless Steel: (check one):
□ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80
PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 12
Thermoset Plastic: (check one)
□ Filament Wound Resin Pipe conforming to ASTM D2996
□ Centrifugally Cast Resin Pipe conforming to ASTM D2997
□ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
□ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
□ PTFE Fluorocarbon Tubing conforming to ASTM D3296
□ FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:
Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
And compliant with (check one or more): □ ASTM A422 □ Type E □ Type S □ Grade B □ Other
Stainless Steel: (check one):
□ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80
PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 12
Thermoset Plastic: (check one)
□ Filament Wound Resin Pipe conforming to ASTM D2996
□ Centrifugally Cast Resin Pipe conforming to ASTM D2997
□ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
□ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
□ PTFE Fluorocarbon Tubing conforming to ASTM D3296
□ FEP Fluorocarbon Tubing conforming to ASTM D3296
Well Number: 3213-08

<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock description, Water level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 1.5</td>
<td>Silty sand, with basalt fragments</td>
<td>10/09/02</td>
</tr>
<tr>
<td>1.5 to 25</td>
<td>Clay, black, slight sand, basalt frags</td>
<td>10/09/02</td>
</tr>
<tr>
<td>25 to 30.5</td>
<td>Clay, slightly sandy, basalt frags</td>
<td>10/09/02</td>
</tr>
<tr>
<td>30.5 to 35</td>
<td>Lean clay, some sand.</td>
<td>10/09/02</td>
</tr>
</tbody>
</table>

Remarks:

DL Form 06/24/2004
### Geologic Log
#### Well No. 3213-08

**Drilling Log**

| Makua Military Reservation | Size and Type of Bit: 7" 3 way |
| Drilling agency: Valley Drilling | Datum for elevation shown: MSL |
| Name of Driller: John Suriqad | Date Started: 10/09/02 |
| Manufacturer's designation of drill: Mobile B-90 | Completed: 10/09/02 |
| Total No. of overburden samples taken: Disturbed 3 | Total Depth of Hole: 35 ft |
| GPS Coord., N 21 deg. 32.063' W 158 deg. 13.13.694' Undisturbed | Elevation ground water: 11.7 ft |

<table>
<thead>
<tr>
<th>Depth</th>
<th>Lithology</th>
<th>Description</th>
<th>Blow Counts</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Silty sand (SM), black, slightly sandy w/ basalt frags.</td>
<td>HNU - 0 ppm SC:LL - 18-20 counts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1</td>
<td>Clay (CL) Black, sl. sandy, basalt frags.</td>
<td>Background counts 18-20 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-2</td>
<td>First clearance. No detect - drilling ahead.</td>
<td>Lean clay (CL) dark gray w/ silt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-3</td>
<td>Lean clay (CL) dark gray w/ silt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-4</td>
<td>Second clearance. No detect - drilling ahead.</td>
<td>HNU - 0 ppm SC:LL - 18-20 counts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-5</td>
<td>Third clearance. No detect - drilling ahead.</td>
<td>Lean clay (CL) dark gray w/ silt, inclusions and lenses.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-6</td>
<td>Fourth clearance. No detect - drilling ahead.</td>
<td>11.7' (Approx. water table) HNU - 0 ppm SC:LL - 18-20 counts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-7</td>
<td>Fifth clearance. No detect - drilling ahead.</td>
<td>Lean clay (CL) sl. sandy, dark gray to black, trace basalt frags.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-8</td>
<td></td>
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<td>-9</td>
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<tr>
<td>-15</td>
<td></td>
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</tr>
</tbody>
</table>
Sixth clearance. No detect - drilling ahead.

Seventh clearance (final). No detect - drilling ahead.

Lean clay, slightly sandy. Dark gray, trace basalt frags. (auger cuttings).

Rock and rock frags (recovered basalt frags).

Lean clay (CL) A/A more sandy (auger cuttings)
Monitoring Well Coordinates
Well MW-2 (3213-08)

Survey by R.M. Towill, Inc.
420 Waiakamilo Rd
Honolulu, HI 96817
Tel: 842-1133
Mr. Ryan Suzuki

Surveyed on June 30, 2003
Latitude (N): 21° 32' 04"
Longitude (W): 158° 13' 42"

Ground Elevation: 10.81 feet
Top of Casing Elevation: 13.59 feet

Coordinates are referred to the North American Datum of 1983 (NAD83)
Elevations are referred to Mean Sea Level (M.S.L.) being established from State
Survey Monument 8-10 having an elevation of 17.83 feet.
In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-2 (Well No. 3213-08) at Makua Military Reservation, Cahu, TMK 8-1-01-2, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1 1/4-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

Permittee's Signature: ___________________________  Date: 10/27/04
Printed Name: COL Floyd A. Quintana  Firm or Title: Director of Public Works, USAG-HI
Driller's Signature: ___________________________  C-57 License #:  A1359  Date: 11/16/04
Printed Name: Mike Sober  Firm or Title: Valley Well Drilling

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

Attachment
C.
USGS
Department of Health Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
State of Hawaii  
COMMISSION ON WATER RESOURCE MANAGEMENT  
Department of Land and Natural Resources  
WELL COMPLETION REPORT - PART I  
Well Construction

Instructions: Please print in ink or type and send completed report (with attachments, if applicable) to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. The Commission may not accept incomplete reports. This form shall be submitted within 60 days of the completion of work. For assistance, please consult the Hawaii Well Construction and Pump Installation Standards or call the Regulation Branch at 808-587-0225. For updates to this form or additional information, please visit our website at http://www.state.hi.us/dlnr/cwrm/

1. State Well No.: 3213-09  
   Well Name: ERDC-MW-3A  
   Island: Oahu

2. Address: Makua Military Reservation  
   Tax Map Key: 8-1-01:1

3. Drilling Company: Valley Well Drilling

4. Drilling method used during construction:  
   ■ Rotary  □ Percussion  □ Other (describe)

5. Date Well Construction (drilled, cased, grouted) completed: 10/14/2002  
   Fill out attached Driller's Log
   In addition to the driller's log, if a geologic log was prepared, please submit with this form.

6. Was the subject well cored?  □ Yes  ■ No

7. Initial water-level encountered: 17 ft. below ground  
   Date and time of measurement: 10/14/2002 10:00

8. Step-Drawdown Test completed?  □ No  ■ Yes  
   Attach Step-Drawdown Test form (12/17/97 SDPTD Form)

9. Constant Rate Aquifer Test completed?  □ No  ■ Yes  
   Attach Constant Rate Aquifer Test form (12/17/97 CRPTD Form)

Parameters prior to pump test:

10. Water-level: 3.8 ft. above msl  
    Date and time of measurement: 4/1/2003 11:00

11. Chloride: 55 ppm  
    Date and time of sampling: 4/1/2003 11:30

12. Temperature: 80°F  
    Date and time of measurement: 4/1/2003 11:30

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

14. Fill in attached surveyor's report.

15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)

16. The proposed manufacturer's rated pump capacity is ______ gpm at a head of ______ ft.

17. Remarks: No pump installed, well is for sampling

Licensed Driller (print)  Mike Sobor  
C-57 Lic. No. 21358

Signature  
Date 11/16/04

Permittee (print)  COL Floyd A. Quintana, DPW, USAG-HI

Signature  
Date 03/27/04
13. AS-BUILT WELL SECTION

(please attach as-built if different from diagram provided below)

Please refer to the Hawaii Well Construction and Pump Installation Standards to ensure that your as-built is in compliance with applicable standards.

Solid Casing Material:
Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other
Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one): □ Schedule 40 □ Schedule 80
PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 12
Thermoset Plastic: (check one)
□ Filament Wound Resin Pipe conforming to ASTM D2996
□ Centrifugally Cast Resin Pipe conforming to ASTM D2997
□ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
□ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
□ PTFE Fluorocarbon Tubing conforming to ASTM D3296
□ FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:
Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other
Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one): □ Schedule 40 □ Schedule 80
PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 12
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□ PTFE Fluorocarbon Tubing conforming to ASTM D3296
□ FEP Fluorocarbon Tubing conforming to ASTM D3296

*msl = mean sea level

**Please note that the page contains diagrams and tables that are not fully transcribed due to the nature of the content.**
### DRILLER’S LOG

**Well Number:** 3213-09

<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock description, Water level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 20</td>
<td>Dark brown sandy clayey silt few basaltic fragments</td>
<td>10/14/2002</td>
</tr>
<tr>
<td>20 to 45</td>
<td>Brown clayey silty sand, trace basaltic fine pebbles</td>
<td>10/14/2002</td>
</tr>
</tbody>
</table>

**Remarks:**

---

**For Official Use Only:**

RECEIVED

04 DEC 2 P4:29

COMMISSION ON WATER RESOURCE MANAGEMENT

**DL Form 06/24/2004**
## Geologic Log
### Well No. 3213-09

<table>
<thead>
<tr>
<th>Drilling Log</th>
<th>DRAFT</th>
<th>Vertical Hole No.</th>
<th>ERDC MW-3A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makua Military Reservation</td>
<td>Size and Type of Bit: 10' dia Hollow Stn. Auger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drilling agency: Valley Drilling</td>
<td>Datum for elevation shown: MSL (approx. 20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of Driller: John Suriaad</td>
<td>Date Started: 10/14/02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturer's designation of drill: Mobile B-90</td>
<td>Completed: 10/14/02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No. of overburden samples taken: Disturbed 3</td>
<td>Total Depth of Hole: 45 ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undisturbed</td>
<td>Elevation ground water: 17' bgs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Lithology</th>
<th>Description</th>
<th>Blow Counts</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ML Dark brown sandy clayey silt with few basaltic gravel fragments (dry) (loose) (til)</td>
<td>HNU - 0 ppm SC LL - 17-26 background</td>
<td>UXO clearance</td>
<td></td>
</tr>
<tr>
<td>-2</td>
<td>ML Dark brown sandy clayey silt, few basaltic gravel fragments (dry) (loose)</td>
<td>Sample w/ 2&quot; dia split spoon sampler. 140 lb. hammer. Sample ID: MMRSSMW-3A-6.0'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-4</td>
<td>ML Dark brown sandy clayey silt, few basaltic gravel fragments (dry) (loose)</td>
<td>25% recovery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-6</td>
<td>ML Dark brown sandy clayey silt, few basaltic gravel fragments (dry) (loose)</td>
<td>2nd UXO clearance at 6' bgs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-8</td>
<td>ML Dark brown clayey sandy silt, trace basaltic gravel, fine gravel (moist) (medium dense to dense)</td>
<td>33% recovery</td>
<td>3rd UXO clearance</td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td>ML Dark brown clayey sandy silt, trace basaltic gravel, fine gravel (moist) (medium dense to dense)</td>
<td>Sample w/ 2&quot; dia split spoon sampler. 140 lb. hammer. Sample ID: MMRSSMW-3A-10.0'. Sampler refusal?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-12</td>
<td>ML Dark brown clayey sandy silt, trace basaltic gravel, fine gravel (moist) (medium dense to dense)</td>
<td>4th UXO clearance. HNU - 0 ppm SC LL 20-35, background.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-14</td>
<td>ML Dark brown clayey sandy silt, trace basaltic gravel, fine gravel (moist) (medium dense to dense)</td>
<td></td>
<td>Sample w/ 2&quot; dia split spoon sampler. 140 lb. hammer. Rock in sample shoe. Low recovery.</td>
<td></td>
</tr>
</tbody>
</table>
Approx. depth to water table: 17 ft bgs

SC-SM Brown clayey silty sand, trace basaltic fine pebbles (wet) (soft)

SC-SM Brown clayey silty sand w/ trace fine pebbles

Drilling smooth

SC Brown clayey silty sand, trace fine pebbles

5% recovery

HNU - 0 ppm
SC:LL - 17-30, background.

5th UXO clearance 18 ' bgs
End UXO clearance

From drill cutting

From drill cutting

From drill cutting

From drill cutting
Monitoring Well Coordinates

Well MW-3A (3213-09)

Survey by R.M. Towill, Inc.
420 Waiakamilo Rd
Honolulu, HI 96817
Tel: 842-1133
Mr. Ryan Suzuki (Surveyor's Lic. #10059)

Surveyed on June 30, 2003

Latitude (N): \(21^\circ 31' 52''\) Longitude (W) \(158^\circ 13' 36''\)

Ground Elevation: 19.11 feet

Top of Casing Elevation: 22.02 feet

Coordinates are referred to the North American Datum of 1983 (NAD83) Elevations are referred to Mean Sea Level (M.S.L.) being established from State Survey Monument 8-10 having an elevation of 17.83 feet.
WELL CONSTRUCTION PERMIT
ERDC-MW-3A, Well No. 3213-09

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-3A (Well No. 3213-09) at Makua Military Reservation, Oahu, TMK 8-1-01:1, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1 1/4-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

11. If the well is not to be used it must be properly capped. If the well is to be abandoned then the permittee, well operator, and/or well owner must apply for a well abandonment permit in accordance with §13-168-12(6) prior to any well sealing or plugging work.

