7. REFERENCE INFORMATION FOR BIDDING AND CONSTRUCTION

Requirements of Chapter 104, HRS
Wages and Hours of Employees on Public Works Law

Chapter 104, HRS, applies to every public works construction project over $2,000, regardless of the method of procurement or financing (purchase order, voucher, bid, contract, lease arrangement, warranty, SPRB).

Rate of Wages for Laborers and Mechanics

- Minimum prevailing wages (basic hourly rate plus fringe benefits), as determined by the Director of Labor and Industrial Relations and published in wage rate schedules, shall be paid to the various classes of laborers and mechanics working on the job site. [§104-2(a), (b), Hawaii Revised Statutes (HRS)]

- If the Director of Labor determines that prevailing wages have increased during the performance of a public works contract, the rate of pay of laborers and mechanics shall be raised accordingly. [§104-2(a) and (b), HRS; §12-22-3(d) Hawaii Administrative Rules (HAR)]

Overtime

- Laborers and mechanics working on a Saturday, Sunday, or a legal holiday of the State or more than eight hours a day on any other day shall be paid overtime compensation at not less than one and one-half times the basic hourly rate plus the cost of fringe benefits for all hours worked. If the Director of Labor determines that a prevailing wage is defined by a collective bargaining agreement, the overtime compensation shall be at the rates set by the applicable collective bargaining agreement [§§104-1, 104-2(c), HRS]

Weekly Pay

- Laborers and mechanics employed on the job site shall be paid their full wages at least once a week, without deduction or rebate, except for legal deductions, within five working days after the cutoff date. [§104-2(d), HRS]

Posting of Wage Rate Schedules

- Wage rate schedules with the notes for prevailing wages and special overtime rates, shall be posted by the contractor in a prominent and easily accessible place at the job site. A copy of the entire wage rate schedule shall be given to each laborer and mechanic employed under the contract, except when the employee is covered by a collective bargaining agreement. [§104-2(d), HRS]

Withholding of Accrued Payments

- If necessary, the contracting agency may withhold accrued payments to the contractor to pay to laborers and mechanics employed by the contractor or subcontractor on the job site any difference between the wages required by the public works contract or specifications and the wages received. [§104-2(e), HRS]

Certified Weekly Payrolls and Payroll Records

- A certified copy of all payrolls shall be submitted weekly to the contracting agency.

- The contractor is responsible for the submission of certified copies of the payrolls of all subcontractors. The certification shall affirm that the payrolls are correct and complete, that the wage rates listed are not less than the applicable rates contained in the applicable wage rate schedule, and that the classifications for each laborer or mechanic conform with the work the laborer or mechanic performed. [§104-3(a), HRS]

- Payroll records shall be maintained by the contractor and subcontractors for three years after completion of construction. The records shall contain: [HAR §12-22-10]
  - the name and home address of each employee
  - the employee's correct classification
  - rate of pay (basic hourly rate + fringe benefits)
  - itemized list of fringe benefits paid
  - daily and weekly hours worked
  - weekly straight time and overtime earnings
  - amount and type of deductions
  - actual wages paid
  - date of payment

- Records shall be made available for inspection by the contracting agency, the Department of Labor and Industrial Relations, and any of its authorized representatives, who may also interview employees during working hours on the job. [§104-3(b), HRS]

Termination of Work on Failure to Pay Wages

- If the contracting agency finds that any laborer or mechanic employed on the job site by the contractor or any subcontractor has not been paid prevailing wages or overtime, the contracting agency may, by written notice to the contractor, terminate the contractor's or subcontractor's right to proceed with the work or with the part of the work in which the required wages or overtime compensation have not been paid. The contracting agency may complete this work by contract or otherwise, and the contractor or contractor's sureties shall be liable to the contracting agency for any excess costs incurred. [§104-4, HRS]

Apprentices and Trainees

- In order to be paid apprentice or trainee rates, apprentices and trainees must be parties to an agreement either registered with or recognized as a USDOL nationally approved apprenticeship program by the Department of Labor and Industrial Relations, Workforce Development Division, (808) 586-8877. [§12-22-6(1), HAR]

- The number of apprentices or trainees on any public work in relation to the number of journeyworkers in the same craft classification as the apprentices or trainees employed by the same employer on the same public work may not exceed the ratio allowed under the apprenticeship or trainee standards registered with or recognized by the Department of Labor and Industrial Relations. A registered or recognized apprentice receiving the journeyworker rate will not be considered a journeyworker for the purpose of meeting the ratio requirement. [§12-22-6(2), HAR]

Enforcement

- To ensure compliance with the law, DLIR and the contracting agency will conduct investigations of contractors and subcontractors. If a contractor or subcontractor violates the law, the penalties are:

  - First Violation — Equal to 25% of back wages found due or $250 per offense up to $2,500, whichever is greater.
  - Second Violation — Equal to amount of back wages found due or $500 for each offense up to $5,000, whichever is greater.
  - Third Violation — Equal to two times the amount of back wages found due or $1,000 for each offense up to $10,000, whichever is greater; and
    Suspension from doing any new work on any public work of a governmental contracting agency for three years.

  ▪ A violation would be deemed a second violation if it occurs within two years of the **first notification of violation**, and a third violation if it occurs within three years of **the second notification of violation**.

  ▪ **Suspension**: For a first or second violation, the department shall immediately suspend a contractor who fails to pay wages or penalties until all wages and penalties are paid in full. For a third violation, the department shall penalize and suspend the contractor as described above, **except that if the contractor continues to violate the law, then the department shall immediately suspend the contractor for a mandatory three years. The contractor shall remain suspended until all wages and penalties are paid in full.** [§§104-24, 104-25]

- **Suspension**: Any contractor who fails to make payroll records accessible or provide requested information within 10 days, or fails to keep or falsifies any required record, shall be assessed a penalty including suspension as provided in Section 104-22(b) and 104-25(a)(3), HRS. [§104-3(c)]

- If any contractor interferes with or delays any investigation, the contracting agency shall withhold further payments until the delay has ceased. Interference or delay includes failure to provide requested records or information within ten days, failure to allow employees to be interviewed during working hours on the job, and falsification of payroll records. The department shall assess a penalty of $10,000 per project, and $1,000 per day thereafter, for interference or delay. [§104-22(b)]

- Failure by the contracting agency to include in the provisions of the contract or specifications the requirements of Chapter 104, HRS, relating to coverage and the payment of prevailing wages and overtime, is not a defense of the contractor or subcontractor for noncompliance with the requirements of this chapter. [§104-2(f)]

For additional information, visit the department's website at *http://labor.hawaii.gov/wsd*
or contact any of the following DLIR offices:

Oahu (Wage Standards Division).....(808) 586-8777
Hawaii Island .....(808) 322-4808
Kauai .....(808) 274-3351
Maui .....(808) 243-5322

State of Hawai‘i
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS
Princess Ruth Ke‘elikolani Building
830 Punchbowl Street
Honolulu, Hawai‘i 96813

February 19, 2018
WAGE RATE SCHEDULE BULLETIN NO. 491

This schedule of wage rates contained herein is recognized by the Director of Labor and Industrial Relations to be prevailing on public construction work for the purposes of Chapter 104, Hawai‘i Revised Statutes. The schedule of wage rates determines the applicable wage determination for each classification and does not impose any staffing requirements for any classification. The schedule of wage rates is applicable only to those laborers and mechanics employed at the site of work.

As required by law, future wage rates for laborers and mechanics are incorporated into this bulletin based on available information and are subject to change. Whenever the Director determines that the prevailing wage has increased as shown in the wage rate schedule, the contractor must increase the wages accordingly during the performance of the contract. For addenda or additional wage rate schedules, please consult the Internet at http://labor.hawaii.gov/rs.

The Apprentice Schedule is available on the Internet or upon request from the Research and Statistics Office. Pursuant to Section 12-22-6 (1), Hawai‘i Administrative Rules, the Apprentice Schedule is applicable only to apprentices who are parties to apprenticeship agreements registered with or recognized by the Department of Labor and Industrial Relations.

Questions on the schedule should be referred to the Research and Statistics Office at (808) 586-9005.

The next regular schedule will be issued on or about September 15, 2018.

LEONARD HOSHIJO
Director

STATE OF HAWAI‘I
DAVID Y. IGE, Governor

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS
LEONARD HOSHIJO, Director

RESEARCH AND STATISTICS OFFICE
PHYLLIS DAYAO, Research & Statistics Officer

OPERATIONS MANAGEMENT INFORMATION STAFF
Janet Kaya, Supervisor
Zachariah Wadsack, Research Statistician
Elienne Yoshida, Research Statistician

In cooperation with:
WAGE STANDARDS DIVISION
PAMELA MARTIN, Administrator

WAGE RATE SCHEDULE BULLETIN NO. 491

Classification	Current			2018			2019			2020			Remarks See Pg 6-8
	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	
ASPHALT PAVING GROUP:	**9/18/17**												
Asphalt Concrete Material Transfer	$73.54	$41.92	$31.62	-	-	-	-	-	-	-	-	-	12,13
Asphalt Raker	$72.58	$40.96	$31.62	-	-	-	-	-	-	-	-	-	12,13
Asphalt Spreader Operator	$74.06	$42.44	$31.62	-	-	-	-	-	-	-	-	-	12,13
Laborer, Hand Roller	$69.81	$38.19	$31.62	-	-	-	-	-	-	-	-	-	12,13
Roller Operator (5 tons and under)	$72.31	$40.69	$31.62	-	-	-	-	-	-	-	-	-	12,13
Roller Operator (over 5 tons)	$73.74	$42.12	$31.62	-	-	-	-	-	-	-	-	-	12,13
Screed Person	$73.54	$41.92	$31.62	-	-	-	-	-	-	-	-	-	12,13
EQUIPMENT OPERATOR:													
Combination Loader/Backhoe (over 3/4 cu. yd.)	$72.58	$40.96	$31.62	-	-	-	-	-	-	-	-	-	12,13
Combination Loader/Backhoe (up to 3/4 cu. yd.)	$71.60	$39.98	$31.62	-	-	-	-	-	-	-	-	-	12,13
Concrete saws and/or Grinder (self-propelled unit on streets, highways, airports and canals)	$73.54	$41.92	$31.62	-	-	-	-	-	-	-	-	-	12,13
Grader, Soil Stabilizer, Cold Planer	$74.37	$42.75	$31.62	-	-	-	-	-	-	-	-	-	12,13
Loader (2-1/2 cu. yds. and under)	$73.54	$41.92	$31.62	-	-	-	-	-	-	-	-	-	12,13
Loader (over 2-1/2 cu. yds. to and including 5 cu. yds.)	$73.86	$42.24	$31.62	-	-	-	-	-	-	-	-	-	12,13
TRUCK DRIVER:													
Assistant to Engineer	$72.31	$40.69	$31.62	-	-	-	-	-	-	-	-	-	12,13
Oil Tanker (double), Hot Liquid Asphalt Tanker	$73.86	$42.24	$31.62	-	-	-	-	-	-	-	-	-	12,13
Semi-Trailer, Semi-Dump, Asphalt Distributor	$73.54	$41.92	$31.62	-	-	-	-	-	-	-	-	-	12,13
Slip-in or Pup	$73.86	$42.24	$31.62	-	-	-	-	-	-	-	-	-	12,13
Single or Rock Cans Tandem Dump Truck (8 cu. yds. & under, water level)	$72.58	$40.96	$31.62	-	-	-	-	-	-	-	-	-	12,13
Single or Rock Cans Tandem Dump Truck (over 8 cu. yds., water level)	$72.89	$41.27	$31.62	-	-	-	-	-	-	-	-	-	12,13
Tractor Trailer (hauling equipment)	$73.97	$42.35	$31.62	-	-	-	-	-	-	-	-	-	12,13
Utility, Flatbed	$72.31	$40.69	$31.62	-	-	-	-	-	-	-	-	-	12,13
* **BOILERMAKER**	**2/19/18**												
	$65.88	$36.43	$29.45	-	-	-	-	-	-	-	-	-	13
CARPENTER:	**9/18/17**			**9/3/18**									
Carpenter; Patent Scaffold Erector (14 feet and over); Piledriver; Pneumatic Nailer	$69.11	$47.45	$21.66	$71.36	$49.45	$21.91	-	-	-	-	-	-	1,12,13
Millwright	$69.36	$47.70	$21.66	$71.61	$49.70	$21.91	-	-	-	-	-	-	1,12,13
Power Saw Operator (2 h.p. & above)	$69.26	$47.60	$21.66	$71.51	$49.60	$21.91	-	-	-	-	-	-	1,12,13
CEMENT FINISHER:	**9/18/17**			**9/3/18**									
Cement Finisher; Curb Setter; Precast Panel Setter; Manhole Builder	$67.58	$39.10	$28.48	$69.13	$39.80	$29.33	-	-	-	-	-	-	2,12,13
Trowel Machine Operator	$67.73	$39.25	$28.48	$69.28	$39.95	$29.33	-	-	-	-	-	-	2,12,13
CHAIN-LINK FENCE ERECTOR	**10/2/17**			**10/1/18**									
	$36.55	$22.60	$13.95	$38.75	$24.00	$14.75	-	-	-	-	-	-	10,13
CHLORINATOR	**9/18/17**												
	$31.59	$28.42	$3.17	-	-	-	-	-	-	-	-	-	

Classification	Current			2018			2019			2020			Remarks See Pg 6-8
	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	Prevailing Wage Total	Basic Hourly Rate	Fringe Hourly Rate	
DIVER:	**9/18/17**												
Diver (Aqua Lung) (Scuba) - Up to a depth of 30 feet	$86.69	$55.63	$31.06	-	-	-	-	-	-	-	-	-	12,13
Diver (Aqua Lung) (Scuba) - Over a depth of 30 feet	$96.06	$65.00	$31.06	-	-	-	-	-	-	-	-	-	12,13
Stand-By Diver (Aqua Lung) (Scuba)	$77.31	$46.25	$31.06	-	-	-	-	-	-	-	-	-	12,13
Diver (Other than Aqua Lung)	$97.31	$66.25	$31.06	-	-	-	-	-	-	-	-	-	3,12,13
Stand-By Diver (Other than Aqua Lung)	$78.56	$47.50	$31.06	-	-	-	-	-	-	-	-	-	3,12,13
Tender (Other than Aqua Lung)	$75.53	$44.47	$31.06	-		-	-	-	-	-	-	-	12,13
DRAPERY INSTALLER	**9/18/17**												
	$20.21	$18.00	$2.21	-	-	-	-	-	-	-	-	-	
DRYWALL INSTALLER	**9/18/17**			**9/3/18**									
	$69.36	$47.70	$21.66	$71.61	$49.70	$21.91	-	-	-	-	-	-	12,13
* **DRYWALL TAPERS/FINISHERS**	**2/19/18**												
	$68.25	$42.10	$26.15	-	-	-	-	-	-	-	-	-	
* **ELECTRICIAN (Note: 2 increases for 2018 and 2019)**	**2/18/18**			**8/26/18**			**2/17/19**			**2/23/20**			
Cable Splicer (inside/outside)	$82.47	$53.68	$28.79	$83.98	$54.78	$29.20	$84.67	$55.33	$29.34	$86.17	$56.43	$29.74	4,13
Ground Worker (outside)	$60.77	$36.60	$24.17	$61.83	$37.35	$24.48	$62.30	$37.73	$24.57	$63.36	$38.48	$24.88	4,13
Heavy Equipment Operator (outside)	$70.08	$43.92	$26.16	$71.31	$44.82	$26.49	$71.90	$45.27	$26.63	$73.13	$46.17	$26.96	4,13
Line Installer (outside); Wire Installer (inside)	$76.27	$48.80	$27.47	$77.65	$49.80	$27.85	$78.28	$50.30	$27.98	$79.66	$51.30	$28.36	4,13
							8/25/19						
Cable Splicer (inside/outside)	-	-	-	-	-	-	$85.48	$55.88	$29.60	-	-	-	4,13
Ground Worker (outside)	-	-	-	-	-	-	$62.87	$38.10	$24.77	-	-	-	4,13
Heavy Equipment Operator (outside)	-	-	-	-	-	-	$72.56	$45.72	$26.84	-	-	-	4,13
Line Installer (outside); Wire Installer (inside)	-	-	-	-	-	-	$79.01	$50.80	$28.21	-	-	-	4,13
Telecommunication Worker	**9/3/17**												
Licensed Technician	$42.13	$29.94	$12.19	-	-	-	-	-	-	-	-	-	13
Technician I / Splicer	$40.38	$28.44	$11.94	-	-	-	-	-	-	-	-	-	13
* **ELEVATOR CONSTRUCTOR MECHANIC**	**2/19/18**												
	$90.005	$57.36	$32.645	-	-	-	-	-	-	-	-	-	13
EQUIPMENT OPERATOR:	**9/18/17**												
Group 1	$72.00	$40.94	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 2	$72.11	$41.05	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 3	$72.28	$41.22	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 4	$72.55	$41.49	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 5	$72.86	$41.80	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 6	$73.51	$42.45	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 7	$73.83	$42.77	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 8	$73.94	$42.88	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 9	$74.05	$42.99	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 9A	$74.28	$43.22	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 10	$74.34	$43.28	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 10A	$74.49	$43.43	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 11	$74.64	$43.58	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 12	$75.00	$43.94	$31.06	-	-	-	-	-	-	-	-	-	5,12,13
Group 12A	$75.36	$44.30	$31.06	-	-	-	-	-	-	-	-	-	5,12,13

Classification	Current Prevailing Wage Total	Current Basic Hourly Rate	Current Fringe Hourly Rate	2018 Prevailing Wage Total	2018 Basic Hourly Rate	2018 Fringe Hourly Rate	2019 Prevailing Wage Total	2019 Basic Hourly Rate	2019 Fringe Hourly Rate	2020 Prevailing Wage Total	2020 Basic Hourly Rate	2020 Fringe Hourly Rate	Remarks See Pg 6-8
FENCE ERECTOR (CHAIN-LINK TYPE)													
See Chain-Link Fence Erector	-	-	-	-	-	-	-	-	-	-	-	-	
FLOOR LAYER (CARPET, LINOLEUM & SOFT TILE)	**2/26/17**			**3/4/18**									
	$60.73	$33.00	$27.73	$63.47	$34.15	$29.32	-	-	-	-	-	-	13
GLAZIER	**9/18/17**												
	$67.32	$36.78	$30.54	-	-	-	-	-	-	-	-	-	6,13
HELICOPTER WORK:	**9/18/17**												
Airborne Hoist Operator	$75.86	$44.80	$31.06	-	-	-	-	-	-	-	-	-	12,13
Co-Pilot	$76.00	$44.94	$31.06	-	-	-	-	-	-	-	-	-	12,13
Pilot	$76.17	$45.11	$31.06	-	-	-	-	-	-	-	-	-	12,13
* **INSULATOR**	**9/18/17**			**9/2/18**			**9/1/19**			**8/30/20**			
	$64.40	$39.90	$24.50	$65.10	$40.40	$24.70	$65.90	$40.90	$25.00	$67.30	$41.90	$25.40	7,12,13
IRONWORKER:	**9/18/17**			**9/1/18**			**9/1/19**						
Reinforcing, Structural	$71.15	$39.00	$32.15	$73.54	$40.25	$33.29	$76.02	$41.50	$34.52	-	-	-	8,12,13
LABORER:	**9/4/17**			**9/3/18**									
Driller	$56.66	$37.40	$19.26	$58.66	$38.40	$20.26	-	-	-	-	-	-	1,13
Gunite Operator or Shotcrete Operator	$56.16	$36.90	$19.26	$58.16	$37.90	$20.26	-	-	-	-	-	-	1,13
High Scaler (Working Suspended)	$56.16	$36.90	$19.26	$58.16	$37.90	$20.26	-	-	-	-	-	-	13
Laborer I	$55.66	$36.40	$19.26	$57.66	$37.40	$20.26	-	-	-	-	-	-	1,13
Laborer II	$53.06	$33.80	$19.26	$55.06	$34.80	$20.26	-	-	-	-	-	-	1,13
Light/Final Clean-up (Janitorial) Laborer	$42.94	$27.80	$15.14	$44.92	$28.80	$16.12	-	-	-	-	-	-	1,13
Mason Tender/Hod Carrier	$56.16	$36.90	$19.26	$58.16	$37.90	$20.26	-	-	-	-	-	-	1,13
Powder Blaster	$56.66	$37.40	$19.26	$58.66	$38.40	$20.26	-	-	-	-	-	-	1,13
Window Washer (Outside) (On bosun's chair, cable-suspended scaffold or work platform)	$55.16	$35.90	$19.26	$57.16	$36.90	$20.26	-	-	-	-	-	-	13
LANDSCAPER:	**9/4/17**			**9/3/18**			**9/2/19**						
Landscape & Irrigation Laborer A	$36.82	$24.85	$11.97	$38.18	$25.50	$12.68	$39.60	$26.15	$13.45	-	-	-	
Landscape & Irrigation Laborer B	$37.62	$25.65	$11.97	$39.08	$26.40	$12.68	$40.60	$27.15	$13.45	-	-	-	
Landscape & Irrigation Maintenance Laborer	$32.62	$20.65	$11.97	$33.78	$21.10	$12.68	$35.00	$21.55	$13.45	-	-	-	
LATHER	**9/18/17**			**9/3/18**									
	$69.36	$47.70	$21.66	$71.61	$49.70	$21.91	-	-	-	-	-	-	12,13
MASON; Bricklayer;	**9/18/17**												
Cement Blocklayer; Stone Mason; Precast Sill Setter	$68.23	$39.76	$28.47	-	-	-	-	-	-	-	-	-	2,13
Pointer-Caulker-Weatherproofer	$68.48	$40.01	$28.47	-	-	-	-	-	-	-	-	-	2,13
PAINTER:	**1/1/18**			**7/1/18**			**1/1/19**						
Painter; Spray Painter; Sandblaster or Waterblaster; Thermoplastic Striper; Paper Hanger	$66.21	$37.35	$28.86	$67.04	$37.85	$29.19	$67.74	$38.35	$29.39	-	-	-	
							7/1/19						
Painter; Spray Painter; Sandblaster or Waterblaster Thermoplastic Striper; Paper Hanger	-	-	-	-	-	-	$68.44	$38.80	$29.64	-	-	-	

Classification	Current Prevailing Wage Total	Current Basic Hourly Rate	Current Fringe Hourly Rate	2018 Prevailing Wage Total	2018 Basic Hourly Rate	2018 Fringe Hourly Rate	2019 Prevailing Wage Total	2019 Basic Hourly Rate	2019 Fringe Hourly Rate	2020 Prevailing Wage Total	2020 Basic Hourly Rate	2020 Fringe Hourly Rate	Remarks See Pg 6-8
PLASTERER:	**9/18/17**			**9/3/18**									
	$69.02	$40.54	$28.48	$70.67	$41.34	$29.33	-	-	-	-	-	-	2,12,13
* **PLUMBER: (Note: 2 increases for each year.)**	**1/7/18**			**7/1/18**			**1/6/19**			**1/5/20**			
Plumber; Pipefitter; Refrigeration Fitter; Heating & Air Conditioning Fitter; Sprinkler Fitter; Steamfitter	$68.12	$42.35	$25.77	$68.87	$42.85	$26.02	$69.59	$43.35	$26.24	$71.06	$44.35	$26.71	9,13
							7/7/19			**7/5/20**			
Plumber; Pipefitter; Refrigeration Fitter; Heating & Air Conditioning Fitter; Sprinkler Fitter; Steamfitter	-	-	-	-	-	-	$70.34	$43.85	$26.49	$71.81	$44.85	$26.96	9.13
* **ROOFER:**	**2/19/18**			**9/2/18**			**9/1/19**			**9/7/20**			
Shingle, Tile, Built-up Roofing	$57.48	$39.85	$17.63	$58.60	$40.50	$18.10	$59.35	$41.15	$18.20	$60.10	$41.80	$18.30	
Coal Tar Pitch	$97.33	$79.70	$17.63	$99.10	$81.00	$18.10	$100.50	$82.30	$18.20	$101.90	$83.60	$18.30	
SANDBLASTER OR WATERBLASTER:													
Use wages of craft to which sand or water blasting is incidental.													
SHEETMETAL WORKER: (Note: 2 increases in 2018 & 2019)	**9/3/17**			**3/4/18**			**3/3/19**						
	$68.33	$41.80	$26.53	$69.23	$42.20	$27.03	$70.66	$42.85	$27.81	-	-	-	13
				9/2/18			**9/1/19**						
				$69.99	$42.55	$27.44	$71.23	$43.13	$28.10	-	-	-	13
TERMITE TREATER	**9/18/17**												
	$16.84	$13.13	$3.71	-	-	-	-	-	-	-	-	-	
TERRAZZO:	**9/4/17**			**9/3/18**									
Terrazzo Setter	$68.92	$40.95	$27.97	$70.52	$41.70	$28.82	-	-	-	-	-	-	2,13
Terrazzo Base Grinder	$67.11	$39.14	$27.97	$68.71	$39.89	$28.82	-	-	-	-	-	-	2,13
Certified Terrazzo Floor Grinder and Tender	$65.56	$37.59	$27.97	$67.16	$38.34	$28.82	-	-	-	-	-	-	2,13
Terrazzo Floor Grinder	$62.56	$34.59	$27.97	$64.16	$35.34	$28.82	-	-	-	-	-	-	2,13
TILE SETTER:	**9/4/17**			**9/3/18**									
Ceramic Hard Tile; Marble Setter	$68.92	$40.95	$27.97	$70.52	$41.70	$28.82	-	-	-	-	-	-	2,13
Certified Ceramic Tile & Marble Helper	$65.56	$37.59	$27.97	$67.16	$38.34	$28.82	-	-	-	-	-	-	2,13
TRUCK DRIVER:	**9/18/17**												
Concrete Mixer	$37.96	$31.73	$6.23	-	-	-	-	-	-	-	-	-	
Concrete Mixer/Booster	$44.97	$34.03	$10.94	-	-	-	-	-	-	-	-	-	
Dump Truck, 8 cu. yds. & under (water level); Water Truck (up to & including 2,000 gallons)	$72.55	$41.49	$31.06	-	-	-	-	-	-	-	-	-	12,13
Flatbed, Utility, etc.	$72.28	$41.22	$31.06	-	-	-	-	-	-	-	-	-	12,13
End Dump, Unlicensed (Euclid, Mack, Caterpillar, or similar); Tractor Trailer (hauling equipment)	$73.94	$42.88	$31.06	-	-	-	-	-	-	-	-	-	12,13
Semi-Trailer, Rock Cans, or Semi-Dump	$73.51	$42.45	$31.06	-	-	-	-	-	-	-	-	-	12,13
Slip-in or Pup	$73.83	$42.77	$31.06	-	-	-	-	-	-	-	-	-	12,13
Tandem Dump Truck, over 8 cu. yds. (water level); Water Truck (over 2,000 gallons)	$72.86	$41.80	$31.06	-	-	-	-	-	-	-	-	-	12,13