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

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

Permittee's Signature: [Signature] Date: [Date]
Printed Name: [Printed Name] Firm or Title: [Firm or Title]

Driller's Signature: [Signature] Date: [Date]
Printed Name: [Printed Name] Firm or Title: [Firm or Title]

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

Attachment:
C: [Attachment]

Department of Health, Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Well No.</td>
<td>3213-10</td>
</tr>
<tr>
<td>Well Name</td>
<td>ERDC-MW-3B</td>
</tr>
<tr>
<td>Island</td>
<td>Oahu</td>
</tr>
<tr>
<td>Address</td>
<td>Makua Military Reservation</td>
</tr>
<tr>
<td>Tax Map Key</td>
<td>8-1-01:1</td>
</tr>
<tr>
<td>Drilling Company</td>
<td>Valley Well Drilling</td>
</tr>
<tr>
<td>Drilling method used during construction</td>
<td>rotary</td>
</tr>
<tr>
<td>Date Well Construction (drilled, cased, grouted) completed</td>
<td>10/14/02</td>
</tr>
<tr>
<td>Initial water-level encountered</td>
<td>15 ft. below ground</td>
</tr>
<tr>
<td>Date and time of measurement</td>
<td>4/13/03 9:20</td>
</tr>
<tr>
<td>Step-Drawdown Test completed</td>
<td>no</td>
</tr>
<tr>
<td>Constant Rate Aquifer Test completed</td>
<td>no</td>
</tr>
<tr>
<td>Water-level</td>
<td>3.78 ft. above msl</td>
</tr>
<tr>
<td>Date and time of measurement</td>
<td>4/13/03 13:30</td>
</tr>
<tr>
<td>Chloride</td>
<td>39 ppm</td>
</tr>
<tr>
<td>Date and time of sampling</td>
<td>4/13/03 13:50</td>
</tr>
<tr>
<td>Temperature</td>
<td>75 °F</td>
</tr>
<tr>
<td>Date and time of measurement</td>
<td>4/13/03 14:20</td>
</tr>
<tr>
<td>Remarks</td>
<td>No pump installed, well for sampling</td>
</tr>
<tr>
<td>Licensed Driller (print)</td>
<td>Mike Soben</td>
</tr>
<tr>
<td>Signature</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>11/16/04</td>
</tr>
<tr>
<td>Permittee (print)</td>
<td>COL Floyd A. Quintana, DPW, USAG-HT</td>
</tr>
<tr>
<td>Signature</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>1/7/05</td>
</tr>
</tbody>
</table>
13. AS-BUILT WELL SECTION

(Please attach as-built if different from diagram provided below)

Elevation at top of casing: __________ ft., msl*

Bench mark elevation:

_______ ft., msl*

(Survey to nearest 0.01 ft.)

Hole Diameter: ______ in.

Minimum of 2' Radius & 4" Thick Concrete Pad

Ground Elevation: __________ ft., msl

Cement Grout: ______ ft.
(min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)

Material:

- Crushed Basalt
- Round Gravel

Rock or Gravel Packing:

________ ft.

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

_______ in.

Water Level Elevation:

________ ft., msl*

Solid Casing Material:

- Filament Wound Resin Pipe conforming to ASTM D2996
- Centrifugally Cast Resin Pipe conforming to ASTM D2997
- Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
- Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
- PTFE Fluorocarbon Tubing conforming to ASTM D3296
- FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing:

- Screen

Length: ______ ft.
Nominal Diameter: ______ in.
Wall Thickness: ______ in.
Bottom Elevation: ______ ft., msl

Open Hole: ______ ft.
Diameter: ______ in.
Bottom Elevation: ______ ft., msl

*msl = mean sea level

Solid Casing Material:

- Carbon Steel: compliant with (check one or more):
  - ANSI/AWWA C200
  - API Spec. 5L
  - ASTM A53
  - ASTM A139
  - Type E
  - Type S
  - Grade B
  - Other

- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)

- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one)
  - Schedule 40
  - Schedule 80

- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one)
  - Schedule 40
  - Schedule 80
  - Schedule 12

Thermoset Plastic: (check one)

- Filament Wound Resin Pipe conforming to ASTM D2996
- Centrifugally Cast Resin Pipe conforming to ASTM D2997
- Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
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  - Type S
  - Grade B
  - Other

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WCR1 Form 9/12/01 Page 4 of 4
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
DRILLER'S LOG

Well Number: 3213-10

<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock description, Water level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 16</td>
<td>Dark brown sandy clayey silt</td>
<td>10/16/02</td>
</tr>
<tr>
<td>16 to 60</td>
<td>Brown clayey silty sand</td>
<td>10/16/02</td>
</tr>
<tr>
<td>60 to 62</td>
<td>Black silty sandy clay with trace basaltic pebbles</td>
<td>10/16/02</td>
</tr>
<tr>
<td>62 to 70</td>
<td>Basaltic boulders. Slow drilling</td>
<td>10/18/02</td>
</tr>
</tbody>
</table>

Remarks:

DL Form 06/24/2004
# Drilling Log
## Makua Military Reservation

- **Drilling agency:** Valley Drilling
- **Name of Driller:** John Suridad
- **Manufacturer's designation of drill:** Mobile B-90
- **Total No. of overburden samples taken:** Disturbed 3, Undisturbed
- **Elevation ground water:** 4' (16' bgs)

<table>
<thead>
<tr>
<th>Depth</th>
<th>Lithology</th>
<th>Description</th>
<th>Blow Counts</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ML</td>
<td>Dark brown sandy clayey silt, few basalitic fine gravel (dry) (loose) (fill)</td>
<td>HNU - 0</td>
<td>SC:LL - 19 to 31, BG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drilling smooth</td>
<td>26</td>
<td>UXO clearance</td>
</tr>
<tr>
<td></td>
<td>ML</td>
<td>Dark brown sandy clayey silt, few basalitic fine gravel (dry) (medium) (dense)</td>
<td>Sample w/ 2 in diameter split spoon sampler, 140 lb hammer</td>
<td>Sample ID: MMRSSMW-3B-5.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drilling smooth</td>
<td>25</td>
<td>UXO clearance</td>
</tr>
<tr>
<td></td>
<td>ML-SC</td>
<td>Dark brown sandy clayey silt, clayey sand at about 16' bgs, few basalitic gravel and cobble (wet) (medium dense)</td>
<td>Approx. water table at 16' bgs</td>
<td>Sample w/ 2 in diameter split spoon sampler, 140 lb hammer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drilling smooth</td>
<td>15</td>
<td>End UXO clearance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td>HNU - 0, SC:LL - 15 to 33 BG, UXO clearance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td>End HNU monitoring</td>
</tr>
</tbody>
</table>

- **Vertical Hole No.:** ERDC MW-3B
- **Size and Type of Bit:**
- **Datum for elevation shown:** MSL (appx. 20)
- **Date Started:** 10/16/02
- **Completed:**

- **Total Depth of Hole:** 70 ft
<table>
<thead>
<tr>
<th>Depth (in ft)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-60</td>
<td>SC Brown clayey silty sand</td>
</tr>
<tr>
<td>-62</td>
<td>CL Black silty sandy clay with trace basaltic pebbles (wet) (soft)</td>
</tr>
<tr>
<td>-68</td>
<td>Drilling hard to TD of borehole.</td>
</tr>
<tr>
<td>-70</td>
<td>Approx. depth from drill cuttings</td>
</tr>
<tr>
<td>TD 63’ bgs with 10” auger</td>
<td></td>
</tr>
</tbody>
</table>

Charcoal odor, black silty clay with basalt rock fragments.
Monitoring Well Coordinates

Well MW-3B (3213-10)

Survey by R.M. Towill, Inc.
420 Waiakamilo Rd
Honolulu, HI 96817
Tel: 842-1133
Mr. Ryan Suzuki

Surveyed on June 30, 2003

Latitude (N): 21° 31' 52"
Longitude (W) 158° 13' 36"

Ground Elevation: 18.34 feet
Top of Casing Elevation: 21.25 feet

Coordinates are referred to the North American Datum of 1983 (NAD83)
Elevations are referred to Mean Sea Level (M.S.L.) being established from State
Survey Monument 8-10 having an elevation of 17.83 feet.
WELL CONSTRUCTION PERMIT
ERDC-MW-3B, Well No. 3213-10

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-3B (Well No. 3213-10) at Makua Military Reservation, Oahu, TMK 8-1-01:1, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

1. The Chairperson of the Commission on Water Resource Management (Commission), P.O. Box 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work authorized by this permit commences and staff shall be allowed to inspect installation activities in accordance with §13-168-16, Hawaii Administrative Rules.

2. The well construction permit shall be for construction and testing of the well only. A minimum 1½-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

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

Permittee's Signature: [Signature]
Printed Name: FLOYD A. QUINTANA
Firm or Title: Director of Public Works, USAG-HI

Driller's Signature: [Signature]
Printed Name: MIKE SABEN
C-57 License #: 21,358
Date: 4/16/04
Firm or Title: Valley Well Drilling

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

Attachment

USGS
Department of Health, Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
1. State Well No.: 3213-11  Well Name: ERDC-MW-3C  Island: Oahu
2. Address: Makua Military Reservation
3. Drilling Company: Valley Well Drilling
4. Drilling method used during construction: ☑ Rotary  ☐ Percussion  ☐ Other (describe)
5. Date Well Construction (drilled,cased,grouted) completed: 4/21/02  Fill out attached Driller's Log
6. Was the subject well cored? ☑ Yes  ☐ No
7. Initial water-level encountered 16 ft. below ground  Date and time of measurement: 4/20/02 13:00
8. Step-Drawdown Test completed? ☐ No  ☑ Yes  Attach Step-Drawdown Test form (12/17/97 SDPTD Form)
9. Constant Rate Aquifer Test completed? ☐ No  ☑ Yes  Attach Constant Rate Aquifer Test form (12/17/97 CRPTD Form)
Parameters prior to pump test:
10. Water-level: 3.82 ft. above msl  Date and time of measurement: 4/21/02 15:00
11. Chloride: 57 ppm  Date and time of sampling: 4/21/02 15:30
12. Temperature: 75 °F  Date and time of measurement: 4/21/02 15:45
13. Fill in the as-built section on the other side of this sheet.
14. Fill in attached surveyor's report.
15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)
16. The proposed manufacturer's rated pump capacity is _____ gpm at a head of _____ ft.
17. Remarks: No pump installed. Well for Sampling

Licensed Driller (print)  Mike Soben  C-57 Lic. No. 21358

Permittee (print)  COL Floyd A. Quintana, DPW, USAG-HI

WCR Form 9/12/01 Page 1 of 4
**Well Number:** 3213-11

<table>
<thead>
<tr>
<th>Depths (ft.)</th>
<th>Rock description, Water level, etc.</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 26</td>
<td>Dark brown clayed silt, Some fragments of basalt</td>
<td>11/20/2002</td>
</tr>
<tr>
<td>26 to 45</td>
<td>Basaltic rock boulder layer</td>
<td>11/21/2002</td>
</tr>
<tr>
<td>45 to 60</td>
<td>Black silty clay with trace of basalt fragments</td>
<td></td>
</tr>
<tr>
<td>60 to 85</td>
<td>Basaltic rock layer, boulders</td>
<td></td>
</tr>
<tr>
<td>85 to 106</td>
<td>Black silty clay, soft, trace basaltic fragments</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

**For Official Use Only:**

04 DEC 2  P4:29

DL Form 06/24/2004
**Geologic Log**

**Well 3213-11**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Lithology</th>
<th>Description</th>
<th>Blow Counts</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-2</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>-4</td>
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<tr>
<td>-6</td>
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<td>-8</td>
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<tr>
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<td>-12</td>
<td></td>
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<tr>
<td>-14</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>-16</td>
<td>SPT 8/13/00</td>
<td>Dark brown clayey silt, dry, loose, few fine to coarse sub-angular basaltic fragments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-18</td>
<td>SPT 4/12/16</td>
<td>Olive gray (5Y4/3) sandy clay with silt, stiff, moist.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-26</td>
<td>Basaltic rock layer at appx. 26' bgs to appx. 45' bgs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-28</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>-30</td>
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<td>-36</td>
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<td>-38</td>
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<tr>
<td>-40</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>-42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-44</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-46</td>
<td>(CL) Black silt clay with trace of basaltic fragments.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Drilling Log**

**Makua Military Reservation**

**Drilling agency:** Valley Drilling

**Name of Driller:** John Surigad

**Manufacturer's designation of drill:** Mobile B-90

**Total No. of overburden samples taken:** Disturbed 2

**Datum for elevation shown:** MSL

**Total Depth of Hole:** 106 ft

**Elevation ground water:** 15.5' bgs

**Vertical Hole No.:** ERDC MW-3C

**Size and Type of Bit:** 10" tri-cone

**Date Started:** 11/20/02

**Completed:** 11/27/02

**Total Depth of Hole:** 106 ft
MEMORANDUM FOR THE RECORD

FROM: Lenore Nakama
SUBJECT: Well Completion Reports for 3113-02 to 06 & 3213-08 to 11

8/11/04 called Traci Sober of Valley Well Drilling to check on the status of the well construction permits for the subject Army wells. She said they needed an extension. I asked Traci who she was communicating with at the Army, because to extend the permits, I need a brief explanation of why the wells couldn’t be completed in the 1st two years. She gave me a name of the person in the field, Steve Turnbull (cell phone 295-4998).

8/12/04 called Steve Turnbull. He said the wells were actually completed, but they weren’t sure if they were permanent because they might be sealed instead. He said he was waiting to file the Completion Reports until it was determined if the wells would be kept or not. I informed Steve that he should file the WCR 1 because the wells were completed under the permit. If the wells are to be sealed later, well abandonment permits should be obtained first. He said he had misunderstood and that he will work on getting the WCR1s in for all 9 wells. He said it will take about a month before he will be able to get the military commander’s signature. I told him that he could send in partially executed WCR1s and let us know that fully executed WCR1s would be forthcoming. He said that he would prefer to wait until he can get the signatures. I told him that would be fine.

10-8-04 called again for Steve to call me re: status of WCR1

10-8-04 Steve called back, will submit for signature ASAP.

10-8-04 told him we could wait another 3 weeks or so before notice of viol. (later) send.
November 26, 2002

Mr. Jon Fukuda
U.S. Army
DPW, Attn: APVG-GWV
U.S. Army Garrison
Schofield Barracks, HI 96857

Dear Mr. Fukuda:

Well Construction Permit
ERDC-MW-5 (Well No. 3113-06)

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

Special Conditions

1. Standard Condition 2 is modified and Standard Condition 7.e. is waived to exempt the permittee from the requirements for conducting pumping tests in accordance with the protocol established in the Hawaii Well Construction and Pump Installation Standards.

This permit does not authorize work for your permanent pump installation.

Please sign and have the contractor sign both permit originals and return one for our files.

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

If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218.

Aloha,

GILBERT S. COLOMA-AGARAN
Chairperson

Enclosures

c: State of Hawaii, Department of Land and Natural Resources
WELL CONSTRUCTION PERMIT
ERDC-MW-5, Well No. 3113-06

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-5 (Well No. 3113-06) at Makua Military Reservation, Oahu, TMK 8-2-01:20, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1/4-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: October 28, 2002
Expiration Date: October 28, 2004

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

Permittee's Signature: ___________________________ Date: __________________

Printed Name: ___________________________ Firm or Title: ___________________________

Driller's Signature: ___________________________ C-57 License #: ___________________________ Date: __________________

Printed Name: ___________________________ Firm or Title: ___________________________

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

Attachment

USGS
Department of Health/ Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
State of Hawaii, Department of Land and Natural Resources
**SECTION 1: WELL LOCATION INFORMATION**

<table>
<thead>
<tr>
<th>Island</th>
<th>OAHU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquifer System</td>
<td>WAIANAE</td>
</tr>
<tr>
<td>Aquifer Sector</td>
<td>######</td>
</tr>
</tbody>
</table>

**SECTION 2: WELL SECTION DATA** *(enter data in grey cells only)*

<table>
<thead>
<tr>
<th>Elevation at top of casing</th>
<th>1025 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Elevation</td>
<td>ft., m.s.l.</td>
</tr>
<tr>
<td>Cement Grout</td>
<td>ft.</td>
</tr>
<tr>
<td>Rock Packing</td>
<td>ft.</td>
</tr>
<tr>
<td>Hole Diameter</td>
<td>in.</td>
</tr>
<tr>
<td>Total Depth</td>
<td>ft.</td>
</tr>
<tr>
<td>Estimated Head</td>
<td>25 ft.</td>
</tr>
<tr>
<td>Calculated Aquifer Thickness</td>
<td>1025 ft.</td>
</tr>
</tbody>
</table>

| County Water Supply (Y/N ?) | Y |

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

**Well Depth**

- Theoretical Thickness of Aquifer: 1025 ft.
- 1/4 Aquifer Thickness: 256.3 ft.

**Depth of Well below Sea Level**: 25 ft. okay *(refer to HWCPIS Section 2.2)*

**Well Casing**

- Minimum Wall Thickness
  - Material: PVC
  - County or Non-County: non-county
  - Minimum Thickness per standards: 0.237 in.
  - Wall Thickness Provided: 0.406 in. okay *(refer to HWCPIS Section 2.4 c)*

**Minimum Length of Solid Casing**

- 90% of ground to top of aquifer: 157.5 ft.
- Length of solid casing Provided: 170 ft. okay *(refer to HWCPIS Section 2.4 d)*

**Casing Material**

- Sch 40 okay *(refer to HWCPIS Section 2.4 e)*

**Annular Space**

- If the cell above reads #N/A, reference HWCPIS

**Depth of Grouting**

- Calculated Depth of Grouting: 122.5 ft.
- Depth of Grouting provided: 165 ft. okay *(refer to HWCPIS Section 2.6 c)*
- Thickness of Annular Space: 3 in. okay *(refer to HWCPIS Section 2.6 d)*
MEMORANDUM

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

FROM: Dierdre S. Mamiya, Administrator

SUBJECT: Application for Permit – Well Construction; State Well No. 3113-06, Well Name
         ERDC-MW-5, Makua, Waianae, Oahu, Tax Map Key: 8-2-001:Por 20

This is a follow-up to your memorandum dated July 26, 2002, requesting for
confirmation of State ownership; obtain the Chairperson's signature on the attached Application
for Permit and confirmation if Chapter 343 have been met.

Please find enclosed the permit with the Chairperson's signature.

In regards to the confirmation on whether Chapter 343 have been met, please refer to the
Department of Army's letter dated October 21, 2002, stating that they are not required to obtain a
CDUA permit under the doctrine of sovereign immunity.

Should you have any questions, please feel free to call Patti Miyashiro of my staff at
587-0410.

Enclosure

c: Central Files
   District Files
APPLICATION FOR PERMIT

COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources

APPLICATION FOR PERMIT

[Check all that apply]
- [ ] Well Construction
- [ ] Pump Installation

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

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

APPLICANT INFORMATION:

For Official Use (print legibly)

1. (a) WELL OWNER: U.S. Army Contact Person: Jon Fukuda Phone: 656-2878
   Mailing Address: DPW, Attn: APVG-GWV, U.S. Army Garrison, Schofield Barracks, HI 96857
   Fax: 656-1039 E-mail: fukuda@army.mil

2. WELL NAME: ERDC-MW-5 Island: Oahu
   Address: Makua Military Reservation
   Tax Map Key: 8 - 20 - 01 - 20

3. PROPOSED WORK:
   (check all that apply)
   [ ] Construct New Well
   [ ] Modify Existing Well
   [ ] Abandon/Seal
   [ ] Install New Pump
   [ ] Modify Pump

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

5. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: (not applicable) gallons per minute
   Pump Type (check one):
   [ ] Deep Well Turbine [ ] Rotary [ ] Propeller
   [ ] Submersible [ ] Rotary-Displacement [ ] Reciprocating
   [ ] Centrifugal [ ] Rotary-Gear [ ] Impulse

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

7. (a) PROPOSED AMOUNT OF WITHDRAWAL:
   [ ] Not applicable
   Galons per day
   (b) METHOD OF FLOW MEASUREMENT:
   [ ] Flowmeter [ ] Open-pipe [ ] Weir [ ] Orifice [ ] Other (explain): Moniitoring Well

OTHER IMPORTANT INFORMATION:

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

9. REMARKS, EXPLANATIONS:
   This monitoring well will be installed for monitoring of groundwater quality and collection of groundwater elevations as part of an EIS.

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

Well Owner: LTC Floyd A. Quintan Landowner: Eric T. Higino Contractor: Valley Well Drilling
Signature: __________________________ Date: 2/3/07 Signature: __________________________ Date: 10/10/02 Signature: __________________________ Date: 9/18/02

For official use only

Latitude: ____________ State Well No.: ____________
Longitude: ____________ Aquifer System No.: ____________
### Details

<table>
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<tr>
<th>Details</th>
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| **TMK:** | 8-2-001:020  
| Historical TMK Sequence: |  
| Area (sq ft): | 40536239  
| Area (acres): | 930  
| Lot Number: |  
| Ohana: |  

### LAND CONTROL CODES

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<td>STATE LAND USE STANDARDS</td>
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### FACILITIES

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### TMK SEPARATIONS

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City and County of Honolulu  
Department of Permitting & Planning  
650 So. King St, Honolulu, HI 96813  
Fax: (808) 527-6743  
E-mail: info@honoluludpp.org  
© 2000 City and County of Honolulu. All Rights Reserved.
October 21, 2002

Ms. Dierdre Mamiya, Administrator
Department of Land and Natural Resources
Land Division, State of Hawaii
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Ms. Mamiya & Planners

Subject: Conservation District Use Application for Drilling and Installation of Monitoring Well ERDC-MW-5 at Makua Military Reservation, Oahu.

I am replying to a 3 October 2002 request by Ms. Patty Miyashiro of the Department of Land and Natural Resources (DLNR) for the Army to submit a Conservation District Use Application (CDUA) as part of drilling and installation of the above reference monitoring well at Makua Military Reservation (MMR). The Army submitted a monitoring well permit application on 24 September 2002. The matter was referred to my office for legal review after DLNR requested that the Army also file a CDUA. The Army respectfully declines DLNR's request because we are not required to obtain a CDUA permit under the doctrine of sovereign immunity. In fact, the Army is not required to submit a monitoring well permit but has done so for informational purposes as a courtesy to the State.

Federal activities and installations are subject to state regulation only if Congress relinquishes federal supremacy by clearly and specifically waiving the federal government's immunity from that state regulation. Three Supreme Court cases, Hancock v. Train, 426 U.S. 167 (1976); Department of Energy v. Ohio, 503 US 607 (1992) and United States v. Idaho, 508 U.S. 1 (1993), confirm that such waivers must be unequivocally and strictly construed. There has not been any Congressional waiver of sovereign immunity with regards to the CDUA permits at issue. The Army's position on this issue is supported by a decision from the United States District Court for the District of Hawaii and is consistent with the approach taken by other military services in Hawaii.

The Army appreciates DLNR's timely processing for permit ERDC-MW-5 in addition to the processing of eight other well permits for MMR last month (to include well numbers - 3113-2, 3213-08,3213-09,3213-10,3113-03,3113-04,3213-11,3113-05). We look forward to continued spirit of cooperation between our agencies. The Army's technical point of contact on this matter is Steve Turnbull at 696-2878 x 1050. If you wish to discuss the legal issues further, please feel free to call me at 438-6724.

Very Respectfully,

Jeanne Prussman Ockerman
Attorney Advisor
25th Infantry Division (L) & U.S. Army, Hawaii
Mr. Jon Fukuda  
U.S. Army  
DPW, Attn: APVG-GWV  
U.S. Army Garrison  
Schofield Barracks, HI  96857

Dear Mr. Fukuda:

Well Construction Permit  
ERDC-MW-1 (Well No. 3113-02)

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

Special Conditions

1. All wells (excepting salt-water wells, artesian wells, and temporary monitor wells designed for immediate or short-term monitoring purposes and subsequent abandonment/sealing) shall be constructed with a casing string having a minimum length of solid casing equal to 90 percent of the depth measured from the ground surface to the top of the selected aquifer.

2. To prevent surface contamination, the annular space of all cased non-artesian wells (except monitor wells designed for immediate and short-term monitoring purposes and subsequent abandonment) must be sealed with grout from the ground surface to a minimum depth of 500 feet or 70% of the vertical distance between the ground surface and the top of the aquifer selected for exploration, long-term monitoring, or development, whichever depth is less.

3. Standard Condition 2 is modified and Standard Condition 7.e. is waived to exempt the permittee from the requirements for conducting pumping tests in accordance with the protocol established in the Hawaii Well Construction and Pump Installation Standards.

This permit does not authorize work for a permanent pump installation.

Please sign and have the contractor sign both permit originals and return one for our files.

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

If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218.

Aloha,

[Signature]

GILBERT S. COLOMA-AGARAN  
Chairperson

Enclosures
WELL CONSTRUCTION PERMIT
ERDC-MW-1, Well No. 3113-02

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-1 (Well No. 3113-02) at Makua Military Reservation, Oahu, TMK 8-2-01:24, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1½-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

Permittee's Signature: ___________________________ Date: ____________

Printed Name: ___________________________ Firm or Title: ___________________________

Driller's Signature: ___________________________ C-57 License #: ____________ Date: ____________

Printed Name: ___________________________ Firm or Title: ___________________________

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

Attachment

USGS
Department of Health/ Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
Mr. Jon Fukuda  
U.S. Army  
DPW, Attn: APVG-GWV  
U.S. Army Garrison  
Schofield Barracks, HI  96857

Dear Mr. Fukuda:

Well Construction Permit  
ERDC-MW-4A (Well No. 3113-03)

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

Special Conditions

1. All wells (excepting salt-water wells, artesian wells, and temporary monitor wells designed for immediate or short-term monitoring purposes and subsequent abandonment/sealing) shall be constructed with a casing string having a minimum length of solid casing equal to 90 percent of the depth measured from the ground surface to the top of the selected aquifer.

2. Standard Condition 2 is modified and Standard Condition 7.e. is waived to exempt the permittee from the requirements for conducting pumping tests in accordance with the protocol established in the Hawaii Well Construction and Pump Installation Standards.

This permit does not authorize work for a permanent pump installation.

Please sign and have the contractor sign both permit originals and return one for our files.

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

If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218.

Aloha,

GILBERT S. COLOMA-AGARAN  
Chairperson

Enclosures
In accordance with Department of Land and Natural Resources, Commission on Water Resource Management’s Administrative Rules, Section 13-168, entitled “Water Use, Wells, and Stream Diversion Works”, this document permits the construction and testing of ERDC-MW-4A (Well No. 3113-03) at Makua Military Reservation, Oahu, TMK 8-2-01:24, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

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

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

Permittee's Signature: ___________________________ Date: ______________

Printed Name: ___________________________ Firm or Title: ___________________________

Driller's Signature: ___________________________ C-57 License #: ______________ Date: ______________

Printed Name: ___________________________ Firm or Title: ___________________________

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

Attachment
C: USGS
Department of Health/ Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
September 26, 2002

Mr. Jon Fukuda  
U.S. Army  
DPW, Attn: APVG-GWV  
U.S. Army Garrison  
Schofield Barracks, HI 96857

Dear Mr. Fukuda:

Well Construction Permit  
ERDC-MW-4B (Well No. 3113-04)

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

**Special Conditions**

1. Standard Condition 2 is modified and Standard Condition 7.e. is waived to exempt the permittee from the requirements for conducting pumping tests in accordance with the protocol established in the Hawaii Well Construction and Pump Installation Standards.

   This permit does not authorize work for a permanent pump installation.

   Please sign and have the contractor sign both permit originals and return one for our files.

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

   If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218.

Aloha,

GILBERT S. COLOMA-AGARAN  
Chairperson

Enclosures
In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-4B (Well No. 3113-04) at Makua Military Reservation, Oahu, TMK 8-2-01:24, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1\(\frac{1}{4}\) -inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

Permittee's Signature: ___________________________ Date: __________

Printed Name: ___________________________ Firm or Title: __________

Driller's Signature: ___________________________ C-57 License #: __________ Date: __________

Printed Name: ___________________________ Firm or Title: __________

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

Attachment c:
USGS
Department of Health/ Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
September 26, 2002

Mr. Jon Fukuda
U.S. Army
DPW, Attn: APVG-GWV
U.S. Army Garrison
Schofield Barracks, HI 96857

Dear Mr. Fukuda:

Well Construction Permit
ERDC-MW-4C (Well No. 3113-05)

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

Special Conditions

1. Standard Condition 2 is modified and Standard Condition 7.e. is waived to exempt the permittee from the requirements for conducting pumping tests in accordance with the protocol established in the Hawaii Well Construction and Pump Installation Standards.