Classification	Current Prevailing Wage Total	Current Basic Hourly Rate	Current Fringe Hourly Rate	2018 Prevailing Wage Total	2018 Basic Hourly Rate	2018 Fringe Hourly Rate	2019 Prevailing Wage Total	2019 Basic Hourly Rate	2019 Fringe Hourly Rate	2020 Prevailing Wage Total	2020 Basic Hourly Rate	2020 Fringe Hourly Rate	Remarks See Pg 6-8
UNDERGROUND LABORER:	**9/4/17**			**9/3/18**									
Worker in a raise, shaft, or tunnel.													
Group 1	$56.26	$37.00	$19.26	$58.26	$38.00	$20.26	-	-	-	-	-	-	13
Group 2	$57.76	$38.50	$19.26	$59.76	$39.50	$20.26	-	-	-	-	-	-	13
Group 3	$58.26	$39.00	$19.26	$60.26	$40.00	$20.26	-	-	-	-	-	-	13
Group 4	$59.26	$40.00	$19.26	$61.26	$41.00	$20.26	-	-	-	-	-	-	13
Group 5	$59.51	$40.25	$19.26	$61.51	$41.25	$20.26	-	-	-	-	-	-	13
Group 6	$59.61	$40.35	$19.26	$61.61	$41.35	$20.26	-	-	-	-	-	-	13
Group 7	$59.86	$40.60	$19.26	$61.86	$41.60	$20.26	-	-	-	-	-	-	13
Group 8	$60.31	$41.05	$19.26	$62.31	$42.05	$20.26	-	-	-	-	-	-	13
WATER FRONT CONSTRUCTION (DREDGING):	**9/18/17**												
CLAMSHELL OR DIPPER DREDGES:													
Clamshell or Dipper Operator	$75.00	$43.94	$31.06	-	-	-	-	-	-	-	-	-	11,12,13
Mechanic; Welder; Watch Engineer	$74.34	$43.28	$31.06	-	-	-	-	-	-	-	-	-	12,13
Deckmate; Bargemate	$73.94	$42.88	$31.06	-	-	-	-	-	-	-	-	-	12,13
Fire Person; Oiler; Deckhand; Barge Worker	$72.28	$41.22	$31.06	-	-	-	-	-	-	-	-	-	12,13
HYDRAULIC SUCTION DREDGES:													
Lever Operator	$74.64	$43.58	$31.06	-	-	-	-	-	-	-	-	-	12,13
Mechanic; Welder	$74.34	$43.28	$31.06	-	-	-	-	-	-	-	-	-	12,13
Watch Engineer (steam or electric)	$74.49	$43.43	$31.06	-	-	-	-	-	-	-	-	-	12,13
Dozer Operator	$74.28	$43.22	$31.06	-	-	-	-	-	-	-	-	-	12,13
Deckmate	$73.94	$42.88	$31.06	-	-	-	-	-	-	-	-	-	12,13
Winch Operator (stern winch on dredge)	$73.83	$42.77	$31.06	-	-	-	-	-	-	-	-	-	12,13
Fire Person; Oiler; Deckhand (can operate anchor scow under direction of deckmate); Levee Operator	$72.28	$41.22	$31.06	-	-	-	-	-	-	-	-	-	12,13
DERRICKS:													
Operator: Derrick, Piledriver, Crane	$75.00	$43.94	$31.06	-	-	-	-	-	-	-	-	-	12,13
Deckmate; Saurman Type Dragline (up to & including 5 yds.)	$74.34	$43.28	$31.06	-	-	-	-	-	-	-	-	-	12,13
Saurman Type Dragline (over 5 cu. yds.)	$73.94	$42.88	$31.06	-	-	-	-	-	-	-	-	-	12,13
Fire Person; Oiler; Deckhand	$72.28	$41.22	$31.06	-	-	-	-	-	-	-	-	-	12,13
BOAT OPERATORS:													
Master Boat Operator	$74.64	$43.58	$31.06	-	-	-	-	-	-	-	-	-	12,13
Boat Operator	$74.49	$43.43	$31.06	-	-	-	-	-	-	-	-	-	12,13
Boat Deckhand	$72.28	$41.22	$31.06	-	-	-	-	-	-	-	-	-	12,13
WATER WELL DRILLER:	**9/18/17**												
Water Well Driller	$40.97	$31.00	$9.97	-	-	-	-	-	-	-	-	-	
Water Well Driller Helper	$26.87	$18.00	$8.87	-	-	-	-	-	-	-	-	-	
WELDER:													
Use wages of craft to which welding is incidental, except for Chain-Link Fence Erector. See remark.													10

Comments: Overtime must be paid at one and one-half times the basic hourly rate plus the hourly cost of required fringe benefits.
*** Indicates a wage, fringe benefit, remark, or title change from the previous bulletin.**

REMARKS:

1. Carpenter, Laborer (excluding High Scaler, Window Washer): $.50 per hour shall be added to the regular straight-time rate for height pay for each hour while working from a bosun's chair and/or from a cable-suspended scaffold or work platform which is free swinging (not attached to building) for each hour worked on said rig.

2. Cement Finisher, Mason, Plasterer, Terrazzo, Tile Setter: $1.00 per hour shall be added to the regular straight-time rate for height pay for each hour while working from a bosun's chair and/or from a cable-suspended scaffold or work platform which is free swinging (not attached to building) for each hour worked on said rig.

3. Diver (Other than Aqua Lung), Stand-By Diver (Other than Aqua Lung):

   A. On any dive exceeding 50 feet, the diver shall, in addition, be paid the following amount of "depth money":

50 feet to 100 feet	$1.50 per foot in excess of 50 feet
100 feet to 150 feet	$100.00 plus $2.00 per foot in excess of 100 feet
150 feet to 200 feet	$200.00 plus $3.00 per foot in excess of 150 feet

   B. When it is necessary for a Diver to enter any pipe, tunnel or other enclosure, the said Diver shall, in addition to the hourly rate, receive a premium in accordance with the following schedule for distance traveled from the entrance of the pipe, tunnel or other enclosure:

      1) When able to stand erect, but in which there is no vertical ascent:

5 feet to 50 feet	$5.00 per day
50 feet to 100 feet	$7.50 per day
100 feet to 150 feet	$12.50 per day
Greater than 150 feet	The premium shall be increased an additional $7.50 for each succeeding 50 feet.

      2) When unable to stand erect and in which there is no vertical ascent:

5 feet to 50 feet	$5.00 per day
50 feet to 100 feet	$7.50 per day
100 feet to 150 feet	$12.50 per day
150 feet to 200 feet	$36.75 per day
200 feet to 300 feet	$1.00 per foot
300 feet to 450 feet	$1.50 per foot
450 feet to 600 feet	$2.50 per foot

4. Electrician:

   A. One and one-half times the straight-time rate while working in a tunnel under construction; under water with aqualung equipment; in a completed tunnel which has only one entrance or exit providing access to safety and where no other personnel are working; or in an underground structure having no access to safety or where no other personnel are working.

   B. Double the straight-time rate shall be paid for the following types of hazardous work regardless if fall prevention devices are used:

      1) While working from poles, trusses, stacks, towers, tanks, bosun's chairs, swinging or rolling scaffolds, supporting structures, and open platforms, over 70 feet from the ground where the employee is subject to a free fall; provided, however, that when work is performed on stacks, towers or permanent platforms where the employees are on a firm footing within an enclosure, a hazardous condition does not exist regardless of height;
      2) While working outside of a railing or enclosure, or temporary platforms extending outside of a building, or from scaffolding or ladder within an enclosure where an employee's footing is within one foot of the top of such railing, and the employee is subject to a free fall of over 70 feet;
      3) Working on buildings while leaning over the railing or edge of the building, and is subject to a free fall of 70 feet; or
      4) Two hours minimum hazardous pay per day shall be paid while climbing to a stack, tower or permanent platform which exceeds 70 feet from the ground but where the employee is on a firm footing within an enclosure.

   C. Five percent per hour shall be added to the hourly wage for height pay while working above 9,000 feet elevation.

REMARKS:

5. Equipment Operator:

   A. Operators and Assistants to Engineer (climbing a boom) of cranes (under 50 tons) with booms of eighty feet or more (including jib) or of cranes (under 50 tons) with leads of one hundred feet or more, shall receive additional premium according to the following schedule:

	Per Hour
Booms of 80 feet up to, or leads of 100 feet up to, but not including 130 feet	$0.50
Booms and/or leads of 130 feet up to, but not including 180 feet	$0.75
Booms and/or leads of 180 feet up to and including 250 feet	$1.15
Booms and/or leads over 250 feet	$1.50

   Operators and Assistants to Engineer (climbing a boom) of cranes (50 tons and over) with booms of 180 feet or more (including jib) shall receive additional premium according to the following schedule:

	Per Hour
Booms of 180 feet up to and including 250 feet	$1.25
Booms over 250 feet	$1.75

   Note: The boom shall be measured from the center of the heel pin to the center of the boom or jib point sheave.

   B. $1.25 per hour shall be added to the hourly wage while operating a rig suspended by ropes or cables or to perform work on a Yo-Yo Cat.

   C. In a raise or shaft, a premium of $.40 per hour will be paid in addition to the regular straight time wage.
   A raise is defined to be an underground excavation (lined or unlined) whose length exceeds its width and the inclination of the grade from the excavation is greater than 20 degrees from the horizontal.
   A shaft is defined to be an excavation (lined or unlined) made from the surface of the earth, generally vertical in nature, but may decline up to 75 degrees from the vertical, and whose depth is greater than 15 feet and its largest horizontal dimension. Includes an underground silo.

   D. In a tunnel, a premium of $.30 per hour will be paid in addition to the regular straight time wages.
   A tunnel is defined to be an underground excavation (lined or unlined) whose length exceeds its width and the inclination of the grade from the excavation is no greater than 20 degrees from the horizontal.

6. Glazier: $1.00 per hour shall be added to the hourly wage for height pay for exterior glazing work performed in a walking/working surface with an unprotected side or edge 10 feet or more above a lower level which requires protection from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, position devise systems, fall restraint systems, perimeter safety cables or controlled decking zones.

7. Insulator: Six percent per hour shall be added to the hourly wage for hazardous pay while working from a boatswain chair, staging or free standing scaffolding erected from the ground up or mezzanine floor subject to a free fall and skyclimber suspended from a permanent structure and when working above 40 feet.

8. Ironworker: $.50 per hour shall be added to the hourly wage while working in tunnels or coffer dams. $1.00 per hour shall be added to the hourly wage while working under or covered with water (submerged), or on the summits of Mauna Kea, Mauna Loa or Haleakala.

9. Plumber: One and one-half times the straight-time rate for height pay while working from OSHA approved trusses, stacks, towers, tanks, bosun's chair, swinging or rolling scaffolding, supporting structures or on open platforms where the employee is subject to a direct fall of 40 feet or more. Provided, however, that when said work is performed where the employee is on a firm footing within an enclosure, a hazardous condition does not exist regardless of height. $1.00 per hour shall be added to the straight-time rate while working with flame cutting or any type of welding equipment on any galvanized material or product for at least an hour.

10. Chain-Link Fence Erector: $1.00 per hour shall be added to the hourly wage while performing welding services.

11. Water Front Construction: Clamshell or Dipper Operator: $.50 per hour shall be added to the straight-time rate while working with boom (including jib) over 130 feet.

12. Possible wage/fringe option increases:
    Carpenter, Drywall and Lather: Effective WRS 492 - $0.25
    Cement Finisher, Plasterer: - Effective WRS 492 - $0.30
    Drywall Taper/Finishers: Effective 1/1/19 -$2.50
    Asphalt Paving, Diver, Equipment Operator, Helicopter Work, Truck Driver except Concrete Mixer & Concrete Mixer Booster, Water Construction (Dredging): Effective WRS 492 - $2.75
    Insulator: Effective: 9/1/19 - $0.25
    Ironworker: Effective WRS 492 - $0.26; 9/1/19 - $0.27
    Roofer: Effective 9/1/19 - $0.75; 9/7/20 - $0.80

REMARKS:

13. Overtime/Holiday must be paid at one and one-half times the basic hourly rate, plus the hourly cost of required fringe, with the following exceptions:

A. ***Two times*** *the basic hourly rate, plus the hourly cost of required fringe.*

Asphalt Paving: Sunday, New Year's Day, Martin Luther King Day, Presidents' Day, Memorial Day, Kamehameha Day, Fourth of July, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day.

Boilermaker: Sunday, New Year's Day, President's Day, Memorial Day, Kamehameha Day, July 4th, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day.

Diver: Sunday, New Year's Day, Martin Luther King Day, Presidents' Day, Memorial Day, Kamehameha Day, Fourth of July, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day.

Electrician: Sunday, New Year's Day, Presidents' Day, Memorial Day, Kamehameha Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day.

Elevator Constructor: Saturday, Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day.

Equipment Operator: Sunday, New Year's Day, Martin Luther King Day, Presidents' Day, Memorial Day, Kamehameha Day, Fourth of July, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day.

Floor Layer: Labor Day.

Glazier: Sunday.

Helicopter Worker: Sunday, New Year's Day, Martin Luther King Day, Presidents' Day, Memorial Day, Kamehameha Day, Fourth of July, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day.

Ironworker: Sunday, New Year's Day, Presidents' Day, Memorial Day, Kamehameha Day, Fourth of July, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day.

Plumber: Sunday, New Year's Day, Martin Luther King Jr. Day, President's Day, Memorial Day, Kamehameha Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day.

Sheetmetal Worker: Sunday, New Year's Day, Martin Luther King Day, President's Day, Memorial Day, Kamehameha Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day.

Telecommunication: Sunday, New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day.

Truck Driver, except Concrete Mixer & Concrete Mixer/Booster: Sunday, New Year's Day, Martin Luther King Day, Presidents' Day, Memorial Day, Kamehameha Day, Fourth of July, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day.

Water Front Construction (Dredging): Sunday, New Year's Day, Martin Luther King Day, Presidents' Day, Memorial Day, Kamehameha Day, Fourth of July, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day.

B. ***Three times*** *the basic hourly wage, plus the hourly cost of required fringe* ***on Labor Day***.

Carpenter
Cement Finisher
Chain Link Fence Erector
Drywall Installer
Insulator
Laborer
Lather
Mason
Plasterer
Terrazzo
Tile Setter
Underground Laborer

Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section l(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part

of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section l(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section l(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at *http://www.dol.gov/esa/whd/forms/wh347instr.htm* or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant ',to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than $5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable where the amount of the prime contract exceeds $100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in sub paragraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety. The provisions of this paragraph C are applicable where the amount of the prime contract exceeds $100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

General Decision Number: HI180001 07/20/2018 HI1

Superseded General Decision Number: HI20170001

State: Hawaii

Construction Types: Building, Heavy (Heavy and Dredging), Highway and Residential

Counties: Hawaii Statewide.

BUILDING CONSTRUCTION PROJECTS; RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories); HEAVY AND HIGHWAY CONSTRUCTION PROJECTS AND DREDGING

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018
1	01/26/2018
2	02/23/2018
3	03/09/2018
4	04/27/2018
5	07/06/2018
6	07/20/2018

ASBE0132-001 08/31/2015

	Rates	Fringes
Asbestos Workers/Insulator Includes application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems. Also the application of firestopping material for wall openings and		

penetrations in walls, floors, ceilings and curtain walls	$ 39.65	23.50

BOIL0627-005 01/01/2013

	Rates	Fringes
BOILERMAKER	$ 35.20	27.35

BRHI0001-001 09/04/2017

	Rates	Fringes
BRICKLAYER		
Bricklayers and Stonemasons	$ 44.55	23.22
Pointers, Caulkers and Weatherproofers	$ 45.01	23.22

BRHI0001-002 09/04/2017

	Rates	Fringes
Tile, Marble & Terrazzo Worker		
Terrazzo Base Grinders	$ 44.54	22.72
Terrazzo Floor Grinders and Tenders	$ 42.99	22.72
Tile, Marble and Terrazzo Workers	$ 46.35	22.72

CARP0745-001 09/04/2017

	Rates	Fringes
Carpenters:		
Carpenters; Hardwood Floor Layers; Patent Scaffold Erectors (14 ft. and over); Piledrivers; Pneumatic Nailers; Wood Shinglers and Transit and/or Layout Man	$ 47.45	21.66
Millwrights and Machine Erectors	$ 47.70	21.66
Power Saw Operators (2 h.p. and over)	$ 47.60	21.66

CARP0745-002 09/04/2017

	Rates	Fringes
Drywall and Acoustical Workers and Lathers	$ 47.70	21.66

ELEC1186-001 02/18/2018

	Rates	Fringes
Electricians:		
Cable Splicers	$ 53.68	28.79

Electricians	$ 48.80	28.64
Telecommunication worker	$ 28.44	11.94

ELEC1186-002 02/18/2018

	Rates	Fringes
Line Construction:		
Cable Splicers	$ 53.68	28.79
Groundmen/Truck Drivers	$ 36.60	28.28
Heavy Equipment Operators	$ 43.92	28.50
Linemen	$ 48.80	28.64
Telecommunication worker	$ 28.44	11.94

ELEV0126-001 01/01/2018

	Rates	Fringes
ELEVATOR MECHANIC	$ 57.36	32.65

a. VACATION: Employer contributes 8% of basic hourly rate for 5 years service and 6% of basic hourly rate for 6 months to 5 years service as vacation pay credit.

b. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the Friday after Thanksgiving Day and Christmas Day.

ENGI0003-002 09/04/2017

	Rates	Fringes
Diver (Aqua Lung) (Scuba))		
Diver (Aqua Lung) (Scuba) (over a depth of 30 feet)	$ 65.00	30.93
Diver (Aqua Lung) (Scuba) (up to a depth of 30 feet)	$ 55.63	30.93
Stand-by Diver (Aqua Lung) (Scuba)	$ 46.25	30.93
Diver (Other than Aqua Lung)		
Diver (Other than Aqua Lung)	$ 65.00	30.93
Diver Tender (Other than Aqua Lung)	$ 43.22	30.93
Stand-by Diver (Other than Aqua Lung)	$ 46.25	30.93
Helicopter Work		
Airborne Hoist Operator for Helicopter	$ 44.80	30.93
Co-Pilot of Helicopter	$ 44.94	30.93
Pilot of Helicopter	$ 45.11	30.93
Power equipment operator - tunnel work		
GROUP 1	$ 41.24	30.93
GROUP 2	$ 41.35	30.93
GROUP 3	$ 41.52	30.93
GROUP 4	$ 41.79	30.93
GROUP 5	$ 42.10	30.93
GROUP 6	$ 42.75	30.93

GROUP 7	$ 43.07	30.93
GROUP 8	$ 43.18	30.93
GROUP 9	$ 43.29	30.93
GROUP 9A	$ 43.52	30.93
GROUP 10	$ 43.58	30.93
GROUP 10A	$ 43.73	30.93
GROUP 11	$ 43.88	30.93
GROUP 12	$ 44.24	30.93
GROUP 12A	$ 44.60	30.93
Power equipment operators:		
GROUP 1	$ 40.94	30.93
GROUP 2	$ 41.05	30.93
GROUP 3	$ 41.22	30.93
GROUP 4	$ 41.49	30.93
GROUP 5	$ 41.80	30.93
GROUP 6	$ 42.45	30.93
GROUP 7	$ 42.77	30.93
GROUP 8	$ 42.88	30.93
GROUP 9	$ 42.99	30.93
GROUP 9A	$ 43.22	30.93
GROUP 10	$ 43.28	30.93
GROUP 10A	$ 43.43	30.93
GROUP 11	$ 43.58	30.93
GROUP 12	$ 43.94	30.93
GROUP 12A	$ 44.30	30.93
GROUP 13	$ 41.22	30.93
GROUP 13A	$ 41.49	30.93
GROUP 13B	$ 41.80	30.93
GROUP 13C	$ 42.45	30.93
GROUP 13D	$ 42.77	30.93
GROUP 13E	$ 42.88	30.93

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Fork Lift (up to and including 10 tons); Partsman (heavy duty repair shop parts room when needed).

GROUP 2: Conveyor Operator (Handling building material); Hydraulic Monitor; Mixer Box Operator (Concrete Plant).

GROUP 3: Brakeman; Deckhand; Fireman; Oiler; Oiler/Gradechecker; Signalman; Switchman; Highline Cableway Signalman; Bargeman; Bunkerman; Concrete Curing Machine (self-propelled, automatically applied unit on streets, highways, airports and canals); Leveeman; Roller (5 tons and under); Tugger Hoist.

GROUP 4: Boom Truck or dual purpose "A" Frame Truck (5 tons or less); Concrete Placing Boom (Building Construction); Dinky Operator; Elevator Operator; Hoist and/or Winch (one drum); Straddle Truck (Ross Carrier, Hyster and similar).

GROUP 5: Asphalt Plant Fireman; Compressors, Pumps, Generators and Welding Machines ("Bank" of 9 or more, individually or collectively); Concrete Pumps or Pumpcrete Guns; Lubrication and Service Engineer (Grease Rack); Screedman.

GROUP 6: Boom Truck or Dual Purpose "A"Frame Truck (over 5 tons); Combination Loader/Backhoe (up to and including 3/4

cu. yd.); Concrete Batch Plants (wet or dry); Concrete Cutter, Groover and/or Grinder (self-propelled unit on streets, highways, airports, and canals); Conveyor or Concrete Pump (Truck or Equipment Mounted); Drilling Machinery (not to apply to waterliners, wagon drills or jack hammers); Fork Lift (over 10 tons); Loader (up to and including 3 and 1/2 cu. yds); Lull High Lift (under 40 feet); Lubrication and Service Engineer (Mobile); Maginnis Internal Full Slab Vibrator (on airports, highways, canals and warehouses); Man or Material Hoist; Mechanical Concrete Finisher (Large Clary, Johnson Bidwell, Bridge Deck and similar); Mobile Truck Crane Driver; Portable Shotblast Concrete Cleaning Machine; Portable Boring Machine (under streets, highways, etc.); Portable Crusher; Power Jumbo Operator (setting slip forms, etc., in tunnels); Rollers (over 5 tons); Self-propelled Compactor (single engine); Self-propelled Pavement Breaker; Skidsteer Loader with attachments; Slip Form Pumps (Power driven by hydraulic, electric, air, gas, etc., lifting device for concrete forms); Small Rubber Tired Tractors; Trencher (up to and including 6 feet); Underbridge Personnel Aerial Platform (50 feet of platform or less).

GROUP 7: Crusher Plant Engineer, Dozer (D-4, Case 450, John Deere 450, and similar); Dual Drum Mixer, Extend Lift; Hoist and/or Winch (2 drums); Loader (over 3 and 1/2 cu. yds. up to and including 6 yards.); Mechanical Finisher or Spreader Machine (asphalt), (Barber Greene and similar) (Screedman required); Mine or Shaft Hoist; Mobile Concrete Mixer (over 5 tons); Pipe Bending Machine (pipelines only); Pipe Cleaning Machine (tractor propelled and supported); Pipe Wrapping Machine (tractor propelled and supported); Roller Operator (Asphalt); Self-Propelled Elevating Grade Plane; Slusher Operator; Tractor (with boom) (D-6, or similar); Trencher (over 6 feet and less than 200 h.p.); Water Tanker (pulled by Euclids, T-Pulls, DW-10, 20 or 21, or similar); Winchman (Stern Winch on Dredge).

GROUP 8: Asphalt Plant Operator; Barge Mate (Seagoing); Cast-in-Place Pipe Laying Machine; Concrete Batch Plant (multiple units); Conveyor Operator (tunnel); Deckmate; Dozer (D-6 and similar); Finishing Machine Operator (airports and highways); Gradesetter; Kolman Loader (and similar); Mucking Machine (Crawler-type); Mucking Machine (Conveyor-type); No-Joint Pipe Laying Machine; Portable Crushing and Screening Plant; Power Blade Operator (under 12); Saurman Type Dragline (up to and including 5 yds.); Stationary Pipe Wrapping, Cleaning and Bending Machine; Surface Heater and Planer Operator, Tractor (D-6 and similar); Tri-Batch Paver; Tunnel Badger; Tunnel Mole and/or Boring Machine Operator Underbridge Personnel Aerial Platform (over 50 feet of platform).

GROUP 9: Combination Mixer and Compressor (gunite); Do-Mor Loaderand Adams Elegrader; Dozer (D-7 or equal); Wheel and/or Ladder Trencher (over 6 feet and 200 to 749 h.p.).

GROUP 9A: Dozer (D-8 and similar); Gradesetter (when required by the Contractor to work from drawings, plans or specifications without the direct supervision of a foreman

or superintendent); Push Cat; Scrapers (up to and including 20 cu. yds); Self-propelled Compactor with Dozer; Self-Propelled, Rubber-Tired Earthmoving Equipment (up to and including 20 cu. yds) (621 Band and similar); Sheep's Foot; Tractor (D-8 and similar); Tractors with boom (larger than D-6, and similar).

GROUP 10: Chicago Boom; Cold Planers; Heavy Duty Repairman or Welder; Hoist and/or Winch (3 drums); Hydraulic Skooper (Koehring and similar); Loader (over 6 cu. yds. up to and including 12 cu. yds.); Saurman type Dragline (over 5 cu. yds.); Self-propelled, rubber-tired Earthmoving Equipment (over 20 cu. yds. up to and including 31 cu. yds.) (637D and similar); Soil Stabilizer (P & H or equal); Sub-Grader (Gurries or other automatic type); Tractors (D-9 or equivalent, all attachments); Tractor (Tandem Scraper); Watch Engineer.

GROUP 10A: Boat Operator; Cable-operated Crawler Crane (up to and including 25 tons); Cable-operated Power Shovel, Clamshell, Dragline and Backhoe (up to and including 1 cu. yd.); Dozer D9-L; Dozer (D-10, HD41 and similar) (all attachments); Gradall (up to and including 1 cu. yd.); Hydraulic Backhoe (over 3/4 cu. yds. up to and including 2 cu. yds.); Mobile Truck Crane Operator (up to and including 25 tons) (Mobile Truck Crane Driver Required); Self-propelled Boom Type Lifting Device (Center Mount) (up to and including 25 tons) (Grove, Drott, P&H, Pettibone and similar; Trencher (over 6 feet and 750 h.p. or more); Watch Engineer (steam or electric).

GROUP 11: Automatic Slip Form Paver (concrete or asphalt); Band Wagon (in conjunction with Wheel Excavator); Cable-operated Crawler Cranes (over 25 tons but less than 50 tons); Cable-operated Power Shovel, Clamshell, Dragline and Backhoe (over 1 cu. yd. up to 7 cu. yds.); Gradall (over 1 cu. yds. up to 7 cu. yds.); DW-10, 20, etc. (Tandem); Earthmoving Machines (multiple propulsion power units and 2 or more Scrapers) (up to and including 35 cu. yds.," struck" m.r.c.); Highline Cableway; Hydraulic Backhoe (over 2 cu. yds. up to and including 4 cu. yds.); Leverman; Lift Slab Machine; Loader (over 12 cu. yds); Master Boat Operator; Mobile Truck Crane Operator (over 25 tons but less than 50 tons); (Mobile Truck Crane Driver required); Pre-stress Wire Wrapping Machine; Self-propelled Boom-type Lifting Device (Center Mount) (over 25 tons m.r.c); Self-propelled Compactor (with multiple-propulsion power units); Single Engine Rubber Tired Earthmoving Machine (with Tandem Scraper); Tandem Cats; Trencher (pulling attached shield).

GROUP 12: Clamshell or Dipper Operator; Derricks; Drill Rigs; Multi-Propulsion Earthmoving Machines (2 or more Scrapers) (over 35 cu. yds "struck"m.r.c.); Operators (Derricks, Piledrivers and Cranes); Power Shovels and Draglines (7 cu. yds. m.r.c. and over); Self-propelled rubber-tired Earthmoving equipment (over 31 cu. yds.) (657B and similar); Wheel Excavator (up to and including 750 cu. yds. per hour); Wheel Excavator (over 750 cu. yds. per hour).

GROUP 12A: Dozer (D-11 or similar or larger); Hydraulic Excavators (over 4 cu. yds.); Lifting cranes (50 tons and over); Pioneering Dozer/Backhoe (initial clearing and excavation for the purpose of providing access for other equipment where the terrain worked involves 1-to-1 slopes that are 50 feet in height or depth, the scope of this work does not include normal clearing and grubbing on usual hilly terrain nor the excavation work once the access is provided); Power Blade Operator (Cat 12 or equivalent or over); Straddle Lifts (over 50 tons); Tower Crane, Mobile; Traveling Truss Cranes; Universal, Liebher, Linden, and similar types of Tower Cranes (in the erection, dismantling, and moving of equipment there shall be an additional Operating Engineer or Heavy Duty Repairman); Yo-Yo Cat or Dozer.

GROUP 13: Truck Driver (Utility, Flatbed, etc.)

GROUP 13A: Dump Truck, 8 cu.yds. and under (water level); Water Truck (up to and including 2,000 gallons).

GROUP 13B: Water Truck (over 2,000 gallons); Tandem Dump Truck, over 8 cu. yds. (water level).

GROUP 13C: Truck Driver (Semi-trailer. Rock Cans, Semi-Dump or Roll-Offs).

GROUP 13D: Truck Driver (Slip-In or Pup).

GROUP 13E: End Dumps, Unlicensed (Euclid, Mack, Caterpillar or similar); Tractor Trailer (Hauling Equipment); Tandem Trucks hooked up to Trailer (Hauling Equipment)

BOOMS AND/OR LEADS (HOURLY PREMIUMS):

The Operator of a crane (under 50 tons) with a boom of 80 feet or more (including jib), or of a crane (under 50 tons) with leads of 100 feet or more, shall receive a per hour premium for each hour worked on said crane (under 50 tons) in accordance with the following schedule:

Booms of 80 feet up to but not including 130 feet or Leads of 100 feet up to but not including 130 feet	0.50
Booms and/or Leads of 130 feet up to but not including 180 feet	0.75
Booms and/or Leads of 180 feet up to and including 250 feet	1.15
Booms and/or Leads over 250 feet	1.50

The Operator of a crane (50 tons and over) with a boom of 180 feet or more (including jib) shall receive a per hour premium for each hour worked on said crane (50 tons and over) in accordance with the following schedule:

Booms of 180 feet up to and including 250 feet	1.25
Booms over 250 feet	1.75

ENGI0003-004 09/04/2017

	Rates	Fringes
Dredging: (Boat Operators)		
Boat Deckhand	$ 41.22	30.93
Boat Operator	$ 43.43	30.93
Master Boat Operator	$ 43.58	30.93
Dredging: (Clamshell or Dipper Dredging)		
GROUP 1	$ 43.94	30.93
GROUP 2	$ 43.28	30.93
GROUP 3	$ 42.88	30.93
GROUP 4	$ 41.22	30.93
Dredging: (Derricks)		
GROUP 1	$ 43.94	30.93
GROUP 2	$ 43.28	30.93
GROUP 3	$ 42.88	30.93
GROUP 4	$ 41.22	30.93
Dredging: (Hydraulic Suction Dredges)		
GROUP 1	$ 43.58	30.93
GROUP 2	$ 43.43	30.93
GROUP 3	$ 43.28	30.93
GROUP 4	$ 43.22	30.93
GROUP 5	$ 37.88	26.76
Group 5	$ 42.88	30.93
GROUP 6	$ 37.77	26.76
Group 6	$ 42.77	30.93
GROUP 7	$ 36.22	26.76
Group 7	$ 41.22	30.93

CLAMSHELL OR DIPPER DREDGING CLASSIFICATIONS

GROUP 1: Clamshell or Dipper Operator.
GROUP 2: Mechanic or Welder; Watch Engineer.
GROUP 3: Barge Mate; Deckmate.
GROUP 4: Bargeman; Deckhand; Fireman; Oiler.

HYDRAULIC SUCTION DREDGING CLASSIFICATIONS

GROUP 1: Leverman.
GROUP 2: Watch Engineer (steam or electric).
GROUP 3: Mechanic or Welder.
GROUP 4: Dozer Operator.
GROUP 5: Deckmate.
GROUP 6: Winchman (Stern Winch on Dredge)
GROUP 7: Deckhand (can operate anchor scow under direction of Deckmate); Fireman; Leveeman; Oiler.

DERRICK CLASSIFICATIONS

GROUP 1: Operators (Derricks, Piledrivers and Cranes).
GROUP 2: Saurman Type Dragline (over 5 cubic yards).
GROUP 3: Deckmate; Saurman Type Dragline (up to and including 5 yards).
GROUP 4: Deckhand, Fireman, Oiler.

ENGI0003-044 09/04/2017

	Rates	Fringes
Power Equipment Operators (PAVING)		
Asphalt Concrete Material Transfer	$ 41.92	30.53
Asphalt Plant Operator	$ 42.35	30.53
Asphalt Raker	$ 40.96	30.53
Asphalt Spreader Operator	$ 42.44	30.53
Cold Planer	$ 42.75	30.53
Combination Loader/Backhoe (over 3/4 cu.yd.)	$ 40.96	30.53
Combination Loader/Backhoe (up to 3/4 cu.yd.)	$ 39.98	30.53
Concrete Saws and/or Grinder (self-propelled unit on streets, highways, airports and canals)	$ 41.92	30.53
Grader	$ 42.75	30.53
Laborer, Hand Roller	$ 40.46	30.53
Loader (2 1/2 cu. yds. and under)	$ 41.92	30.53
Loader (over 2 1/2 cu. yds. to and including 5 cu. yds.)	$ 42.24	30.53
Roller Operator (five tons and under)	$ 40.69	30.53
Roller Operator (over five tons)	$ 42.12	30.53
Screed Person	$ 41.92	30.53
Soil Stabilizer	$ 42.75	30.53

IRON0625-001 09/01/2017

	Rates	Fringes
Ironworkers:	$ 39.00	34.65

a. Employees will be paid $.50 per hour more while working in tunnels and coffer dams; $1.00 per hour more when required to work under or are covered with water (submerged) and when they are required to work on the summit of Mauna Kea, Mauna Loa or Haleakala.

LABO0368-001 09/04/2017

	Rates	Fringes
Laborers:		
Driller	$ 37.40	19.26
Final Clean Up	$ 27.80	15.14
Gunite/Shotcrete Operator and High Scaler	$ 36.90	19.26
Laborer I	$ 36.40	19.26
Laborer II	$ 33.80	19.26
Mason Tender/Hod Carrier	$ 36.90	19.26
Powderman	$ 37.40	19.26
Window Washer (bosun chair)	$ 35.90	19.26

LABORERS CLASSIFICATIONS

Laborer I: Air Blasting run by electric or pneumatic compressor; Asphalt Laborer, Ironer, Raker, Luteman, and Handroller, and all types of Asphalt Spreader Boxes; Asphalt Shoveler; Assembly and Installation of Multiplates, Liner Plates, Rings, Mesh, Mats; Batching Plant (portable and temporary); Boring Machine Operator (under streets and sidewalks); Buggymobile; Burning and Welding; Chainsaw, Faller, Logloader, and Bucker; Compactors (Jackson Jumping Jack and similar); Concrete Bucket Dumpman; Concrete Chipping; Concrete Chuteman/Hoseman (pouring concrete) (the handling of the chute from ready-mix trucks for such jobs as walls, slabs, decks, floors, foundations, footings, curbs, gutters, and sidewalks); Concrete Core Cutter (Walls, Floors, and Ceiling); Concrete Grinding or Sanding; Concrete: Hooking on, signaling, dumping of concrete for treme work over water on caissons, pilings, abutments, etc.; Concrete: Mixing, handling, conveying, pouring, vibrating, otherwise placing of concrete or aggregates or by any other process; Concrete: Operation of motorized wheelbarrows or buggies or machines of similar character, whether run by gas, diesel, or electric power; Concrete Placement Machine Operator: operation of Somero Hammerhead, Copperheads, or similar machines; Concrete Pump Machine (laying, coupling, uncoupling of all connections and cleaning of equipment); Concrete and/or Asphalt Saw (Walking or Handtype) (cutting walls or flatwork) (scoring old or new concrete and/or asphalt) (cutting for expansion joints) (streets and ways for laying of pipe, cable or conduit for all purposes); Concrete Shovelers/Laborers (Wet or Dry); Concrete Screeding for Rough Strike-Off: Rodding or striking-off, by hand or mechanical means prior to finishing; Concrete Vibrator Operator; Coring Holes: Walls, footings, piers or other obstructions for passage of pipes or conduits for any purpose and the pouring of concrete to secure the hole; Cribbers, Shorer, Lagging, Sheeting, and Trench Jacking and Bracing, Hand-Guided Lagging Hammer Whaling Bracing; Curbing (Concrete and Asphalt); Curing of Concrete (impervious membrane and form oiler) mortar and other materials by any mode or method; Cut Granite Curb Setter (setting, leveling and grouting of all precast concrete or stone curbs); Cutting and Burning Torch (demolition); Dri Pak-It Machine; Environmental Abatement: removal of asbestos, lead, and bio hazardous materials (EPA and/or OSHA certified); Falling, bucking, yarding, loading or burning of all trees or timber on construction site; Forklift (9 ft. and under); Gas, Pneumatic, and Electric tools; Grating and Grill work for drains or other purposes; Green Cutter of concrete or aggregate in any form, by hand, mechanical means, grindstone or air and/or water; Grout: Spreading for any purpose; Guinea Chaser (Grade Checker) for general utility trenches, sitework, and excavation; Headerboard Man (Asphalt or Concrete); Heat Welder of Plastic (Laborers' AGC certified workers) (when work involves waterproofing for waterponds, artificial lakes and reservoir) heat welding for sewer pipes and fusion of HDPE pipes; Heavy Highway Laborer (Rigging, signaling, handling, and installation of pre-cast catch basins, manholes, curbs

and gutters); High Pressure Nozzleman - Hydraulic Monitor (over 100# pressure); Jackhammer Operator; Jacking of slip forms: All semi and unskilled work connected therewithin; Laying of all multi-cell conduit or multi-purpose pipe; Magnesite and Mastic Workers (Wet or Dry)(including mixer operator);Mortar Man; Mortar Mixer (Block, Brick, Masonry, and Plastering); Nozzleman (Sandblasting and/or Water Blasting): handling, placing and operation of nozzle; Operation, Manual or Hydraulic jacking of shields and the use of such other mechanical equipment as may be necessary; Pavement Breakers; Paving, curbing and surfacing of streets, ways, courts, under and overpasses, bridges, approaches, slope walls, and all other labor connected therewith; Pilecutters; Pipe Accessment in place, bolting and lining up of sectional metal or other pipe including corrugated pipe; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, HDPE, metallic or non-metallic, conduit, and any other stationary-type of tubular device used for conveying of any substance or element, whether water, sewage, solid, gas, air, or other product whatsoever and without regard to the nature of material from which tubular material is fabricated; No-joint pipe and stripping of same, Pipewrapper, Caulker, Bander, Kettlemen, and men applying asphalt, Laykold, treating Creosote and similar-type materials (6-inch) pipe and over); Piping: resurfacing and paving of all ditches in preparation for laying of all pipes; Pipe laying of lateral sewer pipe from main or side sewer to buildings or structure (except Contactor may direct work be done under proper supervision); Pipe laying, leveling and marking of the joint used for main or side sewers and storm sewers; Laying of all clay, terra cotta, ironstone, vitrified concrete, HDPE or other pipe for drainage; Placing and setting of water mains, gas mains and all pipe including removal of skids; Plaster Mortar Mixer/Pump; Pneumatic Impact Wrench; Portable Sawmill Operation: Choker setters, off bearers, and lumber handlers connected with clearing; Posthole Digger (Hand Held, Gas, Air and Electric); Powderman's Tender; Power Broom Sweepers (Small); Preparation and Compaction of roadbeds for railroad track laying, highway construction, and the preparation of trenches, footings, etc., for cross-country transmission by pipelines, electrical transmission or underground lines or cables (by mechanical means); Raising of structure by manual or hydraulic jacks or other methods and resetting of structure in new locations, including all concrete work; Ramming or compaction; Rigging in connection with Laborers' work (except demolition), Signaling (including the use of walkie talkie) Choke Setting, tag line usage; Tagging and Signaling of building materials into high rise units; Riprap, Stonepaver, and Rock Slinger (includes placement of stacked concrete, wet or dry and loading, unloading, signaling, slinging and setting of other similar materials); Rotary Scarifier (including multiple head concrete chipping Scarifier); Salamander Heater, Drying of plaster, concrete mortar or other aggregate; Scaffold Erector Leadman; Scaffolds: (Swing and hanging) including maintenance thereof; Scaler; Septic

Tank/Cesspool and Drain Fields Digger and Installer; Shredder/Chipper (tree branches, brush, etc.); Stripping and Setting Forms; Stripping of Forms: Other than panel forms which are to be re-used in their original form, and stripping of forms on all flat arch work; Tampers (Barko, Wacker, and similar type); Tank Scaler and Cleaners; Tarman; Tree Climbers and Trimmers; Trencher (includes hand-held, Davis T-66 and similar type); Trucks (flatbed up to and including 2 1/2 tons when used in connection with on-site Laborers'work; Trucks (Refuse and Garbage Disposal) (from job site to dump); Vibra-Screed (Bull Float in connection with Laborers' work); Well Points, Installation of or any other dewatering system.

Laborer II: Asphalt Plant Laborer; Boring Machine Tender; Bridge Laborer; Burning of all debris (crates, boxes, packaging waste materials); Chainman, Rodmen, and Grade Markers; Cleaning, clearing, grading and/or removal for streets, highways, roadways, aprons, runways, sidewalks, parking areas, airports, approaches, and other similar installations; Cleaning or reconditioning of streets, ways, sewers and waterlines, all maintenance work and work of an unskilled and semi-skilled nature; Concrete Bucket Tender (Groundman) hooking and unhooking of bucket; Concrete Forms; moving, cleaning, oiling and carrying to the next point of erection of all forms; Concrete Products Plant Laborers; Conveyor Tender (conveying of building materials); Crushed Stone Yards and Gravel and Sand Pit Laborers and all other similar plants; Demolition, Wrecking and Salvage Laborers: Wrecking and dismantling of buildings and all structures, with use of cutting or wrecking tools, breaking away, cleaning and removal of all fixtures, All hooking, unhooking, signaling of materials for salvage or scrap removed by crane or derrick; Digging under streets, roadways, aprons or other paved surfaces; Driller's Tender; Chuck Tender, Outside Nipper; Dry-packing of concrete (plugging and filling of she-bolt holes); Fence and/or Guardrail Erector: Dismantling and/or re-installation of all fence; Finegrader; Firewatcher; Flagman (Coning, preparing, stablishing and removing portable roadway barricade devices); Signal Men on all construction work defined herein, including Traffic Control Signal Men at construction site; General Excavation; Backfilling, Grading and all other labor connected therewith; Digging of trenches, ditches and manholes and the leveling, grading and other preparation prior to laying pipe or conduit for any purpose; Excavations and foundations for buildings, piers, foundations and holes, and all other construction. Preparation of street ways and bridges; General Laborer: Cleaning and Clearing of all debris and surplus material. Clean-up of right-of-way. Clearing and slashing of brush or trees by hand or mechanical cutting. General Clean up: sweeping, cleaning, wash-down, wiping of construction facility and equipment (other than "Light Clean up (Janitorial) Laborer. Garbage and Debris Handlers and Cleaners. Appliance Handling (job site) (after delivery unlading in storage area); Ground and Soil Treatment Work (Pest Control); Gunite/Shotcrete Operator Tender; Junk Yard Laborers (same as Salvage Yard); Laser Beam "Target Man" in connection with Laborers' work; Layout Person for Plastic

(when work involves waterproofing for waterponds, artificial lakes and reservoirs); Limbers, Brush Loaders, and Pilers; Loading, Unloading, carrying, distributing and handling of all rods and material for use in reinforcing concrete construction (except when a derrick or outrigger operated by other than hand power is used); Loading, unloading, sorting, stockpiling, handling and distribution of water mains, gas mains and all pipes; Loading and unloading of all materials, fixtures, furnishings and appliances from point of delivery to stockpile to point of installation; hooking and signaling from truck, conveyance or stockpile; Material Yard Laborers; Pipelayer Tender; Pipewrapper, Caulker, Bander, Kettlemen, and men applying asphalt, Laykold, Creosote, and similar-type materials (pipe under 6 inches); Plasterer Laborer; Preparation, construction and maintenance of roadbeds and sub-grade for all paving, including excavation, dumping, and spreading of sub-grade material; Prestressed or precast concrete slabs, walls, or sections: all loading, unloading, stockpiling, hooking on of such slabs, walls or sections; Quarry Laborers; Railroad, Streetcar, and Rail Transit Maintenance and Repair; Roustabout; Rubbish Trucks in connection with Building Construction Projects (excluding clearing, grubbing, and excavating); Salvage Yard: All work connected with cutting, cleaning, storing, stockpiling or handling of materials, all cleanup, removal of debris, burning, back-filling and landscaping of the site; Sandblasting Tender (Pot Tender): Hoses and pots or markers; Scaffolds: Erection, planking and removal of all scaffolds used for support for lathers, plasters, brick layers, masons, and other construction trades crafts; Scaffolds: (Specially designed by carpenters) laborers shall tend said carpenter on erection and dismantling thereof, preparation for foundation or mudsills, maintenance; Scraping of floors; Screeds: Handling of all screeds to be reused; handling, dismantling and conveyance of screeds; Setting, leveling and securing or bracing of metal or other road forms and expansion joints; Sheeting Piling/trench shoring (handling and placing of skip sheet or wood plank trench shoring); Ship Scalers; Shipwright Tender; Sign Erector (subdivision traffic, regulatory, and street-name signs); Sloper; Slurry Seal Crews (Mixer Operator, Applicator, Squeegee Man, Shuttle Man, Top Man); Snapping of wall ties and removal of tie rods; Soil Test operations of semi and unskilled labor such as filling sand bags; Striper (Asphalt, Concrete or other Paved Surfaces); Tool Room Attendant (Job Site); Traffic Delineating Device Applicator; Underpinning, lagging, bracing, propping and shoring, loading, signaling, right-of-way clearance along the route of movement, The clearance of new site, excavation of foundation when moving a house or structure from old site to new site; Utilities employees; Water Man; Waterscape/Hardscape Laborers; Wire Mesh Pulling (all concrete pouring operations); Wrecking, stripping, dismantling and handling concrete forms an false work.