This permit does not authorize work for a permanent pump installation.

Please sign and have the contractor sign both permit originals and return one for our files.

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

If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218.

Aloha,

[Signature]
GILBERT S. COLOMA-AGARAN
Chairperson

Enclosures
WELL CONSTRUCTION PERMIT
ERDC-MW-4C, Well No. 3113-05

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-4C (Well No. 3113-05) at Makua Military Reservation, Oahu, TMK 8-2-01:24, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1½-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the permittee, assignee, or employee, contractor, or agent under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

Permittee's Signature: _____________________________ Date: _____________________________

Printed Name: _____________________________ Firm or Title: _____________________________

Driller's Signature: _____________________________ C-57 License #: __________ Date: _____________________________

Printed Name: _____________________________ Firm or Title: _____________________________

Please sign both copies of this permit, return one to the Chairperson, and retain the other for your records.
September 26, 2002

TO: Ms. Dede Mamiya, Administrator
    Land Division

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

SUBJECT: Request for Chairperson's Signature as Landowner

The attached permit application entails the use of State-owned land and, accordingly, requires the signature of the Chairperson as the landowner. Here, we are requesting your help in affirming the State's ownership of the property and, thereafter, routing the application to the Chairperson for his signature. (We have enclosed the appropriate transmittal memo that contains the affirmation statement.)

Please note that the Chairperson's signature on the permit application completes the application and allows it to be accepted for processing by the Commission. The signature neither represents an endorsement of the applicant's proposal nor an approval for the use of State land; both approvals would be sought by the applicant under separate actions later.

Please inform us if the proposed project is in the Conservation District and, if so, whether the requirements of Chapter 343 have been met.

Lastly, please inform us of the contact person at Land Division who is responsible for transmitting the attached original applications to the Chairperson's office.

LN:ss
Attach.
September 26, 2002

Mr. Jon Fukuda
U.S. Army
DPW, Attn: APVG-GWV
U.S. Army Garrison
Schofield Barracks, HI 96857

Dear Mr. Fukuda:

Well Construction Permit
ERDC-MW-2 (Well No. 3213-08)

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

Special Conditions

1. All wells (excepting salt-water wells, artesian wells, and temporary monitor wells designed for immediate or short-term monitoring purposes and subsequent abandonment/sealing) shall be constructed with a casing string having a minimum length of solid casing equal to 90 percent of the depth measured from the ground surface to the top of the selected aquifer.

2. To prevent surface contamination, the annular space of all cased non-artesian wells (except monitor wells designed for immediate and short-term monitoring purposes and subsequent abandonment) must be sealed with grout from the ground surface to a minimum depth of 500 feet or 70% of the vertical distance between the ground surface and the top of the aquifer selected for exploration, long-term monitoring, or development, whichever depth is less.

3. Standard Condition 2 is modified and Standard Condition 7.e. is waived to exempt the permittee from the requirements for conducting pumping tests in accordance with the protocol established in the Hawaii Well Construction and Pump Installation Standards.

This permit does not authorize work for a permanent pump installation.

Please sign and have the contractor sign both permit originals and return one for our files.

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

If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218.

Aloha,


GILBERT S. COLOMA-AGARAN
Chairperson

Enclosures
WELL CONSTRUCTION PERMIT

ERDC-MW-2, Well No. 3213-08

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-2 (Well No. 3213-08) at Makua Military Reservation, Oahu, TMK 8-1-01:2, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1/4-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

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

Permittee's Signature: ____________________________ Date: ______________
Printed Name: ____________________________ Firm or Title: ______________

Driller's Signature: ____________________________ C-57 License #: __________ Date: ______________
Printed Name: ____________________________ Firm or Title: ______________

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

Attachment

USGS
Department of Health's Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
Mr. Jon Fukuda  
U.S. Army  
DPW, Attn: APVG-GWV  
U.S. Army Garrison  
Schofield Barracks, HI 96857  

Dear Mr. Fukuda:

Well Construction Permit  
ERDC-MW-3A (Well No. 3213-09)

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

Special Conditions

1. All wells (excepting salt-water wells, artesian wells, and temporary monitor wells designed for immediate or short-term monitoring purposes and subsequent abandonment/sealing) shall be constructed with a casing string having a minimum length of solid casing equal to 90 percent of the depth measured from the ground surface to the top of the selected aquifer.

2. Standard Condition 2 is modified and Standard Condition 7.e. is waived to exempt the permittee from the requirements for conducting pumping tests in accordance with the protocol established in the Hawaii Well Construction and Pump Installation Standards.

This permit does not authorize work for a permanent pump installation.

Please sign and have the contractor sign both permit originals and return one for our files.

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

If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218.

Aloha,

GILBERT S. COLOMA-AGARAN  
Chairperson

Enclosures
WELL CONSTRUCTION PERMIT

ERDC-MW-3A, Well No. 3213-09

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-3A (Well No. 3213-09) at Makua Military Reservation, Oahu, TMK 8-1-01:1, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

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

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

Permittee's Signature: __________________________ Date: ______________
Printed Name: ___________________________ Firm or Title: ___________________________

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

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

Attachment

USGS
Department of Health/Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
Mr. Jon Fukuda  
U.S. Army  
DPW, Attn: APVG-GWV  
U.S. Army Garrison  
Schofield Barracks, HI 96857

Dear Mr. Fukuda:

Well Construction Permit  
ERDC-MW-3B (Well No. 3213-10)

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

Special Conditions

1. Standard Condition 2 is modified and Standard Condition 7.a. is waived to exempt the permittee from the requirements for conducting pumping tests in accordance with the protocol established in the Hawaii Well Construction and Pump Installation Standards.

This permit does not authorize work for a permanent pump installation.

Please sign and have the contractor sign both permit originals and return one for our files.

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

If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218.

Aloha,

[Signature]

GILBERT S. COLOMA-AGARAN  
Chairperson

Enclosures
WELL CONSTRUCTION PERMIT
ERDC-MW-3B, Well No. 3213-10

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-3B (Well No. 3213-10) at Makua Military Reservation, Cahu, TMK 8-1-01:1, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

2. The well construction permit shall be for construction and testing of the well only. A minimum 1¼-inch diameter monitor tube shall be permanently installed, in a manner acceptable to the Chairperson, to accurately record water levels. The permittee, well operator, and/or well owner shall coordinate with the Chairperson and conduct a pumping test in accordance with the Standards (a pump testing worksheet is attached). The permittee, well operator, and/or well owner shall submit to the Chairperson the test results as a basis for supporting an application to install a permanent pump and withdraw water for use. No permanent pump may be installed until a pump installation permit is approved and issued by the Chairperson.

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

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

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

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

Attachment
C: USGS
Department of Health/ Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
September 26, 2002

Mr. Jon Fukuda
U.S. Army
DPW, Attn: APVG-GWV
U.S. Army Garrison
Schofield Barracks, HI 96857

Dear Mr. Fukuda:

Well Construction Permit
ERDC-MW-3C (Well No. 3213-11)

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

Special Conditions

1. Standard Condition 2 is modified and Standard Condition 7.e. is waived to exempt the permittee from the requirements for conducting pumping tests in accordance with the protocol established in the Hawaii Well Construction and Pump Installation Standards.

This permit does not authorize work for a permanent pump installation.

Please sign and have the contractor sign both permit originals and return one for our files.

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

If you have any questions, please call Lenore Nakama of the Commission staff at 587-0218.

Aloha,

GILBERT S. COLOMA-AGARAN
Chairperson

Enclosures
WELL CONSTRUCTION PERMIT
ERDC-MW-3C, Well No. 3213-11

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

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the construction and testing of ERDC-MW-3C (Well No. 3213-11) at Makua Military Reservation, Oahu, TMK 8-1-01:1, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

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

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

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

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

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

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

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

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

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

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

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

12. The permittee, its successors, and assigns shall indemnify, defend, and hold the State of Hawaii harmless from any loss, liability, claim, or demand for property damage, personal injury, or death arising out of any act or omission of the applicant, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit.

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

Date of Approval: September 23, 2002
Expiration Date: September 23, 2004

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

Permittee's Signature: ____________________________ Date: ______________
Printed Name: ____________________________ Firm or Title: ____________________________

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

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

Attachment

USGS
Department of Health's Safe Drinking Water, Wastewater, and Clean Water Branches
Honolulu Board of Water Supply
**SECTION 1: WELL LOCATION INFORMATION**

<table>
<thead>
<tr>
<th>Island</th>
<th>OAHU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquifer System</td>
<td>WAIANAE</td>
</tr>
<tr>
<td>Aquifer Sector</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proposed Use</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Withdrawal</td>
<td>System Sustainable Yield</td>
</tr>
<tr>
<td></td>
<td>54000</td>
</tr>
</tbody>
</table>

**SECTION 2: WELL SECTION DATA**

(Enter data in grey cells only)

<table>
<thead>
<tr>
<th>Elevation at top of casing</th>
<th>Solid Casing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Elevation</td>
<td>Material</td>
</tr>
<tr>
<td>Cement Grout</td>
<td>Designation</td>
</tr>
<tr>
<td>Rock Packing</td>
<td>Length</td>
</tr>
<tr>
<td>Hole Diameter</td>
<td>Diameter</td>
</tr>
<tr>
<td>Total Depth</td>
<td>Wall Thickness</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated Head</th>
<th>Calculated Aquifer Thickness</th>
<th>County Water Supply (Y/N ?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft., m.s.l.</td>
<td>90.2 ft.</td>
<td>90.2 ft.</td>
</tr>
</tbody>
</table>

**SECTION 3: CHECKLIST**

(Time to check are shaded)

**Well Depth**

- **Theoretical Thickness of Aquifer**: 90.2 ft.
- **1/4 Aquifer Thickness**: 22.55 ft.
- **Depth of Well below Sea Level**: 20 ft.

**Well Casing**

- **Minimum Wall Thickness**
  - **Material**: PVC
  - **County or Non-County**: non-county
  - **Minimum Thickness per standards**: 0.237 in.
  - **Wall Thickness Provided**: 0.405 in.
  - **Minimum Length of Solid Casing**: 11.52 ft.
  - **Length of solid casing Provided**: 10 ft.
  - **Casing Material**: Sch 40

**Annular Space**

- **Depth of Grouting**
  - **Calculated Depth of Grouting**: 8.96 ft.
  - **Depth of Grouting provided**: 8 ft.
  - **Thickness of Annular Space**: 3 in.
### SECTION 1: WELL LOCATION INFORMATION

<table>
<thead>
<tr>
<th>Island</th>
<th>OAHU</th>
<th>Aquifer System</th>
<th>WAIANAE</th>
<th>Aquifer Sector</th>
<th>######</th>
</tr>
</thead>
</table>

### SECTION 2: WELL SECTION DATA  (enter data in grey cells only)

| Elevation at top of casing | 90.2 ft., m.s.l. |
| Ground Elevation           |                |
| Cement Grout               |                |
| Rock Packing               |                |
| Hole Diameter              |                |
| Total Depth                |                |
| Estimated Head             |                |
| Calculated Aquifer Thickness | 90.2 ft.     |
| County Water Supply (Y/N ?) | NO          |

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

- **Well Depth**
  - Theoretical Thickness of Aquifer: 90.2 ft.
  - 1/4 Aquifer Thickness: 22.55 ft.
  - Depth of Well below Sea Level: 25 ft.
  - **too deep** (refer to HWCPIS Section 2.2) (disregard if the well is not basal)

- **Well Casing**
  - Minimum Wall Thickness
    - Material: PVC
    - County or Non-County: non-county
    - Minimum Thickness per standards: 0.237 in.
    - Wall Thickness Provided: 0.406 in.
    - Minimum Length of Solid Casing: 16.02 ft.
    - 90% of ground to top of aquifer: 15 ft.
    - **too shallow** (refer to HWCPIS Section 2.4 d) (disregard this if this is a non-county well)
    - Length of solid casing Provided: Sch 40
    - Casing Material: Sch 40
    - **okay** (refer to HWCPIS Section 2.4 c)
    - Annular Space
      - Depth of Grouting
        - Calculated Depth of Grouting: 12.46 ft.
        - Depth of Grouting provided: 13 ft.
        - **okay** (refer to HWCPIS Section 2.6 c)
        - Thickness of Annular Space: 3 in.
        - **okay** (refer to HWCPIS Section 2.6 d)
### SECTION 1: WELL LOCATION INFORMATION

<table>
<thead>
<tr>
<th>Island</th>
<th>OAHU</th>
<th>Aquifer System</th>
<th>WAIANAE</th>
<th>Aquifer Sector</th>
<th>#</th>
<th>Proposed Use</th>
<th>Proposed Withdrawal</th>
<th>System Sustainable Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

### SECTION 2: WELL SECTION DATA

(enter data in grey cells only)

<table>
<thead>
<tr>
<th>Elevation at top of casing</th>
<th>Solid Casing</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Ground Elevation</th>
<th>ft., m.s.l.</th>
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</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Cement Grout</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rock Packing</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Hole Diameter</th>
<th>in.</th>
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</thead>
<tbody>
<tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Depth</th>
<th>ft.</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated Head</th>
<th>ft., m.s.l.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Calculated Aquifer Thickness</th>
<th>90.2 ft.</th>
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<tbody>
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</tbody>
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<table>
<thead>
<tr>
<th>County Water Supply (Y/N ?)</th>
<th>NO</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tbody>
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### SECTION 3: CHECKLIST

(values to check are shaded)

Well Depth

<table>
<thead>
<tr>
<th>Theoretical Thickness of Aquifer</th>
<th>90.2 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 Aquifer Thickness</td>
<td>22.55 ft.</td>
</tr>
<tr>
<td>Depth of Well below Sea Level</td>
<td>50 ft.</td>
</tr>
<tr>
<td>Depth of Well below Sea Level</td>
<td>too deep</td>
</tr>
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<td></td>
<td>(refer to HWCPIS Section 2.2)</td>
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Well Casing