LABO0368-002 09/04/2017

	Rates	Fringes

Landscape & Irrigation
Laborers

GROUP 1	$ 24.85	11.97
GROUP 2	$ 25.65	11.97
GROUP 3	$ 20.65	11.97

LABORERS CLASSIFICATIONS

GROUP 1: Installation of non-potable permanent or temporary irrigation water systems performed for the purposes of Landscaping and Irrigation architectural horticultural work; the installation of drinking fountains and permanent or temporary irrigation systems using potable water for Landscaping and Irrigation architectural horticultural purposes only. This work includes (a) the installation of all heads, risers, valves, valve boxes, vacuum breakers (pressure and non-pressure), low voltage electrical lines and, provided such work involves electrical wiring that will carry 24 volts or less, the installation of sensors, master control panels, display boards, junction boxes, conductors, including all other components for controllers, (b) and metallic (copper, brass, galvanized, or similar) pipe, as well as PVC or other plastic pipe including all work incidental thereto, i.e., unloading, handling and distribution of all pipes fittings, tools, materials and equipment, (c) all soldering work in connection with the above whether done by torch, soldering iron, or other means; (d) tie-in to main lines, thrust blocks (both precast and poured in place), pipe hangers and supports incidental to installation of the entire irrigation system, (e) making of pressure tests, start-up testing, flushing, purging, water balancing, placing into operation all irrigation equipment, fixtures and appurtenances installed under this agreement, and (f) the fabrication, replacement, repair and servicing oflandscaping and irrigation systems. Operation of hand-held gas, air, electric, or self-powered tools and equipment used in the performance of Landscape and Irrigation work in connection with architectural horticulture; Choke-setting, signaling, and rigging for equipment operators on job-site in the performance of such Landscaping and Irrigation work; Concrete work (wet or dry) performed in connection with such Landscaping and Irrigation work. This work shall also include the setting of rock, stone, or riprap in connection with such Landscape, Waterscape, Rockscape, and Irrigation work; Grubbing, pick and shovel excavation, and hand rolling or tamping in connection with the performance of such Landscaping and Irrigation work; Sprigging, handseeding, and planting of trees, shrubs, ground covers, and other plantings and the performance of all types of gardening and horticultural work relating to said planting; Operation of flat bed trucks (up to and including 2 1/2 tons).:

GROUP 2. Layout of irrigation and other non-potable irrigation water systems and the layout of drinking fountains and other potable irrigation water systems in connection with such Landscaping and Irrigation work. This includes the layout of all heads, risers, valves, valve boxes, vacuum breakers, low voltage electrical lines,

hydraulic and electrical controllers, and metallic (coppers, brass, galvanized, or similar) pipe, as well as PVC or other plastic pipe. This work also includes the reading and interpretation of plans and specifications in connection with the layout of Landscaping, Rockscape, Waterscape, and Irrigation work; Operation of Hydro-Mulching machines (sprayman and driver), Drillers, Trenchers (riding type, Davis T-66, and similar) and fork lifts used in connection with the performance of such Landscaping and Irrigation work; Tree climbers and chain saw tree trimmers, Sporadic operation (when used in connection with Landscaping, Rockscape, Waterscape, and Irrigation work) of Skid-Steer Loaders (Bobcat and similar), Cranes (Bantam, Grove, and similar), Hoptos, Backhoes, Loaders, Rollers, and Dozers (Case, John Deere, and similar), Water Trucks, Trucks requiring a State of Hawaii Public Utilities Commission Type 5 and/or type 7 license, sit-down type and "gang" mowers, and other self-propelled, sit-down operated machines not listed under Landscape & Irrigation Maintenance Laborer; Chemical spraying using self-propelled power spraying equipment (200 gallon capacity or more).

GROUP 3: Maintenance of trees, shrubs, ground covers, lawns and other planted areas, including the replanting of trees, shrubs, ground covers, and other plantings that did not "take" or which are damaged; provided, however, that re-planting that requires the use of equipment, machinery, or power tools shall be paid for at the rate of pay specified under Landscape and Irrigation Laborer, Group 1; Raking, mowing, trimming, and runing, including the use of "weed eaters", hedge trimmers, vacuums, blowers, and other hand-held gas, air, electric, or self-powered tools, and the operation of lawn mowers (Note: The operation of sit-down type and "gang" mowers shall be paid for at the rate of pay specified under Landscape & Irrigation Laborer, Group 2); Guywiring, staking, propping, and supporting trees; Fertilizing, Chemical spraying using spray equipment with less than 200 gallon capacity, Maintaining irrigation and sprinkler systems, including the staking, clamping, and adjustment of risers, and the adjustment and/or replacement of sprinkler heads, (Note: the cleaning and gluing of pipe and fittings shall be paid for at the rate of pay specified under Landscape & Irrigation Laborer(Group 1); Watering by hand or sprinkler system and the peformance of other types of gardening, yardman, and horticultural-related work.

LABO0368-003 09/04/2017

	Rates	Fringes
Underground Laborer		
GROUP 1	$ 37.00	19.26
GROUP 2	$ 38.50	19.26
GROUP 3	$ 39.00	19.26
GROUP 4	$ 40.00	19.26
GROUP 5	$ 40.35	19.26
GROUP 6	$ 40.60	19.26
GROUP 7	$ 41.05	19.26

GROUP 1: Watchmen; Change House Attendant.

GROUP 2: Swamper; Brakeman; Bull Gang-Muckers, Trackmen; Dumpmen (any method); Concrete Crew (includes rodding and spreading); Grout Crew; Reboundmen

GROUP 3: Chucktenders and Cabletenders; Powderman (Prime House); Vibratorman, Pavement Breakers

GROUP 4: Miners - Tunnel (including top and bottom man on shaft and raise work); Timberman, Retimberman (wood or steel or substitute materials thereof); Blasters, Drillers, Powderman (in heading); Microtunnel Laborer; Headman; Cherry Pickerman (where car is lifted); Nipper; Grout Gunmen; Grout Pumpman & Potman; Gunite, Shotcrete Gunmen & Potmen; Concrete Finisher (in tunnel); Concrete Screed Man; Bit Grinder; Steel Form Raisers & Setters; High Pressure Nozzleman; Nozzleman (on slick line); Sandblaster-Potman (combination work assignment interchangeable); Tugger

GROUP 5: Shaft Work & Raise (below actual or excavated ground level); Diamond Driller; Gunite or Shotcrete Nozzleman; Rodman; Groundman

GROUP 6: Shifter

GROUP 7: Shifter (Shaft Work & Raiser)

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* PAIN1791-001 07/01/2018

	Rates	Fringes
Painters:		
Brush	$ 37.35	27.85
Sandblaster; Spray	$ 37.35	27.85

PAIN1889-001 07/01/2018

	Rates	Fringes
Glaziers	$ 38.00	31.78

PAIN1926-001 02/26/2017

	Rates	Fringes
Soft Floor Layers	$ 33.00	27.73

PAIN1944-001 01/01/2018

	Rates	Fringes
Taper	$ 42.10	24.25

PLAS0630-001 09/04/2017

	Rates	Fringes

PLASTERER.....$ 40.54 28.23

PLAS0630-002 09/04/2017

	Rates	Fringes
Cement Masons:		
Cement Masons.....	$ 39.70	29.38
Trowel Machine Operators....	$ 39.85	29.38

PLUM0675-001 01/07/2018

	Rates	Fringes
Plumber, Pipefitter, Steamfitter & Sprinkler Fitter...	$ 44.89	25.77

ROOF0221-001 11/05/2017

	Rates	Fringes
Roofers (Including Built Up, Composition and Single Ply).....	$ 39.85	17.66

SHEE0293-001 09/03/2017

	Rates	Fringes
Sheet metal worker.....	$ 41.80	26.53

SUHI1997-002 09/15/1997

	Rates	Fringes
Drapery Installer.....	$ 13.60	1.20
FENCE ERECTOR (Chain Link Fence).....	$ 9.33	1.65

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information

on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

APPRENTICE SCHEDULE BULLETIN NO. 491 February 19, 2018

Rates are applicable only to apprentices who are parties to agreements registered with the Department of Labor and where the journeyworker to apprentice ratio is met.

Apprentice Classifications	Interval Hrs	BASIC HOURLY RATE 1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	FRINGE BENEFIT HOURLY RATE Total	Remarks See Pg 10-11
* BOILERMAKER	1000	$25.50	$27.32	$29.14	$30.96	$32.78	$34.60					$29.45	10
CARPENTER													
Indentured Prior to 9/1/02	1000	$18.98										$12.52	1,10
"	1000		$21.35	$23.73	$28.47	$33.22	$37.96	$42.71	$45.08			$21.66	1,10
Indentured After 9/1/02	1000	$18.98										$8.52	1,10
"	1000		$21.35									$12.96	1,10
"	1000			$23.73	$28.47							$15.46	1,10
"	1000					$33.22	$37.96					$17.46	1,10
"	1000							$42.71	$45.08			$19.46	1,10
(Effective 9/3/18)													
* CARPENTER													
Indentured Prior to 9/1/02	1000	$19.78										$12.77	1,10
"	1000		$22.25	$24.73	$29.67	$34.62	$39.56	$44.51	$46.98			$21.91	1,10
Indentured After 9/1/02	1000	$19.78										$8.77	1,10
"	1000		$22.25									$13.21	1,10
"	1000			$24.73	$29.67							$15.71	1,10
"	1000					$34.62	$39.56					$17.71	1,10
"	1000							$44.51	$46.98			$19.71	1,10
CEMENT FINISHER													
Indentured Prior to 9/1/03	1000	$19.55										$9.37	2,10
"	1000		$21.51	$23.46	$27.37	$29.33	$31.28	$33.24	$35.19			$28.48	2,10
Indentured On or After 9/1/03	1000	$19.55	$21.51	$23.46	$27.37	$29.33	$31.28	$33.24	$35.19			**$15.08**	2,10
(Effective 9/3/18)													
* CEMENT FINISHER													
Indentured Prior to 9/1/03	1000	$19.90										$9.77	2,10
"	1000		$21.89	$23.88	$27.86	$29.85	$31.84	$33.83	$35.82			$29.33	2,10
Indentured On or After 9/1/03	1000	$19.90	$21.89	$23.88	$27.86	$29.85	$31.84	$33.83	$35.82			$15.93	2,10
CONSTRUCTION EQUIPMENT OPERATOR													
Indentured On or After 9/1/02	1000	$21.61										$8.00	3,10
"	1000		$23.77									$18.65	3,10
"	1000			$25.93								$19.62	3,10
"	1000				$30.25							$21.56	3,10
"	1000					$34.58						$23.49	3,10
"	1000						$38.90					$25.43	3,10

APPRENTICE SCHEDULE BULLETIN NO. 491 February 19, 2018

Rates are applicable only to apprentices who are parties to agreements registered with the Department of Labor and where the journeyworker to apprentice ratio is met.

Apprentice Classifications	Interval Hrs	BASIC HOURLY RATE 1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	FRINGE BENEFIT HOURLY RATE Total	Remarks See Pg 10-11
DRYWALL INSTALLER													
Indentured Prior to 9/1/02	1000	$19.08										$12.52	10
"	1000		$21.47	$23.85	$28.62	$33.39	$38.16	$42.93	$45.32			$21.66	10
Indentured After 9/1/02	1000	$19.08										$8.52	10
"	1000		$21.47									$12.96	10
"	1000			$23.85	$28.62							$15.46	10
"	1000					$33.39	$38.16					$17.46	10
"	1000							$42.93	$45.32			$19.46	10
(Effective 9/3/18)													
* DRYWALL INSTALLER													
Indentured Prior to 9/1/02	1000	$19.88										$12.77	10
"	1000		$22.37	$24.85	$29.82	$34.79	$39.76	$44.73	$47.22			$21.91	10
Indentured After 9/1/02	1000	$19.88										$8.77	10
"	1000		$22.37									$13.21	10
"	1000			$24.85	$29.82							$15.71	10
"	1000					$34.79	$39.76					$17.71	10
"	1000							$44.73	$47.22			$19.71	10
* DRYWALL TAPERS/FINISHERS	1000	$16.84	$18.94	$21.05	$23.15	$25.26						$9.90	
	1000						$27.36					$10.40	
	1000							$31.57	$35.78			$13.90	
ELECTRICIAN (WIRE & LINE INSTALLER)	1000	$17.08										$9.57	10
" "	1000		$19.52									$9.91	10
" "	1000			$21.96								$16.36	4,10
" "	1000				$24.40							$17.37	4,10
" "	1000					$26.84						$18.39	4,10
" "	1000						$29.28					$19.39	4,10
" "	1000							$31.72				$20.39	4,10
" "	1000								$34.16			$21.40	4,10
" "	1000									$39.04		$23.43	4,10
" "	1000										$43.92	$25.46	4,10

ELECTRICIAN: Continued on Next Page

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Rates are applicable only to apprentices who are parties to agreements registered with the Department of Labor and where the journeyworker to apprentice ratio is met.

Apprentice Classifications	Interval Hrs	BASIC HOURLY RATE 1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	FRINGE BENEFIT HOURLY RATE Total	Remarks See Pg 10-11
(Effective 8/26/18)													
* ELECTRICIAN (WIRE & LINE INSTALLER)	1000	$17.43										$9.62	10
" "	1000		$19.92									$9.96	10
" "	1000			$22.41								$16.53	4,10
" "	1000				$24.90							$17.55	4,10
" "	1000					$27.39						$18.58	4,10
" "	1000						$29.88					$19.62	4,10
" "	1000							$32.37				$20.64	4,10
" "	1000								$34.86			$21.68	4,10
" "	1000									$39.84		$23.73	4,10
" "	1000										$44.82	$25.78	4,10
* ELEVATOR CONSTRUCTOR	850	$28.68										-	10
"	850		$31.55									$32.645	10
"	1700			$37.28	$40.15	$45.89						$32.645	10
FLOOR LAYER													
Indentured After 2/27/94	1000	$14.85	$16.50									$18.48	10
" "	1000			$18.15	$19.80							$23.48	10
" "	1000					$21.45	$23.10	$26.40	$29.70			$27.73	10
(Effective 3/4/18)													
FLOOR LAYER													
Indentured after 2/27/94	1000	$15.37	$17.08									$19.32	10
" "	1000			$18.78	$20.49							$24.32	10
" "	1000					$22.20	$23.91	$27.32	$30.74			$29.32	10
GLAZIER													
Indentured On or After 7/1/99	1000	$16.55										$27.90	5,10
"	1000		$18.39									$28.14	5,10
"	1000			$20.23								$28.38	5,10
"	1000				$22.07							$28.62	5,10
"	1000					$25.75						$29.10	5,10
"	1000						$27.59					$29.34	5,10
"	1000							$29.42				$29.58	5,10
"	1000								$31.26			$29.82	5,10
"	1000									$33.10		$30.06	5,10
"	1000										$34.94	$30.30	5,10

APPRENTICE SCHEDULE BULLETIN NO. 491 February 19, 2018

Rates are applicable only to apprentices who are parties to agreements registered with the Department of Labor and where the journeyworker to apprentice ratio is met.

Apprentice Classifications	Interval Hrs	BASIC HOURLY RATE 1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	FRINGE BENEFIT HOURLY RATE Total	Remarks See Pg 10-11
HEAVY DUTY REPAIRER & WELDER													
Indentured on or after 9/1/02	1000	$21.61										$8.00	3,10
"	1000		$23.77									$18.65	3,10
"	1000			$25.93								$19.62	3,10
"	1000				$30.25							$21.56	3,10
"	1000					$34.58						$23.49	3,10
"	1000						$36.74					$24.47	3,10
"	1000							$38.90				$25.43	3,10
"	1000								$41.06			$26.41	3,10
INSULATOR													
Indentured After 5/3/95	2000	$19.95										$7.80	6,10
"	2000		$19.95									$18.01	6,10
"	2000			$23.94								$18.35	6,10
"	2000				$27.93							$18.70	6,10
"	2000					$31.92						$19.04	6,10
(Effective 9/2/18)													
* INSULATOR													
Indentured After 5/3/95	2000	$20.20										$7.80	6,10
"	2000		$20.20									$18.21	6,10
"	2000			$24.24								$18.55	6,10
"	2000				$28.28							$18.90	6,10
"	2000					$32.32						$19.24	6,10
IRONWORKER (REINFORCING & STRUCTURAL)													
Indentured After 10/31/93	1000	$19.50										$26.42	7,10
"	1000		$21.45									$26.99	7,10
"	1000			$23.40								$27.56	7,10
"	1000				$27.30							$28.71	7,10
"	1000					$31.20						$29.85	7,10
"	1000						$35.10					$31.01	7,10
(Effective 9/1/18)													
* IRONWORKER (REINFORCING & STRUCTURAL)													
Indentured After 10/31/93	1000	$20.13										$27.37	7,10
"	1000		$22.14									$27.96	7,10
"	1000			$24.15								$28.55	7,10
"	1000				$28.18							$29.73	7,10
"	1000					$32.20						$30.92	7,10
"	1000						$36.23					$32.11	7,10

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Apprentice Classifications	Interval Hrs	BASIC HOURLY RATE 1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	FRINGE BENEFIT HOURLY RATE Total	Remarks See Pg 10-11
* LABORER I													
(Effective 9/4/17)													
* CONSTRUCTION CRAFT													
Indentured On or After 9/3/02	1000	$18.20										$7.55	1,10
"	1000		$21.84	$25.48	$29.12							$14.20	1,10
(Effective 9/3/18)													
* CONSTRUCTION CRAFT													
Indentured On or After 9/3/02	1000	$18.70										$8.10	1,10
"	1000		$22.44	$26.18	$29.92							$14.90	1,10
(Effective 2/19/18)													
* HAZARDOUS WASTE MATERIAL TECHNICIAN													
"	1000	$18.20										$6.15	1,10
"	1000		$21.84	$25.48	$29.12							$12.30	1,10
(Effective 9/3/18)													
* HAZARDOUS WASTE MATERIAL TECHNICIAN													
"	1000	$18.70										$6.70	1,10
"	1000		$22.44	$26.18	$29.92							$13.00	1,10
LANDSCAPER	1000	$16.15										$6.15	
"	1000		$17.40	$18.64	$19.88							$9.82	
(Effective 9/3/18)													
* LANDSCAPER	1000	$16.58										$6.70	
"	1000		$17.85	$19.13	$20.40							$10.43	
MASON													
BRICKLAYER													
Indentured prior to 9/1/03	1000	$19.88										$9.12	2,10
	1000		$21.87	$23.86	$27.83	$29.82	$31.81	$33.80	$35.78			$28.47	2,10
Indentured On or After 9/1/03	1000	$19.88	$21.87	$23.86	$27.83	$29.82	$31.81	$33.80	$35.78			$15.87	2,10
STONE MASON													
Indentured On or After 9/1/03	1000	$21.87	$23.86	$25.84	$27.83	$29.82	$31.81	$33.80	$35.78			$15.87	2,10
POINTER-CAULKER-WEATHERPROOFER													
Indentured On or After 9/1/03	1000	$20.01	$22.01	$24.01	$28.01	$32.01	$36.01					$15.87	2,10

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Apprentice Classifications	Interval Hrs	BASIC HOURLY RATE 1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	FRINGE BENEFIT HOURLY RATE Total	Remarks See Pg 10-11
PAINTER	1000	$16.81										$9.25	
"	1000		$18.68	$20.54	$22.41	$24.28						$12.75	
"	1000						$26.15					$13.75	
"	1000							$28.01	$31.75			$14.50	
(Effective 7/1/18)													
* PAINTER	1000	$17.03										$9.25	
"	1000		$18.93	$20.82	$22.71	$24.60						$12.75	
"	1000						$26.50					$13.75	
"	1000							$28.39	$32.17			$14.50	
PAVING EQUIPMENT OPERATOR	1000	$23.06										$8.00	10
"	1000		$29.34									$19.10	10
"	1000			$33.54								$22.14	10
"	1000				$37.73							$26.17	10
PLASTERER													
Indentured On or After 9/1/03	1000	$16.22	$18.24	$20.27	$22.30	$24.32	$28.38	$32.43	$36.49			$15.08	2,10
(Effective 9/3/18)													
* PLASTERER													
Indentured On or After 9/1/03	1000	$16.54	$18.60	$20.67	$22.74	$24.80	$28.94	$33.07	$37.21			$15.93	2,10
PLUMBER:													
PLUMBER; FIRE SPRINKLER FITTER; REFRIGERATION AIR CONDITIONING; STEAMFITTER-WELDER													
Indentured On or After 9/2/85	1000	$17.02										$6.94	8,10
"	1000		$17.02									$6.99	8,10
"	1000			$20.12								**$9.37**	8,10
"	1000				$20.12							**$9.37**	8,10
"	1000					$23.29						**$10.09**	8,10
"	1000						$23.29					**$10.09**	8,10
"	1000							$27.53				**$10.97**	8,10
"	1000								$27.53			**$10.97**	8,10
"	1000									$31.76		**$11.62**	8,10
"	1000										$31.76	**$11.62**	8,10

PLUMBER: **Continued on Next Page**

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Apprentice Classifications	Interval Hrs	BASIC HOURLY RATE 1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	FRINGE BENEFIT HOURLY RATE Total	Remarks See Pg 10-11
(Effective 7/1/18)													
* PLUMBER:													
PLUMBER; FIRE SPRINKLER FITTER; REFRIGERATION AIR CONDITIONING; STEAMFITTER-WELDER													
Indentured On or After 9/2/85	1000	$17.23										$6.94	8,10
"	1000		$17.23									$6.99	8,10
"	1000			$20.35								**$9.97**	8,10
"	1000				$20.35							**$9.97**	8,10
"	1000					$23.57						**$10.70**	8,10
"	1000						$23.57					**$10.70**	8,10
"	1000							$27.85				**$11.61**	8,10
"	1000								$27.85			**$11.61**	8,10
"	1000									$32.14		**$12.27**	8,10
"	1000										$32.14	**$12.27**	8,10
* ROOFER													
Indentured Prior to 11/1/98	1000	$17.93	$19.93	$23.91								$13.38	9
"	1000				$27.90	$31.88	$35.87	$37.86				$17.63	
Indentured On or After 11/1/98 and Prior to 11/4/12	1000	$17.93	$19.93	$23.91								$13.38	9
"	1000				$27.90	$31.88	$33.87	$35.87	$37.86			$17.63	
Indentured On or After 11/4/12	2000	$17.93	$23.91									$13.38	9
"	2000			$31.88	$35.87							$17.63	9
(Effective 9/2/18)													
* ROOFER													
Indentured Prior to 11/1/98	1000	$18.23	$20.25	$24.30								$13.85	9
"	1000				$28.35	$32.40	$36.45	$38.48				$18.10	
Indentured On or After 11/1/98 and Prior to 11/4/12	1000	$18.23	$20.25	$24.30								$13.85	9
"	1000				$28.35	$32.40	$34.43	$36.45	$38.48			$18.10	
Indentured On or After 11/4/12	2000	$18.23	$24.30									$13.85	9
"	2000			$32.40	$36.45							$18.10	9

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Apprentice Classifications	Interval Hrs	BASIC HOURLY RATE 1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	FRINGE BENEFIT HOURLY RATE Total	Remarks See Pg 10-11
SHEETMETAL WORKER	1000	$16.72										$11.93	10
"	1000		$18.81									$12.12	10
"	1000			$20.90								$21.32	10
"	1000				$22.99							$21.83	10
"	1000					$25.08						$22.35	10
"	1000						$27.17					$22.88	10
"	1000							$29.26				$23.40	10
"	1000								$31.35			$23.93	10
"	1000									$33.44		$24.44	10
"	1000										$35.53	$24.96	10
(Effective 3/4/18)													
SHEETMETAL WORKER	1000	$16.88										$12.07	10
"	1000		$18.99									$12.27	10
"	1000			$21.10								$21.74	10
"	1000				$23.21							$22.27	10
"	1000					$25.32						$22.80	10
"	1000						$27.43					$23.33	10
"	1000							$29.54				$23.86	10
"	1000								$31.65			$24.39	10
"	1000									$33.76		$24.92	10
"	1000										$35.87	$25.44	10
(Effective 9/2/18)													
* SHEETMETAL WORKER													
"	1000	$17.02										$12.20	10
"	1000		$19.15									$12.40	10
"	1000			$21.28								$22.09	10
"	1000				$23.40							$22.63	10
"	1000					$25.53						$23.15	10
"	1000						$27.66					$23.69	10
"	1000							$29.79				$24.23	10
"	1000								$31.91			$24.77	10
"	1000									$34.04		$25.30	10
"	1000										$36.17	$25.83	10

Rates are applicable only to apprentices who are parties to agreements registered with the Department of Labor and where the journeyworker to apprentice ratio is met.

Apprentice Classifications	Interval Hrs	BASIC HOURLY RATE 1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	FRINGE BENEFIT HOURLY RATE Total	Remarks See Pg 10-11
TELECOMMUNICATION WORKER	1000	$17.06										$10.00	10
(TECHNICIAN I / SPLICER)	1000		$18.49									$10.24	10
" "	1000			$19.91								$10.49	10
" "	1000				$21.33							$10.72	10
" "	1000					$22.75						$10.97	10
" "	1000						$25.60					$11.44	10
TILE SETTER													
CERAMIC & HARD TILE													
Indentured Prior to 9/1/03	1000	$20.48										$9.17	2,10
"	1000		$22.52	$24.57	$28.67	$30.71	$32.76	$34.81	$36.86			$27.97	2,10
Indentured On or After 9/1/03	1000	$20.48	$22.52	$24.57	$28.67	$30.71	$32.76	$34.81	$36.86			$15.42	2,10
(Effective 9/3/18)													
* TILE SETTER													
CERAMIC & HARD TILE													
Indentured Prior to 9/1/03	1000	$20.85										$9.57	2,10
"	1000		$22.94	$25.02	$29.19	$31.28	$33.36	$35.45	$37.53			$28.82	2,10
Indentured On or After 9/1/03	1000	$20.85	$22.94	$25.02	$29.19	$31.28	$33.36	$35.45	$37.53			$16.27	2,10

*** Indicates a wage, fringe benefit, remark, or title change from the previous bulletin.**

STATE OF HAWAII
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

List of Construction Trades in Registered Apprenticeship Programs

Apprenticeship programs for the following construction trades were approved and registered by the State Department of Labor and Industrial Relations in accordance with Chapter 372, Hawaii Revised Statutes, and Title 12, Chapter 30, Hawaii Administrative Rules. Union and non-union programs are listed separately. The minimum requirements are not exclusive as a program sponsor may add other requirements in their selection procedures.

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
Boilermaker	**Western States Area Joint Apprenticeship Committee** **(International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmith, Forgers, and Helpers and Subordinate, Lodge No. 627, AFL-CIO, and the Western States Joint Apprenticeship Committee, and Association of Boilermaker Employers)**	**x**		**03/18/1991**	**6,000**	• **At least 18 years old** • **High school graduate or GED equivalent**	Coordinator Address: PO Box 1612 Page, Arizona 86040 Phone: (928)645-0277 Website: **http://www/westermstatesjac/org/** *No training staff currently based in Hawaii
Bricklayer-Mason	**Joint Apprenticeship Committee for Bricklayer-Mason** **(Masonry Contractors Association of Hawaii and Other Signatory Employers and Local 1 of Hawaii of the Bricklayers and Allied Craftsmen International Union, AFL-CIO)**	**x**		**02/10/1964**	**8,000**	• **At least 16 years old** • **High school graduate or GED equivalent** • **Physically able to perform duties of the trade**	Director of Training or Training Coordinator Address: Hawaii Masons & Plasterers Training 1188 Sand Island Parkway Honolulu, HI 96819 Phone: (808) 848-0565 Fax: (808) 847-7068 Website: http://www.bacweb.org

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
Carpenter	**Carpenters Joint Apprenticeship Committee *aka* Hawaii Carpenters Apprenticeship and Training Program** **(General Contractors Association of Hawaii and Building Industry Labor Association and Other Signatory Contractors and the United Brotherhood of Carpenters and Joiners of America, Local 745 AFL-CIO)**	**x**		**04/01/1964**	**8,000**	• **At least 17 years old** • **High school diploma or equivalent education, or equivalent work experience** • **Pass basic math test** • **Complete questionnaire** • **Able to lift 75 lbs.**	Director of Training Address: 1311 Houghtailing Street Room 201 Honolulu, HI 96817 Phone: (808) 848-0794 Ext. 5 Fax: (808) 841-5961 (808) 841-0300 Website: http://www.carpenters.org/
Carpenter	**Associated Builders and Contractors Apprenticeship Committee**		**x**	**02/08/1990**	**8,000**	• **At least 18 years old** • **High school diploma or GED** • **Full-time employee of a member company for a period of not less than six continuous weeks** • **Legally able to work** • **Physically able to perform duties of the trade**	Director of Training Address: 1375 Dillingham Blvd. Suite 200 Honolulu, HI 96817 Phone: (808) 845-4887 Fax: (808) 847-7876 Website: http://www.abchawaii.org/
Cement Finisher	**Joint Apprenticeship Committee for Cement Finishers** **(Operative Plasterers and Cement Finishers International Association, Local 630, AFL-CIO, and Local 1 of the International Union of Bricklayers and Allied Craftsmen, AFL-CIO)**	**x**		**04/01/1961**	**8,000**	• **At least 16 years old** • **Physically able to perform duties of the trade**	Director of Training or Training Coordinator Address: Hawaii Masons & Plasterers Training 1188 Sand Island Parkway Honolulu, HI 96819 Phone: (808) 848-0565 Fax: (808) 847-7068 Website: http://www.opcmia.org/ http://www.bacweb.org

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
Construction Craft Laborer	**Hawaii Laborers' Joint Apprenticeship Committee** **(International Union of North America, Local 368, and Signatory Contractors Association)**	**x**		**02/11/2000**	**4,000**	• **At least 18 years old** • **High school diploma or GED** • **Driver's license** • **Successfully complete Pre-Construction Apprentice Evaluation Course**	Director of Training Address: 96-138 Farrington Hwy. Pearl City, HI 96782 Phone: (808) 455-7979 Fax: (808) 456-8689 Website: http://www.liuna.org/
Construction Equipment Operator	**Hawaii Joint Apprenticeship Committee for Operating Engineers** **(General Contractors Labor Association and the Building Industry Labor Association and International Union of Operating Engineers, Local Union #3, AFL-CIO)**	**x**		**11/14/1967**	**6,000**	• **At least 18 years old** • **High school diploma or GED or C-based test** • **Physically able to perform duties of the trade** • **School transcripts** • **Driver's license** • **Current State DOT PUC physical** • **Pass industry or general knowledge test** • **Have reliable transportation**	State Administrator Address: P.O. Box 428 Kahuku, HI 96731-0428 Phone: (808) 232-2001 Fax: (808) 232-2217 Website: http://oe3.org/training/
Drywall, Acoustic and Lather Installer	**Carpenters Joint Apprenticeship Committee *aka* Hawaii Carpenters Apprenticeship and Training Program** **(General Contractors Association of Hawaii and Building Industry Labor Association and Other Signatory Contractors and the United Brotherhood of Carpenters and Joiners of America, Local 745, AFL-CIO)**	**x**		**04/06/1988**	**8,000**	• **At least 17 years old** • **High school diploma or GED** • **Complete questionnaire** • **Pass basic math test** • **Able to lift 100 lbs.**	Director of Training Address: 1311 Houghtailing Street Room 201 Honolulu, HI 96817 Phone: (808) 848-0794 Ext. 5 Fax: (808) 848-5961 (808) 841-0300 Website: http://www.carpenters.org/

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
Electrical Wireperson	**PECA-HEW Joint Apprenticeship Committee** **(Pacific Electrical Contractors Association and the Hawaii Electrical Workers Division of Laborers International, Local 368)**	**x**		**11/20/1991**	**10,000**	• **At least 18 years old** • **High school diploma or GED** • **Pass color code test** • **Pass aptitude test** • **Transcript of high school or post high school courses** • **Pass one-year high school Algebra 1 (not pre-Algebra) or higher** • **Valid driver's license**	Training Coordinator Address: 1617 Palama Street Honolulu, HI 96817 Phone: (808) 841-5877 Ext 234 Fax: (808) 847-7829 Website: N/A
Electrician	**Associated Builders and Contractors Apprenticeship Committee**		**x**	**02/08/1990**	**10,000**	• **At least 18 years old** • **High school diploma or GED** • **Full-time employee of a member company for a period of not less than six continuous weeks** • **Legally able to work** • **Physically able to perform duties of the trade** • **Pass eye examination for color blindness** • **Completed one-year high school algebra (not pre-algebra)**	Director of Training Address: 1375 Dillingham Blvd. Suite 200 Honolulu, HI 96817 Phone: (808) 845-4887 Fax: (808) 847-7876 Website: http://www.abchawaii.org/
(Electrician) Wireperson	**Hawaii Electricians Joint Apprenticeship Committee** **(International Brotherhood of Electrical Workers (IBEW) Local 1186, AFL-CIO, and Signatory Employers)**	**x**		**04/08/1947**	**10,000**	• **At least 18 years old** • **High school diploma or GED** • **Complete the National Joint Apprenticeship and Training Committee Math Course or one-year high school Algebra 1** • **Transcript of high school or post high school**	Apprenticeship or Training Coordinator Address: 1935 Hau Street Room 301 Honolulu, HI 96819 Phone: (808) 847-0629 Fax: (808) 843-8818 Website: http://www.njatc.org/

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
						courses • Pass industry aptitude test to qualify for oral interview • Application fee (non-refundable)	
Elevator Constructor	International Union of Elevator Constructors Local 126 Joint Apprenticeship Committee (International Union of Elevator Constructors, Local 126 and Signatory Employers)	x		03/27/2003	6,800	• At least 18 years old • High school diploma or GED • School transcripts • Pass aptitude test (math, reading) • Pass medical exam • Physically able to perform duties of the trade	Business Representative Address: 707 Alakea Street Room 314 Honolulu, HI 96813 Phone: (808) 536-8653 Fax: (808) 537-3779 Website: http://iuec.org/
Fire Sprinkler Fitter	Honolulu Joint Apprenticeship and Training Committee for the Plumbing and Pipefitting Industry *aka* JATC of UA Plumbers and Fitters, Local 675, AFL-CIO, and PAMCAH (Plumbing and Mechanical Contractors Association of Hawaii and United Association of Plumbers and Pipefitters Local 675, AFL-CIO)	x		10/19/1992	10,000	• At least 17 years old • High school diploma or GED • School transcripts • Pass placement evaluation with minimum score of 70% • Driver's license	Training Coordinator Address: 720 Iwilei Road, Suite 222 Honolulu, HI 96817 Phone: (808) 456-0585 Fax: (808) 456-7131 Website: http://www.ua.org/
Floor Layer	Joint Apprenticeship and Training Committee for Floor Layers (Hawaii Floor Covering Association and Carpet, Linoleum, and Soft Tile Union Local 1926, AFL-CIO)	x		02/17/1966	8,000	• At least 18 years old • Driver's license • Distinguish colors • High school diploma or equivalent • Physically able to perform duties	Training Coordinator Address: 2240 Young Street Honolulu, HI 96826 Phone: (808) 942-3988 Fax: (808) 946-6667 Website: http://www.iupat.org/
Glazier	Joint Apprenticeship Committee for Glaziers, Architectural Metal and Glassworkers Industry *aka* Glaziers, Architectural Metal and Glassworkers JATC (Glass/Metal Contractors Association of Hawaii and	x		04/01/2001	10,000	• At least 18 years old • High school diploma or GED • Driver's license • Physically able to perform duties of the trade	Training Coordinator Address: 2240 Young Street Honolulu, HI 96826 Phone: (808) 942-3988 Fax: (808) 946-6667 Website: http://www.iupat.org/

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
	Other Signatory Contractors and the Glaziers, Architectural Metal and Glassworkers Union Local 1889, AFL-CIO)						
Hazardous Waste Material Technician	Hawaii Laborers; Union Local 368	x		9/19/2017	4000	• At least 18 years old • High School Diploma or GED • Possess a Valid Driver's License • Pass a Pre-Evaluation course • Physical abilities to perform duties of the trade	96-138 Farrington Highway Pearl City, Hawaii 96782 Phone (808) 455-7979
Heat and Frost Insulator	Honolulu Joint Apprenticeship Committee for the Heat and Frost Asbestos Insulator Trade (Heat and Frost Insulators and Asbestos Workers, Local 132, and Signatory Participating Employers)	x		07/23/1971	10,000	• At least 18 years old • High school diploma or GED • Physically able to perform duties of the trade	Training Coordinator Address: 1019 Lauia Street Bay #4 Kapolei, HI 96707 Phone: (808) 521-6405 Fax: (808) 523-9861 Website: http://www.insulators.org/
Heavy Duty Repairman and Welder	Hawaii Joint Apprenticeship Committee for Operating Engineers (General Contractors Labor Association and the Building Industry Labor Association and International Union of Operating Engineers, Local Union #3, AFL-CIO)	x		11/14/1967	8,000	• At least 18 years old • High school diploma or GED or C-based test • Physically able to perform duties of the trade • School transcripts • Driver's license • Current State DOT PUC physical • Ranked on general knowledge and hands on test • Have reliable transportation	State Administrator Address: P.O. Box 428 Kahuku, HI 96731-0428 Phone: (808) 232-2001 Fax: (808) 232-2217 Website: http://oe3.org/training/
Ironworker Shop Fabricator / Welder	Hawaii Shopmen's Local 803 Joint Apprenticeship and Training Committee (International Association of Bridge,	x		12/31/1963	8,000	• At least 18 years old • High school diploma or GED • Physically able to perform duties of the trade	Training Coordinator Address: 94-497 Ukee Street Waipahu, HI 96797 Phone: (808) 671-4344

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
	Structural and Ornamental Ironworkers, Local 803, AFL-CIO, and Participating Employers)					• **Must be sponsored by employer who is signatory to the Shopmen's Local 803 collective bargaining agreement**	Fax: (808) 676-1144 Website: http://www.ironworkers.org/
Ironworker (Reinforcing)	**Joint Apprenticeship Committee for Ironworker (Reinforcing) *aka* Ironworkers Joint Apprenticeship Committee (Reinforcing)** **(International Association of Bridge, Structural and Ornamental Ironworkers, Local 625, AFL-CIO and Participating Employers)**	**x**		**06/26/1953**	**6,000**	• **At least 16 years old** • **Physically able to perform duties of the trade**	Training Coordinator Address: 94-497 Ukee Street Waipahu, HI 96797 Phone: (808) 671-8225 Fax: (808) 676-1144 Website: http://www.ironworkers.org/

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
Ironworker (Structural)	**Joint Apprenticeship Committee for Ironworker (Structural) *aka* Ironworkers Joint Apprenticeship Committee (Structural)** **(International Association of Bridge, Structural and Ornamental Ironworkers, Local 625, AFL-CIO and Participating Employers)**	**x**		**03/01/1961**	**6,000**	• **At least 16 years old** • **Physically able to perform duties of the trade**	Training Coordinator Address: 94-497 Ukee Street Waipahu, HI 96797 Phone: (808) 671-8225 Fax: (808) 676-1144 Website: http://www.ironworkers.org/
Landscape and Irrigation Laborer	**Hawaii Laborers Union Local 368**	**x**		**03/30/2016**	**4,000**	• **At least 18 years old** • **High school diploma or GED or 10th grade education** • **Valid driver's license** • **Complete and pass the Pre-Landscape and Irrigation Apprentice Evaluation Course**	Director of Training Address: 96-138 Farrington Hwy. Pearl City, HI 96782 Phone: (808) 455-7979 Fax: (808) 456-8689 Website: http://www.liuna.org/
Painter	**Joint Apprenticeship and Training Committee for Painters** **(Painting and Decorating Contractors of Hawaii (PDCA) and the International Union of Painters and Allied Trades (IUPAT) Local 1791, AFL-CIO)**	**x**		**09/01/1961**	**8,000**	• **At least 18 years old** • **High school diploma or GED** • **Driver's license** • **Physically able to perform the duties of the trade** • **Pass color code vision test** • **Pass entry level test of math and vocabulary**	Training Coordinator Address: 2240 Young Street Honolulu, HI 96826 Phone: (808) 947-6606 Fax: (808) 942-0195 Websites: http://www.dc50.org/ http://www.iupat.org/
Painter	**Associated Builders and Contractors Apprenticeship Committee**		**x**	**05/02/1990**	**8,000**	• **At least 18 years old** • **Full-time employee of a member company for a period of not less than six continuous weeks** • **Legally able to work** • **Physically able to perform duties of the trade** • **Pass physical examination if required by Committee**	Director of Training Address: 1375 Dillingham Blvd. Suite 200 Honolulu, HI 96817 Phone: (808) 845-4887 Fax: (808) 847-7876 Website: http://www.abchawaii.org/

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
Painter	**Color Dynamics, Inc.**		**x**	**12/01/1989**	**8,000**	• **At least 16 years old** • **Physically fit to perform duties of the trade** • **Must not be color blind**	President Address: 816 Gulick Avenue Honolulu, HI 96819 Phone: (808) 848-7000 Fax: (808) 842-0800 Website: http://www.colordynamics.com
Painter	**Kawika's Painting**		**x**	**10/01/1984**	**8,000**	• **At least 16 years old** • **Physically fit to perform duties of the trade** • **Must not be color blind**	President Address: 2147 Eluwene Street Honolulu, HI 96819 Phone: (808) 848-0003 Fax: (808) 842-1908 Website: http://www.kawikaspainting.com
Paving Equipment Operator	**Hawaii Joint Apprenticeship Committee for Operating Engineers** **(General Contractors Labor Association and the Building Industry Labor Association and International Union of Operating Engineers, Local Union #3, AFL-CIO)**	**x**		**04/29/2010**	**4,000**	• **At least 18 years old** • **High school diploma or GED or C-based test** • **Physically able to perform duties of the trade** • **School transcripts** • **Driver's license showing address in HI** • **Current State DOT PUC physical** • **Ranked on general knowledge and hands on test** • **Have reliable transportation**	State Administrator Address: P.O. Box 428 Kahuku, HI 96731-0428 Phone: (808) 232-2001 Fax: (808) 232-2217 Website: http://oe3.org/training/
Plasterer	**Joint Apprenticeship Committee for Plasterers** **(Pacific Bureau for Lathing and Plastering and the Operative Plasterers and Cement Finishers Association of the U.S. and**	**x**		**06/30/1959**	**8,000**	• **At least 16 years old** • **Physically able to perform duties of the trade**	Director of Training or Training Coordinator Address: Hawaii Masons & Plasterers Training 1188 Sand Island Parkway Honolulu, HI 96819

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
	Canada, Local 630, AFL-CIO)						Phone: (808) 848-0565 Fax: (808) 847-7068 Website: http://www.opcmia.org/ http://www.bacweb.org
Plumber	Honolulu Joint Apprenticeship and Training Committee for the Plumbing and Pipefitting Industry *aka* JATC of UA Plumbers and Fitters, Local 675, AFL-CIO, and PAMCAH (Plumbing and Mechanical Contractors Association of Hawaii and United Association of Plumbers and Pipefitters Local 675, AFL-CIO)	x		11/14/1952	10,000	• At least 17 years old • High school diploma or GED • School transcripts • Pass placement evaluation with a minimum score of 70% • Driver's license	Training Coordinator Address: 720 Iwilei Road, Suite 222 Honolulu, HI 96817 Phone: (808) 456-0585 Fax: (808) 456-7131 Website: http://www.ua.org/
Plumber	Associated Builders and Contractors Apprenticeship Committee		x	02/02/1999	10,000	• At least 18 years old • Full-time employee of a member company for a period of not less than six continuous weeks • Legally able to work • Physically able to perform duties of the trade • Pass physical examination if required by Committee	Director of Training Address: 1375 Dillingham Blvd. Suite 200 Honolulu, HI 96817 Phone: (808) 845-4887 Fax: (808) 847-7876 Website: http://www.abchawaii.org/
Pointer-Caulker-Weatherproofer	Joint Apprenticeship Committee for Pointer-Caulker-Weatherproofer (Pointing, Caulking and Weatherproofing Contractors and the International Union of Bricklayers and Allied Crafts, Local 1, AFL-CIO)	x		08/23/1995	6,000	• At least 16 years old • High school graduate or GED equivalent • Physically able to perform duties of the trade	Director of Training or Training Coordinator Address: Hawaii Masons & Plasterers Training 1188 Sand Island Parkway Honolulu, HI 96819

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
							Phone: (808) 848-0565 Fax: (808) 847-7068 Website: http://www.bacweb.org
Refrigeration Air-Conditioning	**Honolulu Joint Apprenticeship and Training Committee for the Plumbing and Pipefitting Industry *aka* JATC of UA Plumbers and Fitters, Local 675, AFL-CIO, and PAMCAH** **(Plumbing and Mechanical Contractors Association of Hawaii and United Association of Plumbers and Pipefitters Local 675, AFL-CIO)**	**x**		**09/04/1962**	**10,000**	• **At least 17 years old** • **High school diploma or GED** • **School transcripts** • **Pass placement evaluation with a minimum score of 70%** • **Driver's license**	Training Coordinator Address: 720 Iwilei Road, Suite 222 Honolulu, HI 96817 Phone: (808) 456-0585 Fax: (808) 456-7131 Website: http://www.ua.org/
Roofer	**Joint Apprenticeship and Training Committee for Roofers** **(United Union of Roofers, Waterproofers and Allied Workers, AFL-CIO, Local 221, and All Participating Employers)**	**x**		**01/13/1968**	**8,000**	• **At least 16 years old** • **High school diploma or GED** • **Driver's license** • **Physically able to perform duties of the trade** • **Able to lift 100 lbs.**	Training Director Address: 2045 Kamehameha IV Rd. Room 203 Honolulu, HI 96819 Phone: (808) 847-5757 Fax: (808) 848-8707 Website: http://www.unionroofers.com

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
Roofer	**Associated Builders and Contractors Apprenticeship Committee**		**x**	**01/09/1996**	**7,000**	• **At least 18 years old** • **Full-time employee of a member company for a period of not less than six continuous weeks** • **Legally able to work** • **Physically able to perform duties of the trade** • **Pass physical examination if required by Committee**	Director of Training Address: 1375 Dillingham Blvd. Suite 200 Honolulu, HI 96817 Phone: (808) 845-4887 Fax: (808) 847-7876 Website: http://www.abchawaii.org/
Sheet Metal Worker	**Hawaii Joint Apprenticeship Committee for the Sheet Metal Industry** **(Sheet Metal Contractor's Association and Sheet Metal Workers' International Association, Local 293)**	**x**		**01/02/1958**	**10,000**	• **At least 18 years old** • **High school diploma or GED** • **Complete industry test** • **Driver's license** • **Physically able to perform work**	Apprenticeship Coordinator Address: 1405 North King Street Room 403 Honolulu, HI 96817 Phone: (808) 841-6106 Fax: (808) 841-1842 Website: http://www.smwia.org/
Steamfitter/ Welder	**Honolulu Joint Apprenticeship and Training Committee for the Plumbing and Pipefitting Industry *aka* JATC of UA Plumbers and Fitters, Local 675, AFL-CIO, and PAMCAH** **(Plumbing and Mechanical Contractors Association of Hawaii and United Association of Plumbers and Pipefitters Local 675, AFL-CIO)**	**x**		**02/05/2002**	**10,000**	• **At least 17 years old** • **High school diploma or GED** • **School transcripts** • **Pass placement evaluation with a minimum score of 70%** • **Driver's license**	Training Coordinator Address: 720 Iwilei Road, Suite 222 Honolulu, HI 96817 Phone: (808) 456-0585 Fax: (808) 456-7131 Website: http://www.ua.org/
Stone Mason	**Joint Apprenticeship Committee for Stone Mason Industry** **(Masonry Contractors Association of Hawaii and Local 1 of Hawaii of the Bricklayers and Allied Craftsmen International Union, AFL-CIO, and Other Signatory Employers)**	**x**		**02/10/1964**	**8,000**	• **At least 16 years old** • **High school graduate or GED equivalent** • **Physically able to perform duties of the trade**	Director of Training or Training Coordinator Address: Hawaii Masons & Plasterers Training 1188 Sand Island Parkway Honolulu, HI 96819

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
							Phone: (808) 848-0565 Fax: (808) 847-7068 Website: http://www.bacweb.org
Taper	**Joint Apprenticeship Committee for Tapers** **(Gypsum Drywall Contractors Association of Hawaii and the International Brotherhood of Painters and Allied Trades Tapers Local Union 1944, AFL-CIO)**	**x**		**09/01/1967**	**8,000**	• **At least 18 years old** • **Physically able to perform duties of the trade** • **Driver's license** • **High school diploma or equivalent**	Training Coordinator Address: 2240 Young Street Honolulu, HI 96826 Phone: (808) 941-0991 Fax: (808) 946-6623 Website: http://www.dc50.org/
Telecommunication / CATV Installer Technician	**Hawaii Electricians Joint Apprenticeship Committee** **aka** **Joint Apprenticeship Committee for Telecommunications** **(International Brotherhood of Electrical Workers Local Union 1186, AFL-CIO, and Signatory Employers)**	**x**		**09/16/1998**	**6,000**	• **At least 18 years old** • **High school diploma or GED** • **Complete the National Joint Apprenticeship and Training Committee Math Course or one-year high school Algebra 1** • **Transcript of high school or post high school courses** • **Pass industry aptitude test to qualify for oral interview** • **Application fee (non-refundable)**	Apprenticeship or Training Coordinator Address: 1935 Hau Street Room 301 Honolulu, HI 96819 Phone: (808) 847-0629 Fax: (808) 843-8818 Website: http://www.njatc.org/
Tile Setter	**Joint Apprenticeship Committee for Tile Setters** **(Tile, Marble and Terrazo Contractors Association of Hawaii and Local 1 of Hawaii of the Bricklayers, and Allied Craftsmen International Union of America, AFL-CIO)**	**x**		**06/24/1958**	**8,000**	• **At least 16 years old** • **High school graduate or GED equivalent** • **Physically able to perform duties of the trade**	Director of Training or Training Coordinator Address: Hawaii Masons & Plasterers Training 1188 Sand Island Parkway Honolulu, HI 96819 Phone: (808) 848-0565 Fax: (808) 847-7068 Website: http://www.bacweb.org

Trade	Sponsor	Union	Non-Union	Date of Approval/ Registration	No. of Hours of On-the-Job Training	Minimum Requirements	Contact Information
Truck Operator and Driver	**Hawaii Joint Apprenticeship Committee for Operating Engineers** **(General Contractors Labor Association and the Building Industry Labor Association and International Union of Operating Engineers, Local Union #3, AFL-CIO)**	**x**		**03/01/91**	**2,000**	• **At least 18 years old** • **High school diploma or GED or C-based test** • **Physically able to perform duties of the trade** • **School transcripts** • **Driver's license** • **Current State DOT PUC physical** • **Ranked on general knowledge and hands on test** • **Have reliable transportation**	State Administrator Address: P.O. Box 428 Kahuku, HI 96731-0428 Phone: (808) 232-2001 Fax: (808) 232-2217 Website: http://oe3.org/training/

SCS Project Number 2207-AMP-1

AN ARCHAEOLOGICAL MONITORING PLAN FOR THE DEPARTMENT OF HAWAIIAN HOMELANDS ANAHOLA FARM LOTS WATER SYSTEM, PWS NO. 432 - PHASE I AND PHASE II IMPROVEMENTS ANAHOLA AHUPUA‘A, KAWAIHAU DISTRICT, ISLAND OF KAUA‘I, HAWAI‘I TMK: (4) 4-8 var.