<table>
<thead>
<tr>
<th>Minimum Wall Thickness</th>
<th>PVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>County or Non-County</td>
<td>non-county</td>
</tr>
<tr>
<td>Minimum Thickness per standards</td>
<td>0.237 in.</td>
</tr>
<tr>
<td>Wall Thickness Provided</td>
<td>0.406 in.</td>
</tr>
<tr>
<td></td>
<td>okay</td>
</tr>
<tr>
<td></td>
<td>(refer to HWCPIS Section 2.4 c)</td>
</tr>
<tr>
<td></td>
<td>(disregard if this is a non-county well)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minimum Length of Solid Casing</th>
<th>16.02 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>90% of ground to top of aquifer</td>
<td>16.02 ft.</td>
</tr>
<tr>
<td>Length of solid casing Provided</td>
<td>45 ft.</td>
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<td></td>
<td>(refer to HWCPIS Section 2.4 d)</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Casing Material</th>
<th>Sch 40</th>
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<tbody>
<tr>
<td></td>
<td>okay</td>
</tr>
<tr>
<td></td>
<td>(refer to HWCPIS Section 2.4 e)</td>
</tr>
</tbody>
</table>

| Annular Space | |
|---------------||
|               | |

| Depth of Grouting | |
|-------------------||
|                   | |

<table>
<thead>
<tr>
<th>Calculated Depth of Grouting</th>
<th>12.46 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth of Grouting provided</td>
<td>43 ft.</td>
</tr>
<tr>
<td>Thickness of Annular Space</td>
<td>3 in.</td>
</tr>
<tr>
<td></td>
<td>okay</td>
</tr>
<tr>
<td></td>
<td>(refer to HWCPIS Section 2.6 c)</td>
</tr>
<tr>
<td></td>
<td>(refer to HWCPIS Section 2.6 d)</td>
</tr>
<tr>
<td>Island</td>
<td>OAHU</td>
</tr>
<tr>
<td>-------</td>
<td>---------------</td>
</tr>
<tr>
<td>Aquifer System</td>
<td>WAIANAE</td>
</tr>
<tr>
<td>Aquifer Sector</td>
<td>#</td>
</tr>
</tbody>
</table>

**SECTION 1: WELL LOCATION INFORMATION**

- **Island:** OAHU
- **Aquifer System:** WAIANAE
- **Aquifer Sector:** #

**SECTION 2: WELL SECTION DATA**  
(enter data in grey cells only)

<table>
<thead>
<tr>
<th>Elevation at top of casing</th>
<th>Solid Casing</th>
<th>Ground Elevation</th>
<th>Cement Grout</th>
<th>Rock Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ft., m.s.l.</td>
<td>ft.</td>
<td>ft.</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Head</td>
<td></td>
<td>ft., m.s.l.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calculated Aquifer Thickness</td>
<td></td>
<td>90.2 ft.</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>County Water Supply (Y/N ?)</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Well Casing</th>
<th></th>
</tr>
</thead>
</table>

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

**Well Depth**
- Theoretical Thickness of Aquifer: 90.2 ft.
- 1/4 Aquifer Thickness: 22.55 ft.
- Depth of Well below Sea Level: 80 ft.  
  too deep  
  (refer to HWCPIS Section 2.2)

**Well Casing**
- Minimum Wall Thickness
  - Material
  - County or Non-County: PVC
  - non-county
  - Minimum Thickness per standards: 0.237 in.
  - Wall Thickness Provided: 0.406 in.  okay  
  (refer to HWCPIS Section 2.4 a)
  - Minimum Length of Solid Casing: 16.02 ft.
  - 90% of ground to top of aquifer: 70 ft.  okay  
  (refer to HWCPIS Section 2.4 d)
  - Casing Material: Sch 40  okay  
  (refer to HWCPIS Section 2.4 e)

**Annular Space**
- Depth of Grouting
  - Calculated Depth of Grouting: 12.46 ft.
  - Depth of Grouting provided: 68 ft.  okay  
  (refer to HWCPIS Section 2.6 c)
  - Thickness of Annular Space: 3 in.  okay  
  (refer to HWCPIS Section 2.6 d)
<table>
<thead>
<tr>
<th>Taxkey</th>
<th>Subdiv/Condo</th>
<th>Tnr</th>
<th>Property Address</th>
<th>Owner/Lessee</th>
<th>Beds</th>
<th>Baths</th>
<th>Land area</th>
<th>Living area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-8-2-1-20</td>
<td>G</td>
<td>FARRINGTON HWY</td>
<td>STATE OF HAWAII</td>
<td>930.58 ac</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This information has been supplied by third parties and has not been independently verified by Hawaii Information Service and is, therefore, not guaranteed.
<table>
<thead>
<tr>
<th>Taxkey</th>
<th>Subdiv/Condo</th>
<th>Tnr</th>
<th>Property Address</th>
<th>Owner/Lessee</th>
<th>Beds</th>
<th>Baths</th>
<th>Land area</th>
<th>Living area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-8-1-1-1</td>
<td>G FARRINGTON HWY</td>
<td>UNITED STATES OF AMERICA</td>
<td>13.39 ac</td>
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This information has been supplied by third parties and has not been independently verified by Hawaii Information Service and is, therefore, not guaranteed.
<table>
<thead>
<tr>
<th>Taxkey</th>
<th>Subdiv/Condo</th>
<th>Tnr</th>
<th>Property Address</th>
<th>Owner/Lessee</th>
<th>Beds</th>
<th>Baths</th>
<th>Land area</th>
<th>Living area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-8-1-1-2</td>
<td></td>
<td></td>
<td>G FARRINGTON HWY UNITED STATES OF AMERICA</td>
<td></td>
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<td>25.72 ac</td>
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This information has been supplied by third parties and has not been independently verified by Hawaii Information Service and is, therefore, not guaranteed.
<table>
<thead>
<tr>
<th>Taxkey</th>
<th>Subdiv/Condo Tnr</th>
<th>Property Address</th>
<th>Owner/Lessee</th>
<th>Beds</th>
<th>Baths</th>
<th>Land area</th>
<th>Living area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-8-2-1-24</td>
<td>G</td>
<td>82-180 FARRINGTON HWY</td>
<td>STATE OF HAWAII</td>
<td></td>
<td></td>
<td>260.47 ac</td>
<td></td>
</tr>
</tbody>
</table>

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

LIC ID: CT-21358
NAME: VALLEY WELL DRILLING
TRADE NAME:
STATUS: VALID THRU EXPIRATION DATE, RENEWAL NOTICE SENT
ENTITY: PARTNERSHIP
ORIG LIC DATE: 3/16/98
CLASS PREFIX: C
RESTRICTION:
BUSINESS ADDR: 91-235 OIhana ST #A KAPOLEI HI 96707
MAILING ADDR:

Click here to enter search criteria for prior complaints history ->
For prior complaints and disciplinary history, contact licensing and business information center at (808)587-3295.

<-Back New Search->

EMPLEYEEs LIST || EMPLOYERS LIST || INSURANCE/BOND || LICENSE CLASS

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Hawaii State homepage || DCCA || Professional and Vocational Licensing Division

APPLICATION FOR PERMIT

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

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

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

1. (a) WELD OWNER: U.S. Army
   Contact Person: Jon Fukuda
   Phone: 656-2878
   Mailing Address: DPW, Attn: APWG-GWV, U.S. Army Garrison, Schofield Barracks, HI 96857
   Fax: 656-1039
   E-mail: fukudaj@schofield.army.mil
(b) LAND OWNER: (same as well owner)
   Mailing Address:
   Contact Person: Phone:
   Fax:
   E-mail:
(c) CONTRACTOR: Valley Well Drilling
   Contact Person: Mike Sober
   Phone: 682-1767
   Mailing Address: 91-235A Oihana St. Kapolei, HI 96707
   Fax: 682-1768
   E-mail: vwdh@lava.net
   Lic #: 21358
   (circle one:QPC-57a, or A)

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

2. WELL NAME: ERDC-MW-1
   Island: Oahu
   Address Makua Military Reservation
   Tax Map Key: 8 2 01 24
   Attach the relevant portion of (a) a 7.5-Minute Series USGS topographic map (scale 1:24,000) and include the name of the quad map, and (b) a property tax map, showing well location referenced to established property boundaries.

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

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

5. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: Not applicable
   gallons per minute
   PUMP TYPE (Check one):
   □ Deep Well Turbine
   □ Rotary
   □ Propeller
   □ Submersible
   □ Rotary-Displacement
   □ Reciprocating
   □ Centrifugal
   □ Rotary-Gear
   □ Impulse

6. PROPOSED USE: (check all that apply)
   □ Municipal (including hotels, stores, etc.)
   □ Industrial
   □ Domestic (individual, noncommercial water system)
   □ Irrigation (crop)
   □ No.
   □ No. of Acres:
   □ Other (explain): Monitoring well

7. (a) PROPOSED AMOUNT OF WITHDRAWAL:
   □ Not Applicable
   gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
   □ Flowmeter
   □ Open-pipe
   □ Weir
   □ Orifice
   □ Other (explain)

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS: □ Cup □ SMAP □ EIS □ EA □ None □ Other (explain)

9. REMARKS, EXPLANATIONS: This monitoring well will be installed for monitoring of groundwater quality and collection of groundwater elevations as part of an EIS. (if more space is needed, please attach additional sheet)

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

Well Owner: Lt. Floyd A. Quintana
Signature: [Signature]
Date: 12/04/02
Contractor: Valley Well Drilling
Signature: [Signature]
Date: 1/18/02

For official use only
Aquifer System No. 213-02
Latitude
Longitude
State Well No. 24-107-01
WCPIPA Form 10/25/00
10. PROPOSED WELL SECTION (Please attach schematic if different from diagram provided below)

**HOLE DIAMETER:** 10 in.

**ELEVATION AT TOP OF CASING:** 17 ft., msl*

**MINIMUM OF 2' RADIUS & 4'' THICK CONCRETE PAD TO CONSTITUTE A BENCHMARK**

**TYPICAL SECTION**

- **Cement Grout:** 8 ft.
  - (min. 70% of distance from ground elevation to top of water surface, or 50 ft., whichever is less.)

- **Annular space between hole and casing (min 3"):** 3 in.

- **Rock or Gravel Packing:** 27 ft.
  - Material: (check one):
    - Crushed Basalt
    - Rounded Gravel

- **Estimated Water Level Elevation:** 2.2 ft., msl*

**TOTAL DEPTH:** 35 ft.

**SOLID CASING MATERIAL:**
- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
  - And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one): □ Schedule 40 □ Schedule 80 □ Schedule 120
- PVC Plastic conforming to ASTM F490 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 120
- Thermoset Plastic: (check one):
  - □ Filament Wound Resin Pipe conforming to ASTM D2966
  - □ Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - □ Glass Fiber Reinforced Pressure Pipe conforming to AWWA C950
  - □ PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - □ FEP Fluorocarbon Tubing conforming to ASTM D3296

**OPEN CASING MATERIAL:**
- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
  - And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one): □ Schedule 40 □ Schedule 80 □ Schedule 120
- PVC Plastic conforming to ASTM F490 and (ASTM D1785 or ASTM D2241): (check one): □ Schedule 40 □ Schedule 80 □ Schedule 120
- Thermoset Plastic: (check one):
  - □ Filament Wound Resin Pipe conforming to ASTM D2966
  - □ Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - □ Glass Fiber Reinforced Pressure Pipe conforming to AWWA C950
  - □ PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - □ FEP Fluorocarbon Tubing conforming to ASTM D3296

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

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,

**Bottom Elevation of Well Limit = (Water Elevation - 41 x Water Level Elevation) / 4**

Example: Estimated 2 ft. Water Level Elev. Bottom Elevation of Well Limit = (2 - 41 x 2) / 4 = -18.5 ft.
State of Hawaii  
COMMISSION ON WATER RESOURCE MANAGEMENT  
Department of Land and Natural Resources  
APPLICATION FOR PERMIT

g  Well Construction and/or  □ Pump Installation

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

APPLICANT INFORMATION: (Fill out all three, if applicable, and place a check next to the primary contact)
1. (a)  □ WELL OWNER: U.S. Army  
   Contact Person: Jon Fukuda  
   Phone: 656-2878  
   Mailing Address: DPW, Attn: APVG-CMV, U.S. Army Garrison-Hawaii, Schofield Barracks, HI  
   Fax: 656-1039  
   E-mail: fukudaj@schofield.army.mil
2. (b) □ LAND OWNER: (same as well owner)  
   Contact Person:  
   Phone:  
   Mailing Address:  
   Fax:  
   E-mail:
3. (c) □ CONTRACTOR: Valley Well Drilling  
   Contact Person: Mike Sober  
   Phone: 682-1767  
   Mailing Address: 91-235A Oihana St. Kapolei, HI 96707  
   Fax: 682-1768  
   E-mail: wdhi@lava.net

WELL & PUMP INFORMATION: (Please fill in the diagram on the back of this form.)
2. WELL NAME: ERDC-MW-2 3213-08  
   Island: Oahu  
   Address: Makua Military Reservation  
   Tax Map Key:  
   Zone: 8  
   Sec: 1  
   Plat: 01  
   Parcel: 2

   Attach the relevant portion of a 7.5-Minute Series USGS topographic map (scale 1:24,000) and include the name of the quad map, and (b) a property tax map, showing well location referenced to established property boundaries.