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March 2018
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On behalf of:
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Department of Hawaiian Home Lands
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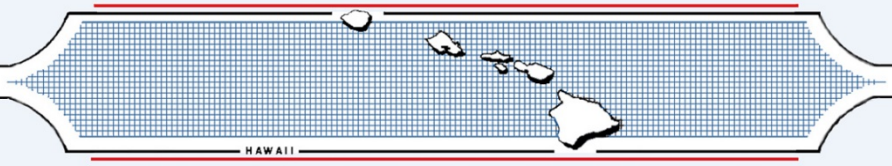
SCIENTIFIC CONSULTANT SERVICES, Inc.



1347 Kapiolani Blvd., Suite 408 Honolulu Hawai`i 96814

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INTRODUCTION

At the request of Oceanit, on behalf of the State of Hawai‘i Department of Hawaiian Home lands (DHHL), Scientific Consultant Services, Inc. (SCS) has prepared this Archaeological Monitoring Plan (AMP) for the Anahola Farm Lots Water System, PWS No. 432 - Phase I and Phase II Improvements Project, located within portions of TMK: (4) 4-8 var. in Anahola Ahupua'a, Kawaihau District, Island of Kaua'i, Hawai`i (Figures 1 through 3), that is proposed for noncontiguous portions of the 350-acre DHHL subject property, including work within the 15,000-sq.ft. (0.34-acres) water system reservoir facility (Figure 4) and installation of approximately 8000-ft of new piping. The project area also encompasses individual service meters and backflow preventers throughout the subject property, PRV valves makai of Kuhio Highway, and existing interties with the County of Kauai, Department of Water system.

The proposed improvements include water distribution systems, PRV station replacement, abandonment in place of approximately 6,500 linear feet of existing Asbestos Concrete piping and installation of 8,000 feet of new piping, new well pump systems, a new booster pump, and a new disinfection system, rehabilitation of back flow preventers, demolition and replacement of 0.5MG steel tank with 0.44MG concrete tank, and with electrical and metering improvements.

Phase 1 improvements include replacement of all existing Asbestos Cement (A C) distribution pipes with 8-inch diameter County Standard pipes, replacement of back flow preventers, service laterals and meters as well as pressure reducing valve improvements and security improvements to the intertie with Kauai Department of Water waterlines.

Phase II improvements involves rehabilitation within the existing 15 ,000-ft^2 water reservoir facility, including replacement of the existing 0.5MG steel water tank with a 0.44MG concrete tank, replacement of well pumps, improvements to the water disinfection system, installation of a temporary 0.1 MG metal water tank to maintain water service, installation of diesel generator, installation of booster pumps and construction of a concrete retaining wall.

Archaeological Monitoring will ensure that any significant cultural resources identified during the current project are sampled, documented, and evaluated for their historical significance in accordance with State Historic Preservation Division (SHPD rules and regulations. This Monitoring program will also ensure that if human skeletal remains are inadvertently identified during subsurface work, appropriate and lawful protocol concerning the Inadvertent Discovery of Human Remains (pursuent to 13-300-40a, b, c, HAR) is followed.

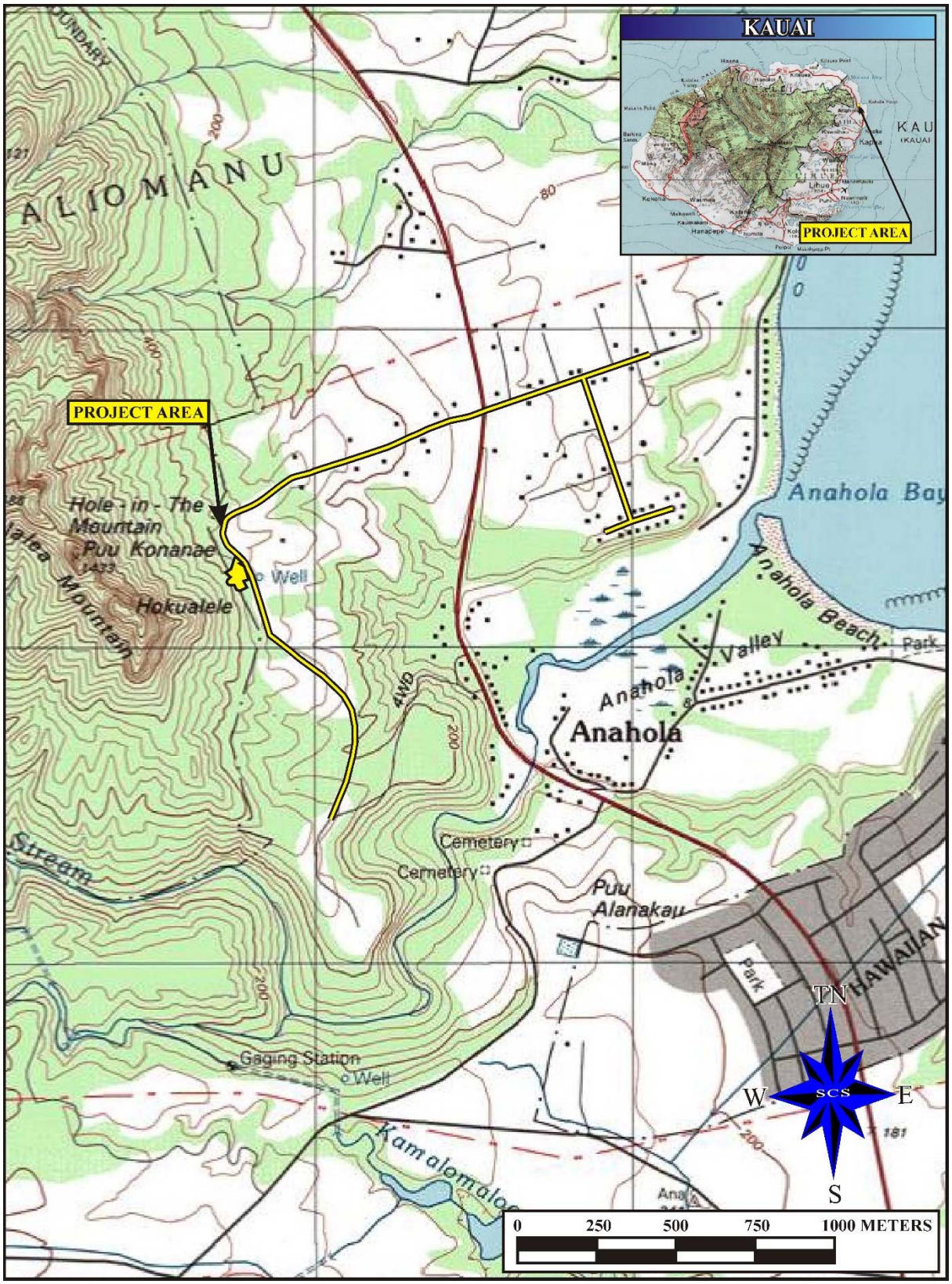

Figure 1: Portion of USGS 1998 Anahola Quadrangle Showing Project Area Location.

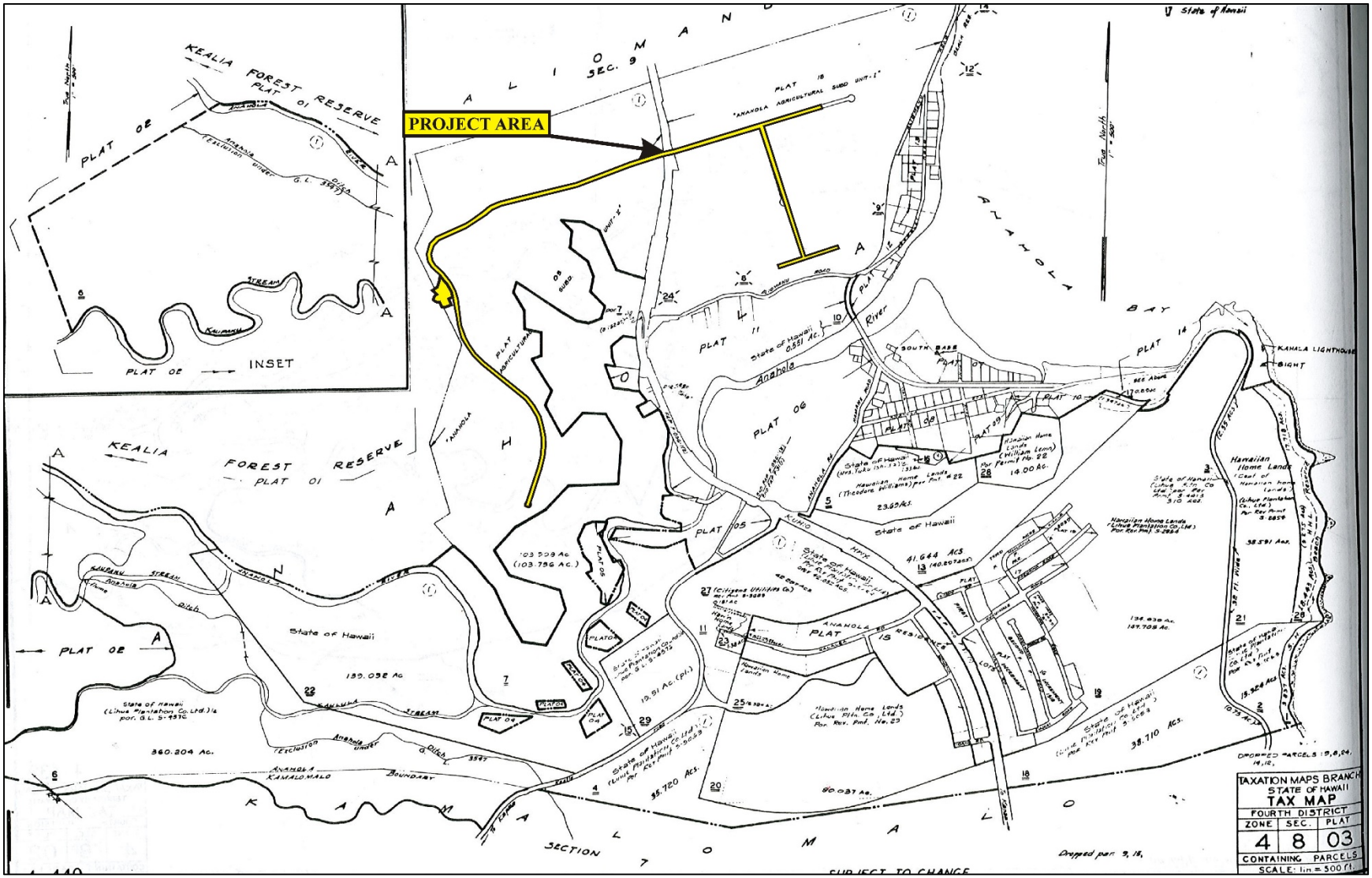

Figure 2: Tax Map Key [TMK (4) 4-8-003 Showing Project Area Location.

Figure 3: Aerial Photograph (Source: Google Earth, accessed 8 March 2018) Showing Project Area Location.

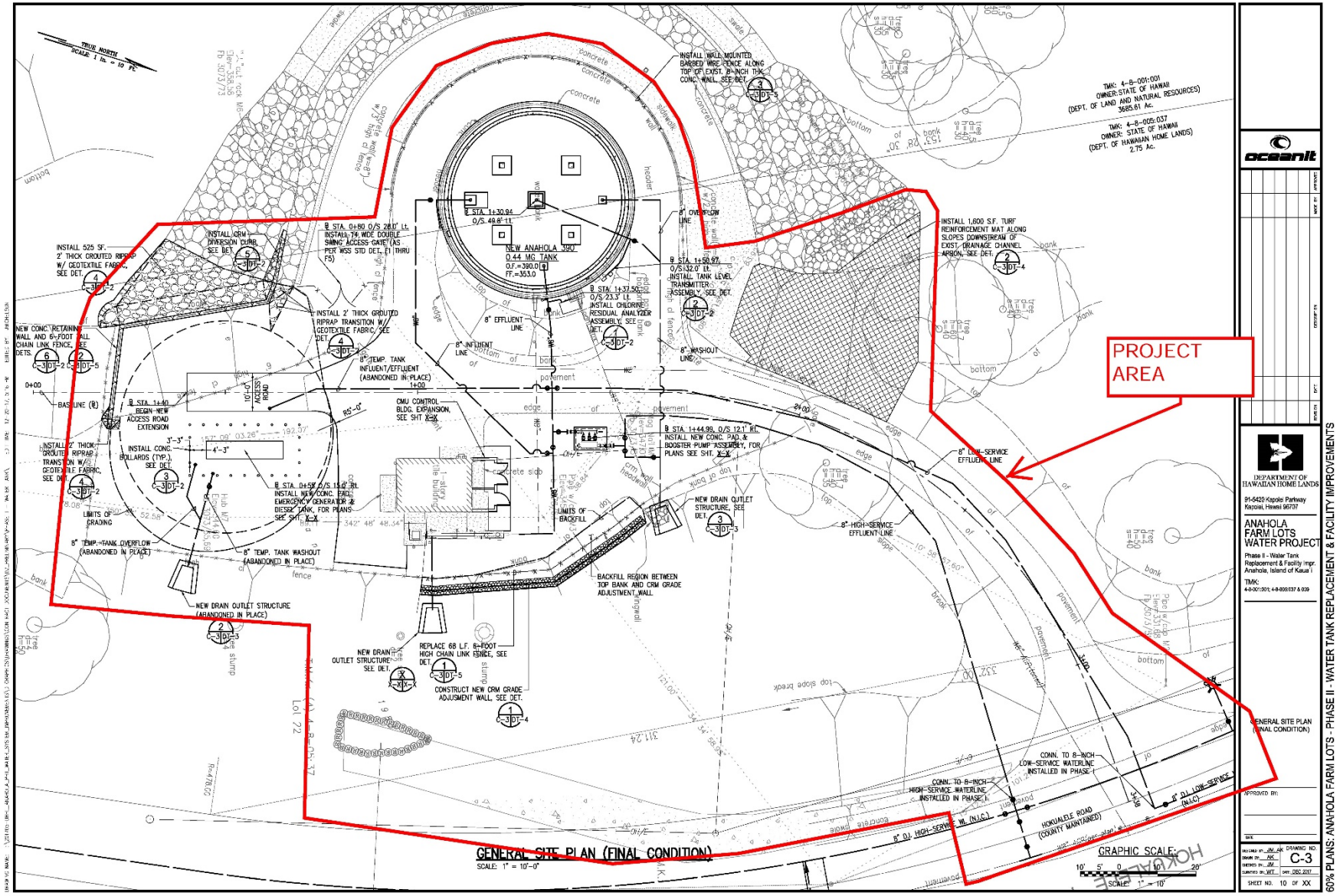

Figure 4: Client-provided Plan Showing the Project Area in the Vicinity of the Water Tank.

Pursuant to HAR §13-279-4(b), "an archaeological monitoring plan shall be reviewed and approved by the SHPD prior to the monitoring project, unless otherwise agreed to by the SHPD". In a Chapter 6E-8 and National Historic Preservation Act (NHPA), Section 106 Review Letter for the Anahola Farm Lots Water System, PWS No. 432 - Phase I and Phase II Improvements Project, dated January 30, 2018, (Log No. 2017.02592, Doc No. 1801GC10), SHPD stipulated that an accepted archaeological monitoring plan is not required for this project, and instead stipulated that archaeological monitoring for the subject project shall be guided by a list of provisions which are included in the Monitoring Conventions and Methodology section of this archaeological monitoring plan.

ENVIRONMENTAL SETTING

Kaua`i, the oldest and fourth largest of the eight main Hawaiian Islands (with land area equaling approximately 1,432 square kilometers), was formed from one great shield volcano (Macdonald et al. 1983:458-461). At one time, this vast volcano supported the largest caldera in the islands, horizontally extending 15 to 20 kilometers across. Mt. Wai`ale`ale, forming the central hub of the island, extends 1,598 meters (above mean sea level) amsl. Topographically, Kaua`i is a product of heavy erosion with broad, deep valleys and large alluvial plains. The current project area lies within the ahupua‘a of Anahola, in the District of Kawaihau, on the northeast side of Kaua‘i.

The Anahola Farm Lots Public Water System currently serves 45 agricultural lessees and 30 residential lots covering approximately 350 acres north of Anahola Stream on the windward side of Kaua'i. The water system's reservoir, well, pump, pump house and disinfection system are located within a 15,000-square foot fenced area at the end of a short access road connected to Hokualele Road. Approximately 90 percent of the fenced area is located on parcel 448005037 which belongs to DHHL. The remaining 10 percent is located on parcel 448001001; which belongs to the Department of Lund and Natural Resources (DLNR). The water tank, located at the mauka border of the fenced area, straddles the boundary between DHHL and DLNR land; with approximately 40 percent of the tank on DHHL land and 60 percent of the lank on DLNR land. Based on the relationship and history between the two departments, it is anticipated proper access to the land will be negotiated between DHHL and DLNR quickly and easily. Ground-disturbing work required for the proposed improvements will take place both within the 350-acres of DHHL/DLNR land and along Hokualele Road and Kamalomaloo Place..

The area in which the project area lies is the semi-wet eastern region of Kauai. Rainfall indicators, according to Price (1983:62), show that the project area could receive up to 10 inches

during the winter months of December through March. Higher elevations within Anahola Ahupua`a are prone to receive more precipitation due to increased rainfall, fog drip, and lower temperature climates. The frequency of the project area receiving much upland runoff appears intermittent, given the lack of streams directly emptying onto the project area.

PROJECT AREA SOILS

The soils within the project corridor are predominately Lihue silty clay loam (Lh). Other soils within the project area are Kalapa silty clay (Kd) and Mokuleia fine sandy loam (Mr) (Figure 5).

Lihue silty clay loam (Lh) soils developed in material weathered from basic igneous rock. They are gently sloping to steep. Elevations range from nearly sea level to 800 feet. The annual rainfall amounts to 40 to 60 inches. The mean annual soil temperature is 73° F. These soils are used for irrigated sugarcane, pineapple, pasture, truck crops, orchards, wildlife habitat, woodland, and homesites. The natural vegetation consists of lantana, guava, koa haole, joee, kikuyu grass, molasses grass, guinea grass, Bermuda grass, and Java plum (Foote et al. 1972:82). Lihue silty clay, 8 to 15 percent slopes [LhC].On this soil, runoff is slow and the erosion hazard is slight. Lihue silty clay, 15 to 25 percent slopes [LhD]. On this soil, runoff is medium and the erosion hazard is moderate. Lihue silty clay, 25 to 40 percent slopes, eroded [LhE2]. This soil is similar to Lihue silty clay, 0 to 8 percent slopes, except that the surface layer is thin. Runoff is rapid, and the erosion hazard is severe (Foote et al. 1972:83).

The Kalapa Series (Kd) consists of well-drained soils at the base of slopes on the island of Kauai. These soils developed in material weathered from basic igneous rock and in colluvium. They are moderately sloping to very steep. Elevations range from 200 to 1,200 feet. The annual rainfall amounts to 60 to 100 inches. The mean annual soil temperature ranges from 69° to 74° F. The natural vegetation consists of guava, lantana, joee, sensitive plant, pilipiliula, ohia, Japanese tea, and ferns (Foote et al. 1972:55). Kalapa silty clay, 8 to 20 percent slopes (KdD]. On this soil, runoff is medium and the erosion hazard is moderate. Kalapa silty clay, 20 to 40 percent slopes (KdE].-On this soil, runoff is rapid and the erosion hazard is severe (Foote et al. 1972:56).

The Mokuleia series (Mr) consists of well-drained soils along the coastal plains on the islands of Oahu and Kauai. These soils formed in recent alluvium deposited over coral sand. They are shallow and nearly level. Elevations range from nearly sea level to 100 feet. The annual rainfall amounts to 50 to 100 inches. The mean annual soil temperature is 74° F. Mokuleia fine sandy loam [Mr]. This soil occurs on the eastern and northern coastal plains of Kauai. It is nearly level. Runoff is very slow, and the erosion hazard is no more than slight. (Foote et al. 1972:95).

Figure 5: USDA NRCS Soil Map (accessed 8 March 2018) Showing Soil Types within the Project Corridor.

PROJECT AREA VEGETATION

Project ground disturbance will be confined to the excavations along along Hokualele Road and Kamalomaloo Place and within the 15,000-square foot fenced area around the existing water tank, wellhead, and associated machinery. The segments along the road will take place within the roadway itself where there is no vegetation. Vegetation within the fenced area consists of grass and weeds.

TRADITIONAL AND HISTORIC SETTING

Kaua`i is justifiably famous as the first landing place of Captain James Cook in January of 1778. Cook estimated a total population of the island of approximately 30,000, but this figure has been questioned by some (e.g., Bennett 1931) as probably too high. Later estimates, based on U.S. Census data, put the early 19th century population of Kaua`i at approximately 10,000. In any case, compared with the other large islands, Kaua`i has witnessed relatively modest growth and development, with a modern population (c. 50,000) not much larger than these original figures.

Until very recently, the island has survived primarily on an agricultural economy, with commercial sugarcane, rice, and other crops supplanting the traditional taro in historic times. A concomitant influx of many diverse ethnic groups (including Japanese, Filipino, Chinese, and Euro-American) has also added to the modern character of the island. Much of the knowledge of traditional land use patterns is based on what was recorded at the time of, and shortly after, western Contact, in 1778. Early records, such as journals kept by travelers and missionaries, documented Hawaiian traditions that had survived long enough to be written down. Archaeological investigations have also assisted in understanding the past, written records and the archaeological record being necessarily utilized together when studying the past of the Hawaiian Islands.

TRADITIONAL PERIOD

The project area is located in the Kawaihau District, formerly known as Ko`olau District. The Kawaihau District is a roughly triangular area bordered on the northwest by the moku (district) of Halele`a and on the south and southwest by the moku of Puna. The irregular boundaries were formed by the upland mountain ranges that physically separate the Kawaihau District from the Halele`a District, and the flat plateau lands of Anahola Ahupua`a that separate the Kawaihau District from the Puna District. The coastline occurs on the northeast side of Kawaihau District.

The traditional Hawaiian economy was based on agricultural production, marine exploitation, animal husbandry, and wild plant and bird collecting. Coastal zones were utilized for marine resources, habitation, burials, and ceremonial structures often associated with fishing (Bennett 1931). Extended household groups settled in various ahupua`a, (i.e., smaller land divisions within a district), which customarily extended inland from the ocean. Ideally, this situation allowed each ahupua`a to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). Typically, river valleys were defined by cultivation occurring in lower valley sections and on bends in the stream where alluvial terraces could be modified to take advantage of the stream flow (Kirch and Sahlins Vol.2 1992:59; Earle 1978:31, 155). In ahupua`a such as Kamalomalo, table lands or slopes were often cultivated in addition to the major farming areas on the broader alluvial flat lands situated in lower portions of valleys. This pattern of cultivation was seen throughout Hawai`i in similar environmental zones, such as the North Kohala coast of Hawai`i Island and the north shore of O`ahu (Earle 1978; Tomonari-Tuggle 1988:19; Kirch and Sahlins Vol.2 1992:59).

During the pre-Contact Period, impressive irrigation systems were built to transport stream water to agricultural fields (Earle 1978:67–9; Handy and Handy 1972:405). Dole (1892) described ancient agricultural resources still functioning on Kaua`i by referring to Kapa`a. Mr. Dole stated: "great engineering enterprises were undertaken, such as irrigation systems of Wahiawa, Kapa`a, and Kilauea on the island of Kaua`i." Many streams and river valleys in the various ahupua`a contained agricultural features (structures such as terraces, alignments, walls, and `auwai or ditches), which occurred in lower valley reaches near meanders in streams. The meanders consist of alluvial flood plains and terraces that could be modified to take advantage of the stream flow to bring fresh water to adjacent agricultural fields (Kirch 1985; Earle 1978:31, 155). In such a setting, the majority of farming activities (e.g., taro cultivation) presumably occurred in lower portions of the valleys (such as Papa`a Valley north of the project area) where the broad alluvial flats provided more land amenable to cultivation. Habitation most likely occurred on an alluvial, coastal plain in close proximity to both agricultural fields and marine resources. That habitation structures and agricultural fields were integrated is not unprecedented on Kaua`i (see Kirch 1985:101, 104).

Habitation was also likely to occur directly adjacent to the coastline, within sandy deposits, as has been previously documented for the Hā`ena area of Kaua`i (Griffin et al. 1977; Hammatt et al. 1978; Griffin 1984). Although coastlines were the first settled areas within the Hawaiian Islands (see Kirch 1985:71) and also the location of major habitation centers (see Davis 1984), inland areas were settled in at least a limited temporary fashion. Later in the

culture historical sequence, during the so-called Expansion Period (c. A.D. 1100–1650), people may have engaged in more intensive habitation activities within inland locales (Kirch 1985: 303–306). Dryland cultivation (e.g., taro, sweet potato) presumably occurred just inland of dune deposits (c.f. Earle 1978), and in colluvial areas further inland, near the base of valley walls and on lower valley slopes (Bennett 1931:130; see also Green 1970, 1980).

HISTORIC PERIOD

Immense changes began to occur to Hawaiian traditional society with the intrusion of foreign lifestyles, first introduced on January 19, 1778 with the arrival, albeit briefly, of Captain James Cook on Kaua`i. Much of the knowledge of traditional land use patterns is based on journals recorded at the time of, and shortly after, western Contact. Early records, such as journals kept by travelers and missionaries, and surviving Hawaiian traditions, as well as archaeological investigations, have assisted in understanding the past. In 1835, the newspaper Ke Kumu reported 80 adults and 11 children living in the Kahili-Kilauea area. The 1847 census reported an increase in the population of northern Kaua`i with a total of 240 individuals living within the Kahili-Kilauea area (Schmitt 1969).

One of the first written descriptions of the northeastern side of the island was written in 1849 by William DeWitt Alexander while on tour of Kaua`i. He traveled by horseback from the eastern side of the island, eventually arriving in Hanalei. There, he wrote about his observations of Kilauea Stream, among other places that may relate to Anahola as well:

> …But the beauty of the country was the abundance of water. Every valley, large or small had its stream. About five miles from Anahola we crossed Molowa (Moloaa) valley a most beautiful spot. There is a village here … The country near this place has been lately burnt over, but the vegetation is springing up anew. A ride of five miles from this valley over hill, and dale, brought us to a grove of venerable *kukui* trees … A little farther on we entered groves of *hala*, through which we continued to ride during the rest of our journey. We turned from the road to see the 4 falls of the Kahili river. Though not large they are beautiful. Here the river falls in a jet of foam over a precipice of about 40 feet into a broad clear basin below. [Kauai Historical Society 1991]

THE GREAT MĀHELE

In the 1840s traditional land tenure changed drastically with the introduction of private land ownership based on Western la. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kauikeaouli (Kamehameha III) was forced to establish laws changing the traditional Hawaiian society to that of a market economy (Daws 1968:111; Kuykendall Vol. I 1938:145 footnote 47, 152, 165-6, 170: Kame`eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998).

Among other things, the foreigners demanded private ownership of land to secure their island investments (Kuykendall Vol. I, 1938:138, 145, 178, 184, 202, 206, 271; Kame`eleihiwa 1992: 178). The Māhele of 1848 divided Hawaiian lands between the king, chiefs, government, and began the process of private ownership of lands. Once lands were made available and private ownership was instituted, the maka`ainana (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living. These claims, however, could not include any previously cultivated or presently fallow land, stream fisheries, or many other resources traditionally necessary for survival (Kelly 1983; Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). This land division, called the Māhele, was primarily enacted and commenced in 1848. The subsequently awarded parcels were called Land Commission Awards (LCA). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could then take possession of the property (Chinen 1961:16).

Land Commission Award (LCA) data shows that Anahola Ahupua`a was clearly a rich, and heavily utilized land in the historic period. While the subject land parcel on which the project area is situated has no LCAs, the ahupua`a of Anahola contains 87 Land Commission Awards (Waihona `Aina 2006). Most of the LCAs in the Anahola Ahupua`a are located below Kuhio Highway near the Anahola Stream and on the floodplains. The neighboring ahupua`a to the north (Aliomanu Ahupua`a) contains only six LCAs, while the ahupua`a to the south (Kamalomaloo) has none. This disparity may be interpreted as evidence that a large settlement (population) was established in the Anahola area. Maka`ainana (commoners) were able to claim plots on which they had been cultivating and living. However, these claims could not include ocean or stream fisheries or other resources traditionally necessary for survival, explaining the absence of LCAs in the coastal vicinity.

The general area of Anahola has primarily been utilized for sugar cane cultivation from the late nineteenth century by the Makee Sugar Co. This plantation was then bought by the Lihue Plantation in 1933. Cultivation ceased in the late 1980s. The northern portion of the Ahukini Terminal & Railway Co. passed through this area.

PREVIOUS ARCHAEOLOGY

Since early spring 2016, DHHL has been in contact with Mary Jane Naone, SHPD Lead Archeologist for the island of Kaua'i about the project and various aspects of the proposed water system improvements as they relate to historic and cultural resources. Ms. Naone identified three archeological reports conducted on sites near the project area.

According to a memorandum dated August 3, 1983 from Ms. Georgiana K. Padeken, then Chairman of the Hawaiian Homeland Commission, to Mr. Roy Sue, then Administrator of the State Parks, Outdoor Recreation and Historic Sites Division of the Department of Land and Natural Resources, a rock wall was identified in a field near what is today curve number 5 of Hokualele Road. The wall was found in April 1979 by consultants for the Hokualele Road construction project. Based on the proposed design of the road project it was determined that the corner of the wall was located approximately seven feet outside of the project excavations.

In a memorandum from Mr. Susumu Ono, then Chairperson and State Historic Preservation Officer, to Ms. Georgiana K. Padeken, dated August 17, 1983, the State Parks archaeologists who visited the road project site on July 31,1983 concurred that the wall did lie 7 feet outside of the project excavations and that the road construction had not impacted the wall foundation. Mr. Ono's memo went on to state the rock wall was believed to be part of a site identified in 1929 as a possible animal enclosure; rather than a heiau (as described by William Bennett in 1931).

In 1983, William Kikuchi conducted a cursory site survey of agricultural terraces at the reservoir site for the Anahola Farm Plots, slope 340 feet above sea level, located to the west and southwest of the Anahola Farm plots. Kikuchi identified five small stone terraces, 4 to 5 feet wide, 3 to 4 feet long, and 1 to 2 stones high, and a C-shaped structure approximately 15 feet wide and 12 feet deep. According to Kikuchi the C-shaped structure and associated terraces were most likely used for agricultural functions; the terraced areas served as tiny plots which were irrigated via subsurface moisture and the C-shaped structure would have served as temporary habitation for formers tending their upland plants for days at a time (Kikuchi 1963:4).

In 2009, Scientific consultant Services (SCS) conducted archaeological monitoring on a 2.754-acre project area which contained an existing water tank belonging to the County of Kauai (landowner) Department of Water, as part of slope control measures following heavy rains that caused erosion immediately west of the water tank (Tome and Dega 2009:ii). That portion of the slope included the agricultural terraces and C-shape surveyed by Kikuchi in 1983 During Monitoring, one previously unrecorded archaeological site was identified within the area slated for construction of slope control measures. The site, a pre-Contact Period site consisting of 15 features related to habitation and agriculture, was designated as State Site 50-30-04-5026. Cultural materials obtained from testing included three basalt artifacts, a core, one scraper, and a single waste flake (debitage). The site measured approximately 88 feet by 195 feet with its long

axis oriented southeast/northwest (160/340" magnetic) and was located approximately 44 feet west of the water tank and 32 feet west of the subsequently constructed CMU slope retaining wall. The site was interpreted as an agricultural complex with temporary habitation features.

EXPECTED FINDINGS WITHIN THE PROJECT AREA

Based on historical documents and available previous archaeological research the most likely site type that would be have been present in the vicinity of the project area would be Traditional-type agricultural remnants and Traditional-type habitation features where caretakers of agricultural systems would occupy during their day. Traditional-type ceremonial structures might accompany an agricultural complex, and human burials be interred "under house floors" given that there might be habitation features (e.g., enclosures, platforms). No archaeological or cultural sites have been identified within the current project area, and previous construction associated with the construction of the existing well head, water tank and its associated structures as well as previous excavations for the construction of Hokualele Road and Kamalomaloo Place have not revealed any subsurface historical or cultural resources. Nevertheless, DHHL will ensure precautionary monitoring is conducted during all excavation and ground disturbance in order to ensure proper handling of any unanticipated discovery.

MONITORING CONVENTIONS AND METHODOLOGY

In their Chapter 6E-8 and National Historic Preservation Act (NHPA), Section 106 Review Letter for the Anahola Farm Lots Water System, PWS No. 432 - Phase I and Phase II Improvements Project, dated January 30, 2018, (Log No. 2017.02592, Doc No. 1801GC10), SHPD stipulated that the archaeological monitoring for this project shall be guided by the following provisions:

- Following selection of the archaeological firm, the DHHL project manager and the archaeological principal investigator and the archaeological monitor(s) shall consult with our office regarding the monitoring provisions;
- The archaeological principal investigator shall meet Secretary of Interior (SOI) professional qualifications and Hawaii Administrative Rules (HAR) professional qualifications specified in HAR §13-281-3 and, per HAR §13-279-5, shall prepare the archaeological monitoring report;
- The archaeological monitor(s) shall have a minimum of 1 year of full-time professional field experience in Hawaii;
- The archaeological principal investigator and monitor(s) shall conduct a pre-construction coordination briefing with all project personnel (DHHL, contractors, etc.);

- The archaeological monitor(s) will conduct a 100% surface pedestrian survey prior to initiation of any project work involving ground disturbance;
- On-site archaeological monitoring shall be conducted during all ground disturbing activities;
- Photographic documentation shall be completed both pre- and post- excavations;
- In the event that non-burial historic properties are identified, SHPD shall be notified of the find and consulted regarding documentation, assessment of significance, and treatment, and that all documentation shall be in compliance with HAR §13-279 and HAR §13-280;
- Documentation of non-burial cultural deposits shall include: recordation of stratigraphy using USDA soil descriptions (and shall include profiles at least 2 m in length); recordation of feature contents through excavation, screening and/or sampling of features; a minimum of two representative scaled profile drawings (if no historic properties are identified); photo documentation of project work and individual trenches or profiles with scale and N arrow; and appropriate laboratory analysis of collected samples and artifacts. Laboratory analysis may include but not be limited to artifact analysis, wood taxa identification, radiocarbon dating, pollen analysis, and invertebrate and vertebrate identification. Charcoal samples shall be submitted for wood taxa identification prior to radiocarbon dating.
- If human remains are identified, work will cease in the vicinity, SHPD shall be notified, and compliance with procedures outlined in HRS 6E-43, HAR §13-300-40, and SHPD directives shall be followed;
- An archaeological monitoring report meeting the reporting requirements of HAR §13-279-5 shall be prepared and submitted to SHPD for review within 30 days of completion of archaeological monitoring;
- Final curation and archiving of any collections shall be determined in consultation with the SHPD and the landowner; and
- Departure from these provisions shall occur only in consultation with and written concurrence from SHPD.

This AMP has been prepared in accordance with DLNR-SHPD rules governing standards for Archaeological Monitoring (13-279). In addition to the provisions listed above, archaeological monitors will adhere to the following guidelines during monitoring:

1. If significant deposits or features are identified and additional field personnel are required, the archaeological consultants conducting the monitoring will notify the contractor/representatives and the SHPD before additional personnel are brought to the site.
2. One archaeological monitor will be assigned to each piece of machinery conducting ground altering activities within the project area at all times while in operation.
3. If non-burial cultural deposits and/or features are identified during Monitoring, the on-site archaeologist will have the authority to temporarily suspend construction activities at the find location, so the deposits or features may be identified, documented, and assessed for

significance. SHPD will be immediately consulted regarding appropriate documentation and assessment. Construction work and/or back-filling of excavation pits or trenches will occur in the location of find only after all archaeological documentation has been completed and approved by the SHPD.

4. Stratigraphy will also be recorded and photographed with north arrow and scale at selected locations to provide representative stratigraphic data across the project area. Again, the profiles will measure a minimum of 1 m across. Both vertical and horizontal scales will be recorded.
5. The archaeologist will provide all coordination with the contractor, SHPD, and any other groups involved in the project. The archaeologist will coordinate all monitoring and sampling activities with the safety officers for the contractors to ensure that proper safety regulations and protective measures meet compliance. Close coordination will also be maintained with construction representatives in order to adequately inform personnel of the possibility that open archaeological units or trenches may occur in the project area.
9. As necessary, verbal and/or written reports will be made to SHPD and any other agencies as requested. As part of the general conditions of any County permit, the SHPD maintains the right to inspect the project area at any time to ensure the provisions of this AMP are being met.

LABORATORY ANALYSIS

All non-burial artifacts and samples collected during the project will undergo analysis at the SCS laboratory in Honolulu. Photographs, illustrations, and all paper and electronic documents accumulated during the project will be curated at the laboratory of the archaeological consultants conducting the monitoring. All collected artifacts and midden samples will be cleaned, sorted, counted, weighed (metric), and analyzed (both qualitative and quantitative data), with all data recorded on standard laboratory forms. Midden samples will be minimally identified to major class (e.g., bivalve, gastropod mollusk, echinoderm, fish, bird, and mammal). Digital photographs with scales will be taken of a representative sample of the diagnostic artifacts. Tables and text discussing the artifact and sample results will be provided in the report, along with appropriate digital photographs.

Samples (wood charcoal, shell, non-human bone, kukui nut) identified as potentially suitable for dating from an undisturbed context (e.g., cultural layer, pit feature) shall be considered for radiocarbon dating in consultation with SHPD and the landowner. Prior to submittal, potential wood charcoal samples shall first be submitted to International

Archaeological Research Institute, Inc. (IARII) for wood taxa identification. Only samples identified as short-lived endemic or Polynesian-introduced species will be selected for dating purposes.

All stratigraphic profiles and plan view maps of identified historic properties (e.g., sites, cultural layers, features) shall be drafted for presentation in the final report. Photographs of project work, including overviews, and of individual profiles, cultural layers, and features shall also be included in the final report.

CURATION

If requested by the landowner, all collected non-burial materials will be curated in the laboratory of the archaeological consultants conducting the Monitoring until a final disposition repository location is determined in consultation with the landowner and the SHPD.

REPORTING

All historic properties (non-burial and burial) identified and/or further documented during archaeological monitoring (e.g., cultural layer, pit features, buried walls) shall be assessed for site significance per HAR §13-284-6, Criteria a through e and an effect determination will be made. This information shall be included in the final report, along with an appropriate recommendation for future mitigation.

An archaeological monitoring report meeting the reporting requirements of HAR §13-279-5 shall be prepared and submitted to SHPD for review within 30 days of completion of archaeological monitoring. The final SHPD-accepted AMR shall be distributed to SHPD and the landowner. If the project continues beyond a 6 month period, the contracting archaeologist will update the SHPD with a written summary as to progress of the work and any finds identified during monitoring. This will occur at the 180 days mark of monitoring, should work continue beyond this time frame.

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HAZARDOUS MATERIAL SURVEY
AND LIMITED SOIL TESTING
FOR
ANAHOLA FARM LOTS WATER SYSTEM IMPROVEMENTS
ANAHOLA, ISLAND OF KAUAI, 96703
TMK (4)-4-8-05:37

MNA PROJECT 01840_2

MAY 22, 2015

Myounghee Noh & Associates

Environmental Studies and Consulting Services

200 Kohola Street, Hilo, Hawaii, USA 96720 • 808.935.8727
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This survey report is prepared for:

Oceanit Laboratories, Inc.
828 Fort Street Mall, Suite 600
Honolulu, Hawaii 96813

HAZARDOUS MATERIALS SURVEY AND LIMITED SOIL TESTING FOR ANAHOLA FARM LOTS WATER SYSTEM IMPROVEMENTS ANAHOLA, ISLAND OF KAUAI, 96703 TMK: (4)-4-8-05:37

MNA Project 01840_2

May 22, 2015

Adam Custer
Building Inspector (HIASB-3042)

Myounghee Noh, CIH
Principal

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TABLE OF CONTENTS

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Data Reviewers	Adam Custer, Kristin Cabanila
Draft/Illustrator	Kristin Cabanila
Report Writer	Adam Custer
Editor/QC	Jessica Walsh

EXECUTIVE SUMMARY

In August 2014, Myounghee Noh & Associates, L.L.C. (MNA), was retained by Oceanit Laboratories, Inc., to survey the existing conditions in support of the tank rehabilitation design for the Department of Hawaiian Home Lands (DHHL) source water facility at the Anahola Farm Lots, Anahola, Island of Kauai. The survey included those areas anticipated to be disturbed during the planned 500,000 gallon steel tank rehabilitation project, including the tank and the soil surrounding it.

The objective of the survey was to identify the existence (if any), extent, and condition of hazardous materials present in areas anticipated to be disturbed by the planned rehabilitation work.

Targeted Hazardous Material Survey. MNA conducted the survey on April 15, 2015. The MNA inspector identified a total of seven suspect building materials. Based on the analysis of three asbestos samples and 12 lead samples, MNA provides the following summary:

- No asbestos-containing materials (ACM) were identified in the targeted area.
- Five lead-containing paints (LCP) were identified, all on the exterior of the water tank (Table 3). Four of the LCP were lead-based paint (LBP), exceeding the 5,000 milligram per kilogram (mg/kg) threshold:
  - **Dark green paint** in good condition **on metal pipe and valve**, **280 mg/kg** and **710 mg/kg**, approximately 10 square feet.
  - **Light green paint** in fair condition **on metal ladder, pipes, top, and walls**, **110 mg/kg** and **5,600 mg/kg**, approximately 8,000 square feet.
  - **Light gray paint** in fair condition **on metal wall**, **13,000 mg/kg** and **17,000 mg/kg**, approximately 1,500 square feet.
  - **Off-white paint** in poor condition **on metal electrical box**, **47,000 mg/kg** and **50,000 mg/kg**, approximately 5 square feet.
  - **Black paint** in fair condition **on metal vent**, **23,000 mg/kg** and **36,000 mg/kg**, approximately 10 square feet.
- No suspect arsenic-containing materials were identified in the targeted areas.

Limited Soil Testing. The objective of the soil sampling was to identify if levels of heavy metal lead were present in the soil that may pose a potential risk to construction workers and facility users during the planned rehabilitation work.

On April 15, 2015, two composite soil samples were collected from within 1 foot of the eastern vegetated perimeter of the water tank foundation. The samples were collected from the surface soil, 0 to 6 inches below grass cover, and each sample combined ten 30 gram subsamples. Soil

samples were analyzed for lead using EPA method 3051m/7100Bm. All results were below the Hawaii Department of Health Tier 1 Environmental Action Level for unrestricted (residential) land use above a drinking water resource.

Conclusion. Based on the sampling and analysis of suspect paints, bulk materials, and soil, special hazard control measures are warranted for work involving LCP and LBP. These control measures are briefly described in Section 9 Recommendations for Renovation and Construction Work. General dust and runoff controls are also warranted.

The contractor must verify the location and volumes of hazardous materials and determine the appropriate dust and hazard control measures based on the area and material to be disturbed. Quantities of hazardous materials provided in this report are based on visual approximations only during the survey.

1.0 INTRODUCTION

Myounghee Noh & Associates, L.L.C. (MNA), under an agreement with Oceanit Laboratories, Inc., conducted a hazardous materials survey of the 500,000 gallon steel water tank at the Anahola Farm Lots, Anahola, Island of Kauai (Figure 1).

MNA's hazardous material survey was conducted in support of the planned water tank rehabilitation project. Included in this survey were those areas anticipated to be disturbed by the tank rehabilitation project (Table 1).

Anahola Farm Lots Steel Water Tank
April 2015

Table 1. Anticipated Project Scope of Work

Area	Work Anticipated
Interior	Recoat all surfaces
Exterior	Remove all paint and repaint all surfaces, fix any cracks or leaks

The survey targeted the following materials:

- Hazardous building materials due to the potential presence of asbestos, lead, or arsenic.
- Soil from vegetated area within a 1 foot perimeter of the water tank concrete foundation, for the potential presence of lead.

2.0 SAMPLING AND SURVEY METHODS

On April 15, 2015, State of Hawaii-certified building inspector, Adam Custer, conducted the hazardous material survey. The inspector completed a visual assessment of the areas expected to be disturbed by the planned rehabilitation project, identified materials suspected of containing asbestos, lead, or arsenic, and collected samples of these materials. Inspector certifications are presented in Appendix A.

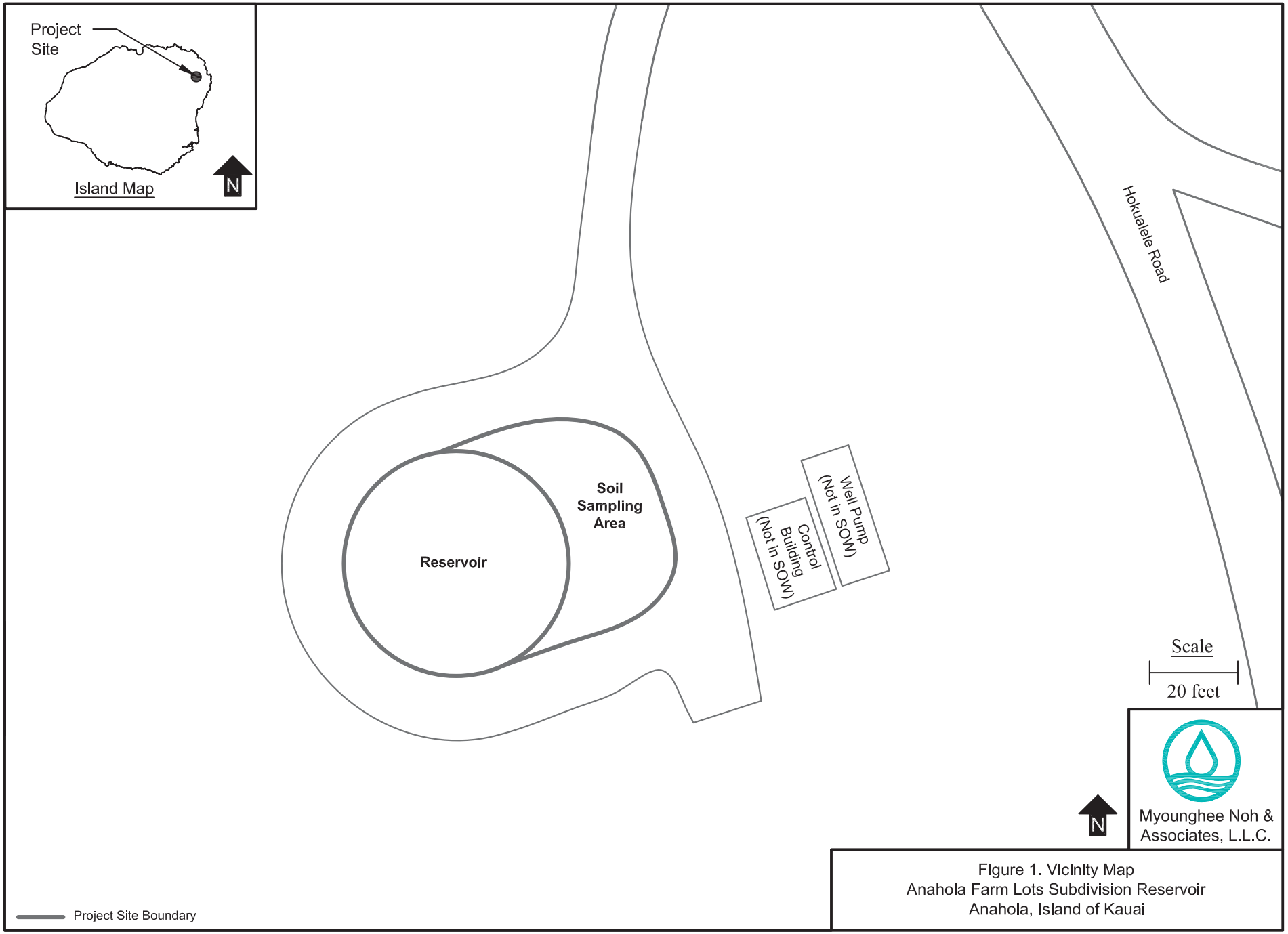


Figure 1. Vicinity Map
Anahola Farm Lots Subdivision Reservoir
Anahola, Island of Kauai

2.1 Identifying Homogeneous Materials

The survey identified building materials with the same appearance, color, and substrate as homogeneous materials. Interior homogeneous materials are considered unique per building and building floor, while exterior building materials are considered unique per building. Building materials with the same characteristics (appearance, color, and substrate), as an identified homogeneous material, should be considered to possess the same hazardous characteristics unless specifically identified as otherwise in the report. As an example, if off-white paint on metal is identified as lead-based paint (LBP), then all similar off-white paint on metal should be treated as LBP. Table 2 provides an overview of sampling and a summary of hazardous materials identified.