3. PROPOSED WORK: (check all that apply)
   a) Construct New Well  
   b) Modify Existing Well*  
   c) Abandon/Seal

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

4. CONSTRUCTION:  
   □ Drilled  
   □ Dug  
   □ Shaft  
   □ Tunnel  

   Is this well part of a battery of wells?  
   Yes ☑ No ☐ (Please describe)

5. PROPOSED PUMP INFORMATION:  
   Rated Pump Capacity:  
   Not applicable gallons per minute
   Pump Type (Check one):  
   ■ Deep Well Turbine  
   □ Rotary  
   □ Propeller  
   □ cheerful  
   □ Submersible  
   □ Rotary-Displacement  
   □ Reciprocating  
   □ Impulse

6. PROPOSED USE: (check all that apply)
   □ Municipal (including hotels, stores, etc.)  
   □ Industrial  
   □ Domestic (individual, noncommercial water system)  
   □ No  
   □ Irrigation (crop)  
   □ No. of Acres:  
   □ Other (explain):  
   Monitoring well

7. (a) PROPOSED AMOUNT OF WITHDRAWAL:  
   Not applicable gallons per day
   (b) METHOD OF FLOW MEASUREMENT:  
   □ Flowmeter  
   □ Open-pipe  
   □ Weir  
   □ Office  
   □ Other (explain):  

OTHER IMPORTANT INFORMATION:

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

9. REMARKS, EXPLANATIONS:  
   This monitoring well will be installed for monitoring of groundwater quality and collection of groundwater elevations as part of an EIS.
   (If more space is needed, please attach additional sheet)

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

Well Owner: LTC Floyd A. Quintana  
Signatures:  
Date: 23-560 02

Landowner:  
Signature:  
Date: 

Contractor: Valley Well Drilling  
Signature:  
Date: 9/18/02

For official use only  
Latitude:  
Aquifer System No:  
Longitude:  
State Well No: 3213-08.

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

(Please attach schematic if different from diagram provided below)

Hole Diameter: __ in.

Minimum of 2’ Radius & 4” Thick Concrete Pad (to contain benchmark surveyed to nearest 0.01 ft.)

Ground Elevation: __ ft., msl*

Elevation at top of casing __ ft., msl*

Cement Grout: 0 ft. (min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)

Annular space between hole and casing (min 3‘):

3 in.

Rock or Gravel Packing:

27 ft.

Material:

☑ Crushed Basalt
☑ Rounded Gravel

Estimated Water Level Elevation:

2.2 ft., msl*

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

Total Length: __ ft.

Nominal Diameter: __ in.

Wall Thickness: __ in.

Bottom Elevation: __ ft., msl*

Open Casing: ☐ Perforated
☐ Screen

Total Length: __ ft.

Nominal Diameter: __ in.

Wall Thickness: __ in.

Bottom Elevation: __ ft., msl*

note: Neither bentonite nor mud should be used in saturated zone during drilling

Open Hole:

Length: __ ft.

Diameter: __ in.

Bottom Elevation: __ ft., msl*

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

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,

Bottom Elevation of Well Limit = (Water Elevation - 0.25 x Water Level Elevation) / 4

Example: Estimated + 2 ft. Water Level Elev. — Bottom Elevation of Well Limit = (2 - 0.25 x 2) / 4 = 1.5 ft.

Solid Casing Material:
Carbon Steel: compliant with (check one or more): ☑ ANSI/AWWA C200 ☑ API Spec. 5L ☑ ASTM A53 ☑ ASTM A139
And compliant with (check one or more): ☑ ASTM A242 ☑ Type E ☑ Type S ☑ Grade B ☑ Other
Stainless Steel: (check one):
☑ ASTM A409 (production wells) ☑ ASTM A312 (monitor wells)
ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) ☑ Schedule 40 ☑ Schedule 80
PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) ☑ Schedule 40 ☑ Schedule 80 ☑ Schedule 120
Thermoset Plastic: (check one) ☑ Filament Wound Resin Pipe conforming to ASTM D2996 ☑ Centrifugally Cast Resin Pipe conforming to ASTM D2997 ☑ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517 ☑ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950 ☑ PTFE Fluorocarbon Tubing conforming to ASTM D3296 ☑ FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:
Carbon Steel: compliant with (check one or more): ☑ ANSI/AWWA C200 ☑ API Spec. 5L ☑ ASTM A53 ☑ ASTM A139
And compliant with (check one or more): ☑ ASTM A242 ☑ Type E ☑ Type S ☑ Grade B ☑ Other
Stainless Steel: (check one):
☑ ASTM A409 (production wells) ☑ ASTM A312 (monitor wells)
ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) ☑ Schedule 40 ☑ Schedule 80
PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) ☑ Schedule 40 ☑ Schedule 80 ☑ Schedule 120
Thermoset Plastic: (check one) ☑ Filament Wound Resin Pipe conforming to ASTM D2996 ☑ Centrifugally Cast Resin Pipe conforming to ASTM D2997 ☑ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517 ☑ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950 ☑ PTFE Fluorocarbon Tubing conforming to ASTM D3296 ☑ FEP Fluorocarbon Tubing conforming to ASTM D3296
MOKULEIA
Zone 6 Sec 5
RESERVE

KEAWULA - KAHANAHAIKI, WAIANA, OAHU

STATE OF HAWAII
23.01 ac

KEAWULA FISHER

TAXATION MAPS BUREAU
TERRITORY OF HAWAII
TAX MAP
FRST DIVISION
ZONE: 6 SEC: 5 PLAT: 8101
BORDERING: PARCELS
SCALE: 1"=100' 0"
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT

& Well Construction and/or □ Pump Installation

Instructions: Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. Application must be accompanied by 3 copies and a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulations Branch at 587-0226. For further information and updates to this application form, visit http://www.state.hi.us/dlnr/cwrm.

APPLICANT

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

1. □ WELL OWNER: U.S. Army
   Mailing Address: DPW, Attn: APG-GWV, U.S. Army Garrison, Schofield Barracks, HI 96857
   Phone: 656-2878
   Fax: 656-1039
   E-mail: fukudaj@schofield.army.mil
   Contact Person: Jon Fukuda

(b) □ LAND OWNER: (same as well owner)
   Mailing Address: 
   Fax: 
   E-mail: 

(c) □ CONTRACTOR: Valley Well Drilling
   Mailing Address: 91-235A Oihana St. Kapolei, HI 96707
   Phone: 682-1767
   Fax: 682-1768
   E-mail: vwdhi8lava.net
   Lic#: 21358

2. WELL NAME: ERDC-MW-3A
   Island: Oahu
   Address: Makua Military Reservation
   Tax Map Key: 8
   Zone: 1
   Sec: 01
   Parcel: 1

   (Please fill in the diagram on the back of this form.)

   Attach the relevant portion of (a) a 7.5-Minute Series USGS topographic map (scale 1:24,000) and include the name of the map, and (b) a property tax map, showing well location referenced to established property boundaries.

3. PROPOSED WORK:
   □ Construct New Well
   □ Modify Existing Well
   □ Abandon/Seal

   *State Well No.: ____________________________ (if unknown, please call Commission at 587-0226)

4. CONSTRUCTION:
   □ Dug
   □ Shaft
   □ Tunnel

   Is this well part of a battery of wells? □ Yes □ No (Please describe)

   (This well is one of three in nested pairs at different depths MW-3A, 3B, 3C)

5. PROPOSED PUMP INFORMATION:
   □ Rated Pump Capacity: Not Applicable gallons per minute
   □ Pump Type (Check one):
     □ Deep Well Turbine
     □ Rotary
     □ Propeller
     □ Submersible
     □ Rotary-Displacement
     □ Reciprocating
     □ Centrifugal
     □ Rotary-Gear
     □ Impulse
   □ No. of Acres:
   □ Other (explain): Monitoring Well

6. PROPOSED USE:
   □ Industrial
   □ Domestic (individual, noncommercial water system)
   □ Municipal (including hotels, stores, etc.)
   □ Irrigation (crop)
   □ No. of Acres:
   □ Military
   □ Other (explain): Monitoring Well

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: Not Applicable gallons per day

(b) METHOD OF FLOW MEASUREMENT:
   □ Flowmeter
   □ Open-pipe
   □ Weir
   □ Orifice
   □ Other (explain):

OTHER IMPORTANT INFORMATION:

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

9. REMARKS, EXPLANATIONS:
   □ This monitoring well will be installed for monitoring of groundwater quality and collection of groundwater elevations as part of an EIS.

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

Well Owner: LTC Floyd A. Quintana
Signature: ____________________________
Date: 10/25/00

Landowner: ____________________________
Signature: ____________________________
Date: ____________________________

Contractor: Valley Well Drilling
Signature: ____________________________
Date: ____________________________

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

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

Hole Diameter: _______ in.

Elevation at top of casing: ______ ft., msl

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

Ground Elevation: ______ ft., msl

Cement Grout: ______ ft. (min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)

Annular space between hole and casing (min.3): ______ in.

Rock or Gravel Packing: ______ ft.

Material:
- Crushed Basalt
- Rounded Gravel

Estimated Water Level Elevation: ______ ft., msl*

Total Depth: ______ ft.

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or, Bottom Elevation of Well Limit = (Water Elevation + 3 x Water Level Elev.) / 4

Example: Estimated Water Level Elev. = ______ ft., msl*

Solid Casing: (check one):
- PTFE Fluorocarbon Tubing conforming to ASTM D3517
- Glass Fiber Reinforced Resin Pressure Pipe conforming to ANSI/AWWA C950
- Centrifugally Cast Resin Pipe conforming to ASTM D2996
- Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
- Crushed Basalt
- PTFE Fluorocarbon Tubing conforming to ASTM D3296
- Centrifugally Cast Resin Pipe conforming to ASTM D3296
- PTFE Fluorocarbon Tubing conforming to ASTM D3296

Open Casing: (check one):
- PTFE Fluorocarbon Tubing conforming to ASTM D3517
- Glass Fiber Reinforced Resin Pressure Pipe conforming to ANSI/AWWA C950
- Centrifugally Cast Resin Pipe conforming to ASTM D2996
- PTFE Fluorocarbon Tubing conforming to ASTM D3296
- Centrifugally Cast Resin Pipe conforming to ASTM D3296
- PTFE Fluorocarbon Tubing conforming to ASTM D3296

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

Please refer to the HAWAII WELL CONSTRUCTION AND PUMP INSTALLATION STANDARDS to ensure that your as-built is in compliance with applicable standards.
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT

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

For Official Use Only:

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

<table>
<thead>
<tr>
<th>1. WELL OWNER</th>
<th>U.S. Army</th>
<th>Contact Person: Jon Fukuda</th>
<th>Phone: 656-2878</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mailing Address</td>
<td>DPW, Attn: APVG-CGW, U.S. Army Carriorn-WI, Schofield Barracks, HI 96857</td>
<td>Fax: 656-1039</td>
<td>E-mail: <a href="mailto:fukuda@army.mil">fukuda@army.mil</a></td>
</tr>
<tr>
<td>LAND OWNER</td>
<td>(name as well owner)</td>
<td>Contact Person:</td>
<td>Phone:</td>
</tr>
<tr>
<td>CONTRACTOR</td>
<td>Valley Well Drilling</td>
<td>Contact Person: Mike Sober</td>
<td>Phone: 682-1767</td>
</tr>
<tr>
<td>Mailing Address</td>
<td>9-1-235A Olana St. Kapolei, HI 96707</td>
<td>Fax: 682-1768</td>
<td>E-mail: <a href="mailto:wvdh@lava.net">wvdh@lava.net</a></td>
</tr>
</tbody>
</table>

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

| 2. WELL NAME | ERDC-NW-3B | Island: Oahu |
| Address | Makua Military Reservation | Tax Map Key: 8 1 01 1 |

Attach the relevant portion of (a) a 7.5-Minute Series USGS topographic map (scale 1:24,000) and include the name of the quad map, and (b) a property tax map, showing well location referenced to established property boundaries.

3. PROPOSED WORK: (Check all that apply)

- XJ Construct New Well
- Install New Pump* (check all that apply) Dug
- Modify Existing Well* Shaft
- Abandon/Seal* Tunnel

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

4. CONSTRUCTION: (Drilled)

- XJ Yes 
- No (Please describe)

Is this well part of a battery of wells? XJ Yes No (Please describe)

(This well is one of three in a nested pair at different depths NW-3A, 3B, 3C)

5. PROPOSED PUMP INFORMATION: Rated Pump Capacity: (Not Applicable) gallons per minute

- Pipe Type (Check one)
- Deep Well Turbine
- Rotary
- Propeller
- Submersible
- Rotary-Displacement
- Reciprocating
- Impeller
- Centrifugal
- Rotary-Gear

6. PROPOSED USE: (Check all that apply)

- Municipal (including hotels, stores, etc.)
- Industrial
- Domestic (individual, noncommercial water system)
- Other (explan): Monitoring Well

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

- Irrigation (crop)
- No. of Acres:
- Military
- Other (explain)

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: Not Applicable gallons per day

(b) METHOD OF FLOW MEASUREMENT:

- Flowmeter
- Open-pipe
- Well
- Orifice
- Other (explain)

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS: XJ COUP XJ SMAP XJ EIS XJ EA None Other (explain)

9. REMARKS, EXPLANATIONS: This monitoring well will be installed for monitoring of groundwater quality and collection of groundwater elevations as part of an EIS.

If more space is needed, please attach additional sheet.

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

Well Owner: LTC Floyd A. Quinn, Tana | Landowner: (print legibly) | Contractor: Valley Well Drilling

Signature: | Signature: | Signature: 

Date: 2-3-2002 | Date: | Date: 9/1/02

For official use only:

Latitude: Aquifer System No: 3-13-10
Longitude: State Well No:
10. PROPOSED WELL SECTION (Please attach schematic if different from diagram provided below)

**Hole Diameter:** 10 in.

- **Elevation at top of casing:** 22 ft., msl*
- **Minimum of 2' Radius & 4' Thick Concrete Pad** (to contain benchmark surveyed to nearest 0.01 ft.)
- **Ground Elevation:** 20 ft., msl*

**Solid Casing Material:**
- **Total Length:** 45 ft.
- **Nominal Diameter:** 4 in.
- **Wall Thickness:** 0.406 in.
- **Bottom Elevation:** -25 ft., msl*

**Open Casing:**
- **Total Length:** 25 ft.
- **Nominal Diameter:** 4 in.
- **Wall Thickness:** 0.406 in.
- **Bottom Elevation:** -50 ft., msl*

**Note:** Neither bentonite nor mud should be used in saturated zone during drilling.

---

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

---

**For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,**

**Bottom Elevation of Well Limit = \( \frac{\text{Estimated Water Level Elev.} - \text{Bottom Elevation}}{4} \)**

**Example:** Estimated Water Level Elev. = 2 ft., msl*

**Ground Elevation:** 10 ft., msl*

**Total Depth:** 20 ft.

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**Estimated Water Level Elevation:** 2.2 ft., msl*

**Rock or Gravel Packing:**
- Material: Crushed Basalt
- Material: Rounded Gravel

**Total Depth:** 70 ft.

---

**Solid Casing (≥ 90% x (Ground Elev.-Water Level Elev.))**

- **Total Length:** 45 ft.
- **Nominal Diameter:** 4 in.
- **Wall Thickness:** 0.406 in.
- **Bottom Elevation:** -25 ft., msl*

---

**Open Casing:**
- **Total Length:** 25 ft.
- **Nominal Diameter:** 4 in.
- **Wall Thickness:** 0.406 in.
- **Bottom Elevation:** -50 ft., msl*

---

**Open Hole:**
- **Length:** _______ ft.
- **Diameter:** _______ in.
- **Bottom Elevation:** _______ ft., msl*

---

**Solid Casing Material:**

- Carbon Steel: compliant with (check one or more): ANSI/AWWA C200, API Spec. 5L, ASTM A53, ASTM A139
- And compliant with (check one or more): ASTM A242, Type E, Type S, Grade B, Other

---

**Stainless Steel:**

- ASTM A409 (production wells)
- ASTM A312 (monitor wells)

---

**ABS Plastic:**

- Conforming to ASTM F480 and ASTM D1527 (check one): Schedule 40, Schedule 80

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**PVC Plastic:**

- Conforming to ASTM F480 and ASTM D1785 or ASTM D2241 (check one): Schedule 40, Schedule 80, Schedule 120, Schedule 160

---

**Thermoset Plastic:**

- Filament Wound Grout Pipe conforming to ASTM D2996
- Centrifugally Cast Resin Pipe conforming to ASTM D2997
- Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
- Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
- PTFE Fluorocarbon Tubing conforming to ASTM D3296
- FEP Fluorocarbon Tubing conforming to ASTM D3296

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**Open Casing Material:**

- Carbon Steel: compliant with (check one or more): ANSI/AWWA C200, API Spec. 5L, ASTM A53, ASTM A139
- And compliant with (check one or more): ASTM A242, Type E, Type S, Grade B, Other

---

**Stainless Steel:**

- ASTM A409 (production wells)
- ASTM A312 (monitor wells)

---

**ABS Plastic:**

- Conforming to ASTM F480 and ASTM D1527 (check one): Schedule 40, Schedule 80, Schedule 120

---

**PVC Plastic:**

- Conforming to ASTM F480 and ASTM D1785 or ASTM D2241 (check one): Schedule 40, Schedule 80, Schedule 120, Schedule 160

---

**Thermoset Plastic:**

- Filament Wound Resin Pipe conforming to ASTM D2996
- Centrifugally Cast Resin Pipe conforming to ASTM D2997
- Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
- Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
- PTFE Fluorocarbon Tubing conforming to ASTM D3296
- FEP Fluorocarbon Tubing conforming to ASTM D3296
APPLICATION FOR PERMIT

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

2. WELL NAME: ERDC-MW-3C Island: Oahu

Address: Makua Military Reservation

Tax Map Key: 8-1-50

Is this well part of a battery of wells? Yes No (Please describe)

(This well is one of three in nested pair at different depths MW-3A, 3B, 3C)

5. PROPOSED PUMP INFORMATION: Rated Pump Capacity: (not applicable) gallons per minute

Pump Type (Check one):

- Deep Well Turbine
- Rotary
- Propeller
- Submersible
- Rotary-Displacement
- Reciprocating
- Centrifugal
- Rotary-Gear
- Impulse

6. PROPOSED USE: (check all that apply)

- Municipal (including hotels, stores, etc.)
- Industrial
- Domestic (individual, noncommercial water system)
- Irrigation (crop)
- Other

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

- No. of Acres:
- Monitoring Well

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: Not Applicable gallons per day

(b) METHOD OF FLOW MEASUREMENT:

- Flowmeter
- Open-pipe
- Weir
- Office
- Other (explain)

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS:

- CDUP
- SMAP
- EIS
- EA
- None
- Other (explain)

9. REMARKS, EXPLANATIONS: This monitoring well will be installed for monitoring of groundwater quality and collection of groundwater elevations as part of an EIS.

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

For official use only:

Latitude

Longitude

For further information and updates to this application form, visit http://www.state.hi.us/dlnr/cwrm.
10. PROPOSED WELL SECTION

(Please attach schematic if different from diagram provided below)

Hole Diameter: __10__ in.

Elevation at top of casing: __22__ ft., msl^*^.

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

Ground Elevation: __20__ ft., msl^*^.

Cement Grout: __68__ ft. (min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)

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

3 in.

Rock or Gravel Packing:

32 ft.

Material:

- Crushed Basalt
- Rounded Gravel

Total Depth: __100__ ft.

Estimated Water Level Elevation: __2.2__ ft., msl^*^.

Solid Casing:

- 90% x (Ground Elev. - Water Level Elev.)

- Total Length: __70__ ft.

- Nominal Diameter: __4__ in.

- Wall Thickness: __0.406__ in.

- Bottom Elevation: __-80__ ft., msl^*^.

Open Casing:

- Perforated Screen

- Total Length: __30__ ft.

- Nominal Diameter: __4__ in.

- Wall Thickness: __0.406__ in.

- Bottom Elevation: __-80__ ft., msl^*^.

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

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,

Bottom Elevation of Well Limit = (Water Elevation - Ground Elev.)/(1 + Aquifer Thickness)

Example: Estimated 2 ft. Water Level Elev. → Bottom Elevation of Well Limit = (2 - 1/(1 + 0.4)) = 1.8 ft.

Solid Casing Material:

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

- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)

- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one):
  - Schedule 40
  - Schedule 80

- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one):
  - Schedule 40
  - Schedule 80

- Thermoset Plastic: (check one):
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3295

Open Casing Material:

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

- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)

- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one):
  - Schedule 40
  - Schedule 80

- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one):
  - Schedule 40
  - Schedule 80

- Thermoset Plastic: (check one):
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3295

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

3 in.

Rock or Gravel Packing:

32 ft.

Material:

- Crushed Basalt
- Rounded Gravel

Total Depth: __100__ ft.

Estimated Water Level Elevation: __2.2__ ft., msl^*^.

Hole Diameter: __10__ in.

Elevation at top of casing: __22__ ft., msl^*^.

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

Ground Elevation: __20__ ft., msl^*^.

Cement Grout: __68__ ft. (min. 70% of distance from ground elevation to top of water surface or 500 ft., whichever is less.)

Open Casing Material:

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

- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)

- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one):
  - Schedule 40
  - Schedule 80

- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one):
  - Schedule 40
  - Schedule 80

- Thermoset Plastic: (check one):
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3296

Solid Casing:

- 90% x (Ground Elev. - Water Level Elev.)

- Total Length: __70__ ft.

- Nominal Diameter: __4__ in.

- Wall Thickness: __0.406__ in.

- Bottom Elevation: __-80__ ft., msl^*^.

Open Casing:

- Perforated Screen

- Total Length: __30__ ft.

- Nominal Diameter: __4__ in.

- Wall Thickness: __0.406__ in.

- Bottom Elevation: __-80__ ft., msl^*^.

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

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,

Bottom Elevation of Well Limit = (Water Elevation - Ground Elev.)/(1 + Aquifer Thickness)

Example: Estimated 2 ft. Water Level Elev. → Bottom Elevation of Well Limit = (2 - 1/(1 + 0.4)) = 1.8 ft.

Solid Casing Material:

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

- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)

- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one):
  - Schedule 40
  - Schedule 80

- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one):
  - Schedule 40
  - Schedule 80

- Thermoset Plastic: (check one):
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3295

Open Casing Material:

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

- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)

- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one):
  - Schedule 40
  - Schedule 80

- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one):
  - Schedule 40
  - Schedule 80

- Thermoset Plastic: (check one):
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - FEP Fluorocarbon Tubing conforming to ASTM D3295

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

3 in.

Rock or Gravel Packing:

32 ft.

Material:

- Crushed Basalt
- Rounded Gravel

Total Depth: __100__ ft.

Estimated Water Level Elevation: __2.2__ ft., msl^*^.
APPLICATION FOR PERMIT

1. WELL NAME: ERDC-MW-4A
   Island: Oahu
   Address: Makua Military Reservation

2. PROPOSED WORK:
   (check all that apply)
   - Construct New Well
   - Install New Pump
   - Modify Existing Well
   - Modify Pump
   - Abandon/Seal

3. CONSTRUCTION:
   - Dug
   - Shaft
   - Tunnel

   Is this well part of a battery of wells? Yes No (Please describe) This well is one of three in nested pairs at different depths MW-4A,4B,4C

4. PROPOSED USE:
   (check all that apply)
   - Municipal (including hotels, stores, etc.)
   - Industrial
   - Domestic (individual, noncommercial water system)

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

   - Irrigation (crop)
   - No. of Acres:
   - Military
   - Other (explain): Monitoring Well

5. PROPOSED PUMP INFORMATION:
   - Rated Pump Capacity: Not applicable
   - Gallons per minute
   - Pump Type (check one):
     - Deep Well Turbine
     - Rotary
     - Propeller
     - Submersible
     - Rotary-Displacement
     - Reciprocating
     - Centrifugal
     - Rotary-Gear
     - Impulse

6. PROPOSED USE:
   (check all that apply)
   - Domestic (individual, noncommercial water system)

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

   - No. of Acres:
   - Military

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: Not applicable
   (b) METHOD OF FLOW MEASUREMENT:
     - Flowmeter
     - Open-pipe
     - Weir
     - Orifice

8. LEGAL REQUIREMENTS:
   - CDUP
   - SMAP
   - EIS
   - EA

9. REMARKS, EXPLANATIONS:
   This monitoring well will be installed for monitoring of groundwater quality and collection of groundwater elevations as part of an EIS.

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

Well Owner: LTC. Floyd A. Quintana
Landowner: (print legibly)
Signature: 2/3/02
Date: 2/3/02

Contractor: Valley Well Drilling
Landowner: (print legibly)
Signature: 3/17/02
Date: 3/17/02

For official use only
Latitude: ______________________
Longitude: ______________________
Aquifer System No.: 3113-05
State Well No.: 3113-05
10. PROPOSED WELL SECTION (Please attach schematic if different from diagram provided below)

Hole Diameter: __________ in.

- Elevation at top of casing 22 ft., msl
- Minimum of 2' Radius & 4" Thick Concrete Pad to contain benchmark surveyed to nearest 0.01 ft.
- Ground Elevation: ________ ft., msl

Solid Casing: (± 90% x (Ground Elev. - Water Level Elev.))
- Total Length: __________ ft.
- Nominal Diameter: __________ in.
- Wall Thickness: __________ in.
- Bottom Elevation: ________ ft., msl

Open Casing: □ Perforated □ Screen
- Total Length: __________ ft.
- Nominal Diameter: __________ in.
- Wall Thickness: __________ in.
- Bottom Elevation: ________ ft., msl

- note: Neither bentonite nor mud should be used in saturated zone during drilling

Solid Casing Material:
- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- And compliant with (check one or more): □ ASTM A252 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one):
  - □ ASTM A409 (production wells)
  - □ ASTM A501 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one)
  - □ Schedule 40 □ Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one)
  - □ Schedule 40 □ Schedule 80 □ Schedule 120
- Thermoset Plastic: (check one)
  - □ Filament Wound Resin Pipe conforming to ASTM D2996
  - □ Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - □ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C960
  - □ PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - □ FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:
- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- And compliant with (check one or more): □ ASTM A252 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one):
  - □ ASTM A409 (production wells)
  - □ ASTM A501 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one)
  - □ Schedule 40 □ Schedule 80
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one)
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  - □ Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - □ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C960
  - □ PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - □ FEP Fluorocarbon Tubing conforming to ASTM D3296

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

For non-salt water Basal Wells, the bottom elevation of the well should not be deeper than 1/4 of aquifer thickness or, Bottom Elevation of Well Limit = \( \frac{1}{4} \times \text{Elevation} \) for saturated zone during drilling

Example: Estimated + 2 ft, Water Level Elev. \( \rightarrow \) Bottom Elevation of Well Limit = \( 2 \times \frac{1}{4} \times 2 \) ft. = 1 ft.
APPLICATION FOR PERMIT

APPLICANT INFORMATION: (Fill out all three, if applicable, and place a check next to the primary contact)
1. (a) WELL OWNER: U.S. Army
   Mailing Address: DPW, Attn: APWG-GW, U.S. Army Garrison, Schofield Barracks, HI 96755
   Fax: 656-1039
   Contact Person: Jon Fukuda
   Phone: 656-2878
   E-mail: fukuda@shcfield.army.mil

2. (b) LAND OWNER: (same as well owner)
   Mailing Address:
   Fax:
   Contact Person:
   Phone:

3. (c) CONTRACTOR: Valley Well Drilling
   Mailing Address: 91-235A Oihana St. Kapolei, HI 96707
   Fax: 682-1768
   E-mail: vvdi@lava.net
   Lic #: 21358

WELL & PUMP INFORMATION: (Please fill in the diagram on the back of this form)
2. WELL NAME: ERDC-MW-4B
   Address: Makua Military Reservation
   Tax Map Key:
   Island: Oahu
   Zone: 8 2 01 24
   Property Tax Map:
   Is this well part of a battery of wells? Yes (Please describe)
   (This well is one of three in nested pair at different depths MW-4A, 4B, 4C)

3. PROPOSED WORK:
   (check all that apply)
   • Construct New Well
   • Install New Pump*
   • Modify Existing Well*
   • Modify Pump*
   • Abandon/Seal*
   (State Well No.: )
   (if unknown, please call Commission at 808-0225)

4. CONSTRUCTION:
   X Drilled
   Dug
   Shaft
   Tunnel

5. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: Not Applicable gallons per minute
   Pump Type (Check one):
   D Deep Well Turbine
   © Rotary
   D Rotary-Displacement
   D Propeller
   © Reciprocating
   © Rotary-Gear
   © Impulse

6. PROPOSED USE:
   (check all that apply)
   © Municipal (including hotels, stores, etc.)
   © Domestic (individual, non-commercial water system)
   © Industrial
   © Other (explain): Monitoring Well

7. (a) PROPOSED AMOUNT OF WITHDRAWAL:
   Not Applicable gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
   © Flowmeter
   © Open-pipe
   © Weir
   © Orifice
   © Other (explain): Monitoring Well

OTHER IMPORTANT INFORMATION:

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

9. REMARKS, EXPLANATIONS:
   This monitoring well will be installed for monitoring of groundwater quality and collection of groundwater elevations as part of an EIS.
   (If more space is needed, please attach additional sheet)

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

Well Owner: (print legibly) ____________________________
Signature: ____________________________
Date: 10/25/00

Landowner: (print legibly) ____________________________
Signature: ____________________________
Date: ____________________________

Contractor: Valley Well Drilling
(Print legibly)
Signature: ____________________________
Date: 9/18/04

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

State of Hawaii
Commission on Water Resource Management
Department of Land and Natural Resources
APPLICATION FOR PERMIT

Instructions: Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, P.O. Box 521, Honolulu, Hawaii 96809. Application must be accompanied by 3 copies and a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 808-0225. For further information and updates to this application form, visit http://www.state.hi.us/dlnr/cwrm.
10. PROPOSED WELL SECTION (Please attach schematic if different from diagram provided below)

Hole Diameter: 10 in.

Elevation at top of casing: 22 ft. msl*

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

Ground Elevation: 20 ft. msl*

Solid Casing Material:

- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120
- Thermoset Plastic: (check one)
  - □ Filament Wound Resin Pipe conforming to ASTM D2996
  - □ Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - □ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - □ PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - □ FEP Fluorocarbon Tubing conforming to ASTM D3298

Open Casing Material:

- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
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  - □ Filament Wound Resin Pipe conforming to ASTM D2996
  - □ Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - □ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - □ PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - □ FEP Fluorocarbon Tubing conforming to ASTM D3298

Open Hole:

- Length: ft.
- Diameter: in.
- Bottom Elevation: ft. msl*

Solid Casing Material:

- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120
- Thermoset Plastic: (check one)
  - □ Filament Wound Resin Pipe conforming to ASTM D2996
  - □ Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - □ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - □ PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - □ FEP Fluorocarbon Tubing conforming to ASTM D3298

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

Example: Estimated + 2 ft. Water Level Elev. - Bottom Elevation of Well Limit = (2.0 - 44.8) / 4 = -10.5 ft.

Solid Casing Material:

- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120
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  - □ Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - □ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
  - □ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - □ PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - □ FEP Fluorocarbon Tubing conforming to ASTM D3298

Open Casing Material:

- Carbon Steel: compliant with (check one or more): □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
- And compliant with (check one or more): □ ASTM A242 □ Type E □ Type S □ Grade B □ Other
- Stainless Steel: (check one): □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120
- PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120
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  - □ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - □ PTFE Fluorocarbon Tubing conforming to ASTM D3296
  - □ FEP Fluorocarbon Tubing conforming to ASTM D3298

Open Hole:

- Length: ft.
- Diameter: in.
- Bottom Elevation: ft. msl*

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

I. WELL CONSTRUCTION and/or □ Pump Installation

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

APPLICANT INFORMATION:

1. (a) ☑ WELL OWNER: U.S. Army
   Mailing Address: DPW, Attn: APWG-GWU, U.S. Army Garrison, Schofield Barracks, HI 96857
   Fax: 655-1039
   E-mail: fukudaj@schofield.army.mil
   Contact Person: Jon Fukuda Phone: 655-2878

   (b) □ LAND OWNER: (same as well owner)
   Mailing Address: 
   Fax: 
   E-mail: 
   Contact Person: 
   Phone: 

   (c) □ CONTRACTOR: Valley Well Drilling
   Mailing Address: 91-235A Ohana St. Kapolei, HI 96707
   Fax: 682-1768
   E-mail: wdhi@lava.net
   Lic #: 21358
   Contact Person: Mike Sober Phone: 682-1767

WELL & PUMP INFORMATION:

Please fill in the diagram on the back of this form.

2. WELL NAME: ERDC-MW-4C Island: Oahu
   Address Makua Military Reservation Tax Map Key:
   Attach the relevant portion of (a) a 7.5-Minute Series USGS topographic map (scale 1:24,000) and include the name of the quad map, and (b) a property tax map, showing well location referenced to established property boundaries.

   (a) Depth: 313-05

   (b) Method of Flow Measurement:

   (c) Monitoring Well

3. PROPOSED WORK: ☑ Construct New Well
   (check all that apply)
   □ Install New Pump*
   □ Modify Existing Well*
   □ Abandon/Seal*

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

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

   (This well is one of three in nested pair at different depths MW-4A,4B,4C)

5. PROPOSED PUMP INFORMATION: Rated Pump Capacity: (Not applicable) gallons per minute
   Pump Type (Check one):
   □ Deep Well Turbine □ Rotary □ Proppeler
   □ Submersible □ Rotary-Displacement □ Reciprocating
   □ Centrifugal □ Rotary-Gear □ Impulse

6. PROPOSED USE: ☑ Municipal (including hotels, storos, etc.)
   (check all that apply)
   □ Domestic (individual, noncommercial water system)
   □ Irrigation (crop)
   □ Military
   □ Industrial
   □ No of Acres:
   (explain): Monitoring Well

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

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: Not Applicable gallons per day
   (b) METHOD OF FLOW MEASUREMENT: ☑ Flowmeter □ Open-pipe □ weir □ Orifice □ Other(explain)

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS: □ COUP □ SMAP □ EIS □ EA ☑ None □ Other (explain)

9. REMARKS, EXPLANATIONS: This monitoring well will be installed for monitoring of groundwater quality and collection of groundwater elevations as part of an EIS.
   (if more space is needed, please attach additional sheet)

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

Well Owner: Lt Floyd A. Quintana Landowner: 
Signature: Date: 10/25/00

Contractor: Valley Well Drilling

Signature: Date: 10/25/00

For official use only: Aquifer System No. State Well No. 313-05

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

Elevation at top of casing: 22 ft., msl*

Minimum of 2'-0" Radius & 4'-0" Thick Concrete Pad (to contain benchmark surveyed to nearest 0.01 ft.)

Ground Elevation: 20 ft., msl*

Cement Grout: 68 ft.
(min. 70% of distance from ground elevation to top of water surface or 500 ft. whichever is less.)

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

Rock or Gravel Packing:

Material:
- Crushed Basalt
- Rounded Gravel

Total Depth: 100 ft.

2.000 x (Ground Elev.-Water Level Elev.)

Solid Casing: (0.90 x (Ground Elev.-Water Level Elev))

Total Length: 70 ft.
Nominal Diameter: 4 in.
Wall Thickness: 0.406 in.
Bottom Elevation: -50 ft., msl*

Open Casing: [ ] Perforated [ ] Screen

Total Length: 30 ft.
Nominal Diameter: 4 in.
Wall Thickness: 0.406 in.
Bottom Elevation: -50 ft., msl*

Open Hole:

Length: __________________ ft.
Diameter: __________________ in.
Bottom Elevation: __________________ ft., msl*

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

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,

Bottom Elevation of Well Limit = \[ \frac{\text{Water Elevation} - 4 \times \text{Water Level Elevation}}{4} \]

Example: Estimated = 2 ft., Water Level Elevation = 18,5 ft.

Bottom Elevation of Well Limit = \( \left(2 - \frac{4 \times 185}{4}\right) = -18.5 \) ft.

Solid Casing Material:
- Carbon Steel: compliant with (check one or more):
  - ANSI/WWA C200
  - API Spec. 5L
  - ASTM A53
  - ASTM A139
- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)
- PVC Plastic conforming to ASTM F490 and ASTM D1592: (check one)
  - Schedule 40
  - Schedule 80
- Thermoset Plastic: (check one)
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D2917
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - TFE Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material Schedule:
- Carbon Steel: compliant with (check one or more):
  - ANSI/WWA C200
  - API Spec. 5L
  - ASTM A53
  - ASTM A139
- Stainless Steel: (check one):
  - ASTM A409 (production wells)
  - ASTM A312 (monitor wells)
- ABS Plastic conforming to ASTM F490 and ASTM D1592: (check one)
  - Schedule 40
  - Schedule 80
- PVC Plastic conforming to ASTM F490 and ASTM D1592: (check one)
  - Schedule 40
  - Schedule 80
  - Schedule 120
- Thermoset Plastic: (check one)
  - Filament Wound Resin Pipe conforming to ASTM D2996
  - Centrifugally Cast Resin Pipe conforming to ASTM D2997
  - Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D2917
  - Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
  - TFE Fluorocarbon Tubing conforming to ASTM D3296

All annular space between hole and casing shall be grouted with suitable material.

Pipe not deeper than Ground Elevation: ________ ft.

Wall Thickness: ________ in.

Note: Neither bentonite nor mud should be used in saturated zone during drilling.

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

**The approximate elevation must be referenced to mean sea level (msl) at the time of application filing.**

**Final elevations of well components shall be submitted in the Well Completion/Well Abandonment reports and referenced to a benchmark which has been established by a surveyor licensed by the State.**

For non-salt water Basal Wells - bottom elevation of well should not be deeper than 1/4 of aquifer thickness or,

\[
\text{Bottom Elevation of Well Limit} = \left(\frac{\text{Water Elevation} - 4 \times \text{Water Level Elevation}}{4}\right)
\]

Example: Estimated = 2 ft., Water Level Elevation = 18.5 ft.

\[
\text{Bottom Elevation of Well Limit} = \left(2 - \frac{4 \times 18.5}{4}\right) = -18.5 \text{ ft.}
\]
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT

Well will be installed for monitoring of groundwater quality.

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

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

Well Name

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

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

2. WELL NAME: ERDC-MW-5
   Island: Oahu
   Address: Makua Military Reservation
   Tax Map Key: 82 2 20

3. PROPOSED WORK: (check all that apply)
   [ ] Construct New Well
   [ ] Modify Existing Well
   [ ] Abandon/Seal
   [ ] Install New Pump
   [ ] Modify Pump

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

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

5. PROPOSED PUMP INFORMATION

   Pump Type (Check one):
   [ ] Deep Well Turbine [ ] Rotary [ ] Propeller
   [ ] Submersible [ ] Rotary-Displacement [ ] Reciprocating
   [ ] Centrifugal [ ] Rotary-Gear [ ] Impulse

6. PROPOSED USE: (check all that apply)
   [ ] Municipal (including hotels, stores etc.)
   [ ] Domestic (individual, noncommercial water system)
   [ ] Industrial
   [ ] Irrigation (opens)
   [ ] No. of Acres:
   [ ] Military
   [ ] No. of service connections?
   [ ] Yes [ ] No
   [ ] Other (explain): Monitoring Well

7. (a) PROPOSED AMOUNT OF WITHDRAWAL: Not applicable
   (b) METHOD OF FLOW MEASUREMENT: [ ] Flowmeter [ ] Open-pipe [ ] Weir [ ] Office [ ] Other (explain)

OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS: [ ] CDUP [ ] SMAP [ ] ES [ ] EA [ ] None [ ] Other (explain)

9. REMARKS, EXPLANATIONS: This monitoring well will be installed for monitoring of groundwater quality and collection of groundwater elevations as part of an EIS.

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

Well Owner

Landowner

Contractor

For official use only

Latitude

Aquifer System No.

Longitude

State Well No.

S 15002

WCPIPA Form 10/25/00
Solid Casing Material:
Carbon Steel: compliant with (check one or more) □ ANSI/AWWA C200 □ API Spec. 5L □ ASTM A53 □ ASTM A139
Stainless Steel: (check one) □ ASTM A409 (production wells) □ ASTM A312 (monitor wells)
ABS Plastic conforming to ASTM F480 and ASTM D1527: (check one) □ Schedule 40 □ Schedule 80
PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (check one) □ Schedule 40 □ Schedule 80 □ Schedule 120
Thermoset Plastic: (check one)
□ Filament Wound Resin Pipe conforming to ASTM D2996
□ Centrifugally Cast Resin Pipe conforming to ASTM D2997
□ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
□ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
□ PTFE Fluorocarbon Tubing conforming to ASTM D3296
□ FEP Fluorocarbon Tubing conforming to ASTM D3296

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

*The approximate elevation must be referenced to mean sea level (msl) at the time of construction. Final elevations of well components shall be adjusted as shown on the well completion, well abandonment reports, and plans. Final elevation must be referenced to mean sea level (msl). Please refer to the Hawaii Well Construction and Pump Installation Standards to ensure that your as-built is in compliance with applicable standards.

Solid Casing: (± 90% x (Ground Elev. - Water Level Elev.))
Total Length: 170 ft
Nominal Diameter: 4 in
Wall Thickness: 0.406 in
Bottom Elevation: 30 ft

Open Casing:
Perforated Screen:
Total Length: 55 ft
Nominal Diameter: 4 in
Wall Thickness: 0.406 in
Bottom Elevation: 50 ft

Note: Neither bentonite nor mud should be used in saturated zone during drilling

For non-steel wells - bottom elevation of well shall not be deeper than 1/4 of aquifer thickness or:
Bottom Elevation of Well Limit = (Water Elevation - Ground Elevation - 18.5 ft) / 4
Example: Estimated +2 ft. Water Level Elev. = Bottom Elevation of Well Limit = (2 - 18.5 / 4) = 16.5 ft