Table 2. Summary of Sampling and Results

Materials Sampled	Samples Submitted/ Inspected	Suspect Material Locations	Identified Hazardous Materials
Asbestos in bulk material and paint	3	Electrical box	None
Lead in paint	12	Ceiling, electrical box, hatch, ladder, pipes, top, vent, walls	5 LCP (110 mg/kg – 710 mg/kg) including 4 LBP (5,600 mg/kg – 50,000 mg/kg)
Arsenic in bulk material	0	--	None
Soil	3	1 foot at eastern perimeter of tank foundation	None

LBP – Lead-Based Paint, ≥5,000 mg/kg
LCP – Lead-Containing Paint, <5,000 mg/kg
mg/kg – milligrams per kilogram, equivalent to parts per million

2.2 Building Material Sampling

Bulk and paint samples were collected using a decontaminated chisel, razor, and hammer in a manner that minimized airborne dust. The inspector collected triplicate samples for asbestos and duplicate samples for lead. No suspected arsenic-containing materials were identified. Samples were placed in sealable plastic bags, labeled with a unique identification number, and recorded on a chain-of-custody. For each sample, the date, sample appearance, analyte, and sample location were recorded on a field data form. The samples were transported under chain-of-custody by FedEx to LA Testing in South Pasadena, California.

2.3 Soil Sampling

MNA collected composite soil samples from 0-2 inches below grass cover, within 1 foot around the vegetated eastern perimeter of the water tank foundation (Figure 2). Each composite soil sample combined ten 30 gram of subsamples. The 10 subsamples were collected using a Terra-core® sampler and placed into a 16-ounce glass jar. No odors or discolorations were observed in the soil samples.

Soil samples were transported under chain-of-custody for analysis to Curtis & Tompkins, Ltd., in Berkeley, California.

3.0 LABORATORY INFORMATION

LA Testing analyzed the samples as follows:

- Asbestos samples by polarized light microscopy using the Environmental Protection Agency (EPA) Method 600/R-93/116.
- Lead samples by flame atomic absorption spectroscopy using the EPA Method SW 846 3050B/7000B.

LA Testing is certified by:

- National Voluntary Laboratory Accreditation Program, certification 200232-0.
- State of Hawaii Department of Health (HDOH), certification L-01-034.
- American Industrial Hygienist Association Environmental Lead Laboratory Accreditation Program, certification 102814.

Hawaii Analytical Laboratory, L.L.C., analyzed the soil samples for lead by EPA Method 3051m/7000Bm. Hawaii Analytical Laboratory is certified by the American Association for Laboratory Accreditation, certification 101812.

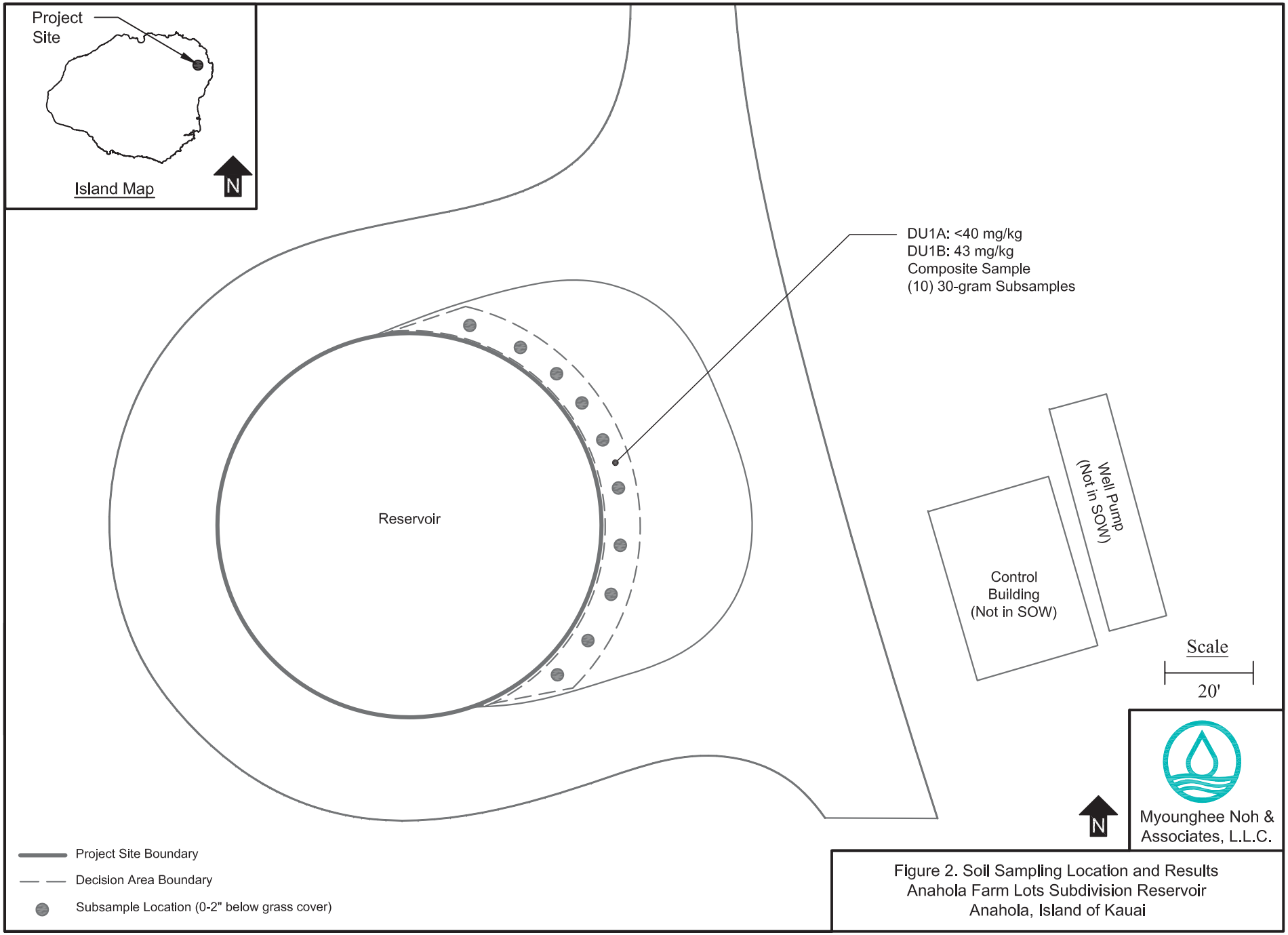


Figure 2. Soil Sampling Location and Results
Anahola Farm Lots Subdivision Reservoir
Anahola, Island of Kauai

4.0 ASBESTOS RESULTS

Materials determined to contain greater than, or equal to, 1% asbestos fibers are considered regulated asbestos-containing material (ACM) under the National Emission Standards for Hazardous Air Pollutants (NESHAP) as specified in 40 Code of Federal Regulations (CFR) Part 61 Subpart M. The U.S. Occupational Safety and Health Administration (OSHA) Asbestos General Industry and Construction Standards also define ACM as 1% or more by volume under 29 CFR 1910.1001 and 29 CFR 1926.1101, respectively. However, OSHA considers any measurable level of asbestos fibers to be a health concern.

One homogeneous material suspected of containing asbestos was identified and sampled, generating three samples for analysis. The suspected ACM was approximately 5 linear feet of off-white wrap with yellow mastic in fair condition on an exterior metal electrical box. Laboratory analytical results indicated no measurable levels of asbestos in the samples. Therefore, it is concluded that no ACM are present in the area anticipated to be disturbed.

The suspected ACM description and identifier is provided in Appendix B. Sample location drawings are provided in Appendix C. A photograph of the suspected material is presented in Appendix D. The laboratory analytical report, chain-of-custody, and field data form is provided in Appendix E.

5.0 LEAD RESULTS

The U.S. Department of Housing and Urban Development (HUD) and the EPA define paint containing 5,000 milligrams per kilogram (mg/kg), or 0.5% by weight, or more of lead to be LBP. OSHA considers paint containing any measurable concentration of lead to be lead-containing paint (LCP) and a health concern. When lead is detected in a multi-layer sample, it is assumed that all layers represented by the sample contain lead at the same concentration.

Six paints suspected of containing lead were identified and sampled, generating 12 paint samples. Five LCP were identified in the survey area, with sample results ranging from 110 mg/kg to 50,000 mg/kg. Four of those LCP were identified as LBP, exceeding 5,000 mg/kg, the threshold for LBP (Table 3).

Suspect LCP descriptions and identifiers are provided in Appendix B. Lead sample and hazardous material location drawings are provided in Appendix C. Photographs of suspect

materials are presented in Appendix D. Laboratory analytical reports, chain-of-custody, and field data forms are provided in Appendix E.

Table 3. Lead-Containing Paint Determination

Area	Locations	HM ID	Material Color	Substrate	Result (mg/kg)	Condition	Estimated Quantity (sq. ft.)
Interior	Ceiling, hatch, ladder, walls	1	Black	Metal	<100	Good	9,000
Exterior	**Ladder, pipes, top, walls**	**2**	**Lt. green**	**Metal**	**LBP 110 - 5,600**	**Fair**	**8,000**
Exterior	**Walls**	**3**	**Lt. gray**	**Metal**	**LBP 13,000 - 17,000**	**Fair**	**1,500**
Exterior	**Pipe, valve**	**4**	**Dk. green**	**Metal**	**LCP 280 - 710**	**Good**	**10**
Exterior	**Electrical box**	**5**	**Off-white**	**Metal**	**LBP 47,000 - 50,000**	**Poor**	**5**
Exterior	**Vent**	**6**	**Black**	**Metal**	**LBP 23,000 - 36,000**	**Fair**	**10**

Bold values indicate results above the detection limit.
Good – Material is in an "as installed" condition. It is usable as is and may show cosmetic wear and tear or fading.
Fair – Material is functional for its installed purpose but shows initial signs of deterioration beyond the cosmetic.
Poor – Material shows significant deterioration and may not be functional for its installed purpose. Paint is bubbling or peeling over 20% or more of surface area and no longer protects the substrate.

Abbreviations and Acronyms
Dk. – Dark
HM ID – Hazardous Material Identifier
LBP – Lead-Based Paint, ≥5,000 mg/kg
LCP – Lead-Containing Paint, <5,000 mg/kg
Lt. – Light
mg/kg – milligrams per kilogram, equivalent to parts per million
sq. ft. – Square Feet

6.0 ARSENIC RESULTS

The disturbance of arsenic-containing materials is regulated by the OSHA Inorganic Arsenic General Industry Standard under 29 CFR 1910.1018.

No suspected arsenic-containing materials were identified; therefore, no samples were collected during this survey of the facility.

7.0 SOIL RESULTS

The analytical results were compared to the HDOH Tier 1 Environmental Action Level (EAL) for lead in soil for unrestricted (residential) land use above a drinking water source and located greater than 150 meters from surface water.

One soil sample analyzed, 1840-DU1B, resulted in a detectable level of lead, 43 mg/kg. The second soil sample, 1840-DU1A, did not have any measurable level of lead, <40mg/kg. Sample results were below the HDOH Tier I EAL, 200 mg/kg. The complete laboratory report is provided in Appendix E.

8.0 SUMMARY OF SURVEY RESULTS

On April 15, 2015, MNA conducted a hazardous material survey at the Department of Hawaiian Home Lands source water facility at the Anahola Farms Lots, Anahola, Island of Kauai. This survey was conducted in support of the planned steel tank rehabilitation project.

Based on the analysis of three asbestos samples, 12 lead samples, and two soil samples, MNA provides the following summary:

- No ACM were identified during the survey.
- Five LCP were identified during the survey, all on the exterior of the water tank (Table 3). Four of the identified LCP were LBP, exceeding the 5,000 mg/kg threshold. The identified LCP were:
  - **Dark green paint** in good condition **on metal pipe and valve**, **280 mg/kg** and **710 mg/kg**, approximately 10 square feet.
- The identified LBP were:
  - **Light green paint** in fair condition **on metal ladder, pipes, top, and walls**, **110 mg/kg** and **5,600 mg/kg**, approximately 8,000 square feet.
  - **Light gray paint** in fair condition **on metal walls**, **13,000 mg/kg** and **17,000 mg/kg**, approximately 1,500 square feet.
  - **Off-white paint** in poor condition **on metal electrical box**, **47,000 mg/kg** and **50,000 mg/kg**, approximately 5 square feet.
  - **Black paint** in fair condition **on metal vent**, **23,000 mg/kg** and **36,000 mg/kg**, approximately 10 square feet.
- No suspect arsenic-containing materials were identified in the targeted areas.
- No lead-contaminated soil was identified in the areas anticipated to be disturbed by the rehabilitation project.

9.0 RECOMMENDATIONS FOR RENOVATION AND CONSTRUCTION WORK

It is required that only properly trained employees perform construction work and renovation that disturbs hazardous materials, in a manner protective of the site workers, the public, and the environment. The following recommendations address OSHA and other applicable federal requirements. These recommendations provide guidance for the management of hazardous building materials and control of occupational and environmental hazards associated with operations, maintenance, renovation, and demolition. These recommendations are based on information gathered during the hazardous materials survey. These recommendations are not intended to constitute a formal work plan but are intended to provide a starting point for the development of a work plan.

9.1 Asbestos-Containing Materials

No ACM were identified in the targeted areas during this survey. Therefore, no special control measures are warranted.

9.2 Lead-Containing Paints

Employees involved in renovation or construction activities that disturb LCP or LBP must conduct work in accordance with 29 CFR 1926.62, the OSHA Lead Construction Standard and 40 CFR 745 EPA Renovation, Repairs, and Painting Program. Work practices that would trigger these requirements include, but are not limited to, sanding, blasting, welding, cutting, or scraping. For each project, the contractor must determine the appropriate safety measures based on the area to be disturbed, the lead concentration, and the paint condition. Applicable work practice guidelines involving the disturbance of LCP or LBP are summarized, but are not limited to:

- Employees must utilize appropriate engineering controls and personal protective equipment (PPE). The PPE includes disposable coveralls, gloves, eye protection, steel-toed boots, a hard hat, and a National Institute for Occupational Safety and Health (NIOSH)-approved appropriate respirator.
- Employees must utilize respiratory protection until the initial air monitoring assessment documents safe working levels of airborne lead (29 CFR 1926.62[d][1] and [2][i][A]).
- An exposure assessment should be carried out when employees are disturbing LCP or LBP to ensure that they are not exposed to airborne lead concentrations greater than the Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter ($\mu g/m^3$) averaged over an 8-hour period. Additional periodic exposure monitoring may be required if the lead OSHA Action Level of 30 $\mu g/m^3$ averaged over an 8-hour period is exceeded.
- Employees must implement stringent dust control procedures to prevent lead in any airborne dust.
- Employees must clean the work area thoroughly using wet methods and a high-efficiency particulate air (HEPA) vacuum. Dry sweeping or air blowing of lead debris and dust must be avoided.
- Lead-containing debris should be segregated from other wastes, collected, and containerized. Wastes should be fully characterized, including a determination of the waste as hazardous or

non-hazardous. Lead-containing waste should be disposed of in accordance with applicable requirements.

- Visually inspect and verify the work area to ensure all lead-containing debris and dust has been properly removed and the project site is free of lead hazard.
- Conduct clearance in accordance with contract specifications.

9.3 Arsenic-Containing Materials

No arsenic-containing materials were identified in the targeted areas during this survey. Therefore, no special control measures are warranted.

9.4 Soil

Soil samples that were collected and analyzed for lead were below the HDOH Tier 1 EAL for unrestricted land use above a drinking water resource and greater than 150 meters from surface water. However, there were measurable levels of lead in the soil. Therefore, for worker and environmental protection, applicable work practice guidelines involving the disturbance of the soil bordering the steel tank are summarized, but are not limited to:

- Lead metal levels found in the soil did not exceed the current HDOH EAL. Therefore, off-site soil disposal is not required.
- Excess soil that may be transported off-site for re-use must be sampled and tested to ensure compliance with the recipient guidelines and requirements.
- Best Management Practices (BMP) such as soil erosion/runoff control or dust control must be implemented during the earthwork.
- The information provided in this report is for the Contractor's information only, and is not guaranteed to fully represent all surface/subsurface soil conditions. The Contractor must perform all necessary due diligence at his expense.

10.0 LIMITATIONS

Every reasonable effort was made to identify suspect building materials during the survey. However, this does not imply a guarantee that all suspect building materials were identified by this assessment because certain building materials and/or surfaces may be hidden by walls, flooring, partitions, or other building components. If suspect materials previously unknown become uncovered, additional survey may be required prior to the planned rehabilitation project.

Material quantities provided in this report are based on visual approximations taken at the time of the survey only. It is the Contractor's responsibility to determine the material quantities and volume of waste.

APPENDIX A

INSPECTOR CERTIFICATIONS

Adam Custer

State of Hawai'i
Lead Based Paint Activities Certification

Expiration Dates:

Inspector- 04/03/2015
Supervisor- n/a
Risk Assessor- n/a
Project Designer- n/a
Worker- n/a

Custer
Adam
Certification # - PB-0307

State of Hawai'i
Asbestos Certification

Training Course Exp. Dates

W	n/a	MP	n/a
CS	02/14/15	PD	n/a
INS	03/05/15	PM	n/a

W= Worker
CS= Cont./Sup
INS= Inspector
PD= Project Designer
MP= Mgmt. Planner
PM= Project Monitor

Custer
Adam S.
Myounghee Noh & Associates, LLC
HIASB-3042
State Exp. Date 02/21/2015

MURANAKA ENVIRONMENTAL CONSULTANTS, INC.

Training Certificate

This is to certify that

ADAM CUSTER

has attended the

ASBESTOS INSPECTOR REFRESHER COURSE

The person has completed the requisite training course for asbestos accreditation under TSCA Title II, Asbestos Model Accreditation Plan.

Accreditation number: MEC-AIR-04-08-2015-0055-04

Student's Social Security Number: XXX-XX-2240

Muranaka Environmental Consultants, Inc. is an accredited training provider in the State of Hawaii
P.O. Box 4341 Honolulu, Hawaii 96812-4341 Phone: (808) 845-8822 Fax: (808) 845-8823

April 8, 2015	*April 8, 2016*	*April 8, 2015*
Date of Attendance	*Expiration Date*	*Date of examination*

Mark T. Muranaka, MS., M.P.H., President

GLOBETECK GROUP, INC

2752 Woodlawn Drive, Suite 5-204A, Honolulu, HI 96822 - PHONE (808) 833-5787 - FAX (808) 833-5987

SITE: http://www.globeteckgroup.com

is pleased to announce that

Adam Custer

1446 Akiikii Place, Kailua, HI 96734

has attended and successfully completed EPA/DOH accredited Lead Inspector Initial Training Course in accordance with 40 CFR 745/HAR Title 11, Chapter 41.

EPA/DOH Accredited Lead Inspector
Initial Training Certificate

Certificate Number: GGI-LII04222015-02C
Place of Training: Honolulu, Hawaii
Date of Course: April 20-22, 2015
Date of Examination: April 22, 2015

CERTIFIED HAZARDOUS MATERIALS MANAGER
MOHAMMAD ROUF
09151
CHMM
JUL 31 2014

Mohammad Rouf, MPH, CHMM
Training Director
Honolulu, Hawaii

APPENDIX B

HOMOGENEOUS MATERIALS IDENTIFIED AND SAMPLE TYPES COLLECTED

Homogeneous Materials Identified and Sample Types Collected

HM ID	Locations	Material Color	Material	Substrate	Asb	Pb	Result
1	Ceiling, hatch, ladder, walls	Black	Paint	Metal		X	<100 mg/kg
2	**Ladder, pipes, top, walls**	**Lt. green**	**Paint**	**Metal**		**X**	**LBP 110 - 5,600 mg/kg**
3	**Walls**	**Lt. gray**	**Paint**	**Metal**		**X**	**LBP 13,000 - 17,000 mg/kg**
4	**Pipe, valve**	**Dk. green**	**Paint**	**Metal**		**X**	**LCP 280 - 710 mg/kg**
5	**Electrical box**	**Off-white**	**Paint**	**Metal**		**X**	**LBP 47,000 - 50,000 mg/kg**
6	**Vent**	**Black**	**Paint**	**Metal**		**X**	**LBP 23,000 - 36,000 mg/kg**
7	Electrical box	Off-white Yellow	Wrap Mastic	Metal	X		ND

Bold values indicate results above the reporting limit.

All materials are located on the exterior of the reservoir.

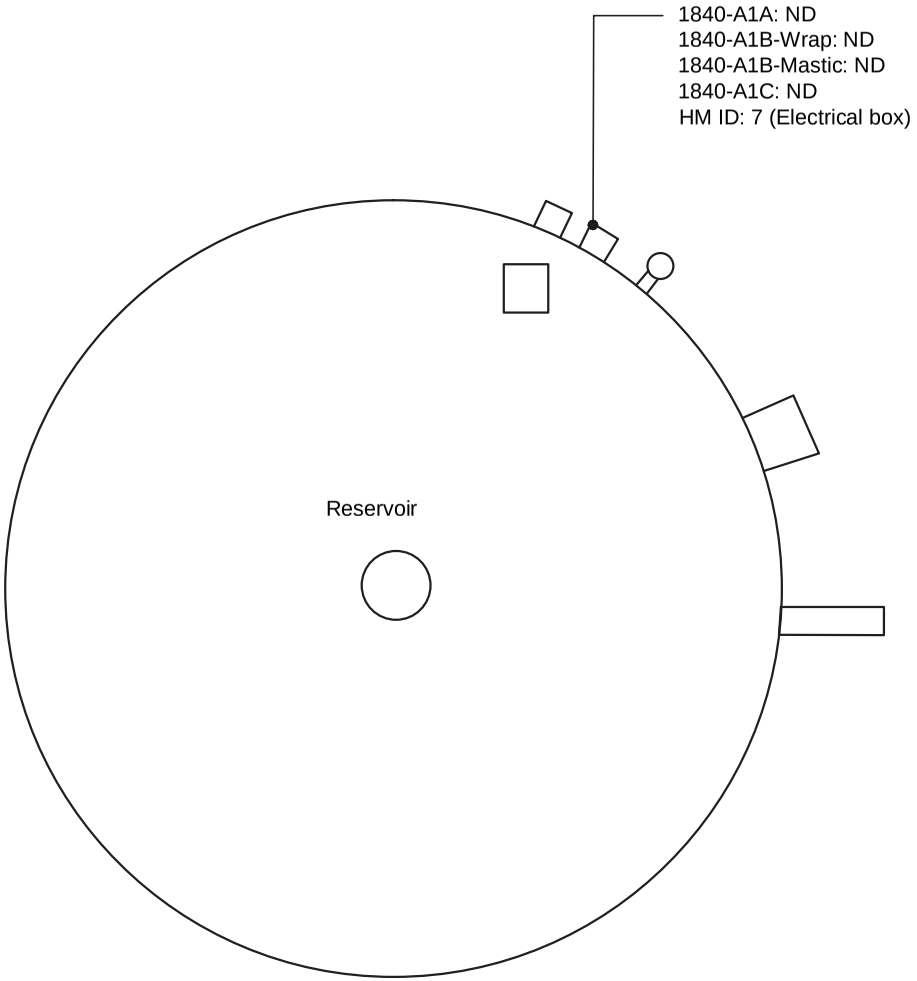
Abbreviations and Acronyms

Asb - Asbestos
HM ID - Homogeneous Material Identifier
LBP - Lead-Based Paint ≥5,000 mg/kg
LCP - Lead-Containing Paint <5,000 mg/kg
ND - Not Detected
Pb - Lead

APPENDIX C

SAMPLE LOCATION DRAWINGS

Table of Contents	
Asbestos Sample Locations Exterior	C-1
Lead Paint Sample and Hazardous Material Locations Interior and Exterior	C-2



Scale

10 feet

N

Myounghee Noh & Associates, L.L.C.

Legend and Notes

HM ID - Homogeneous Material Identifier

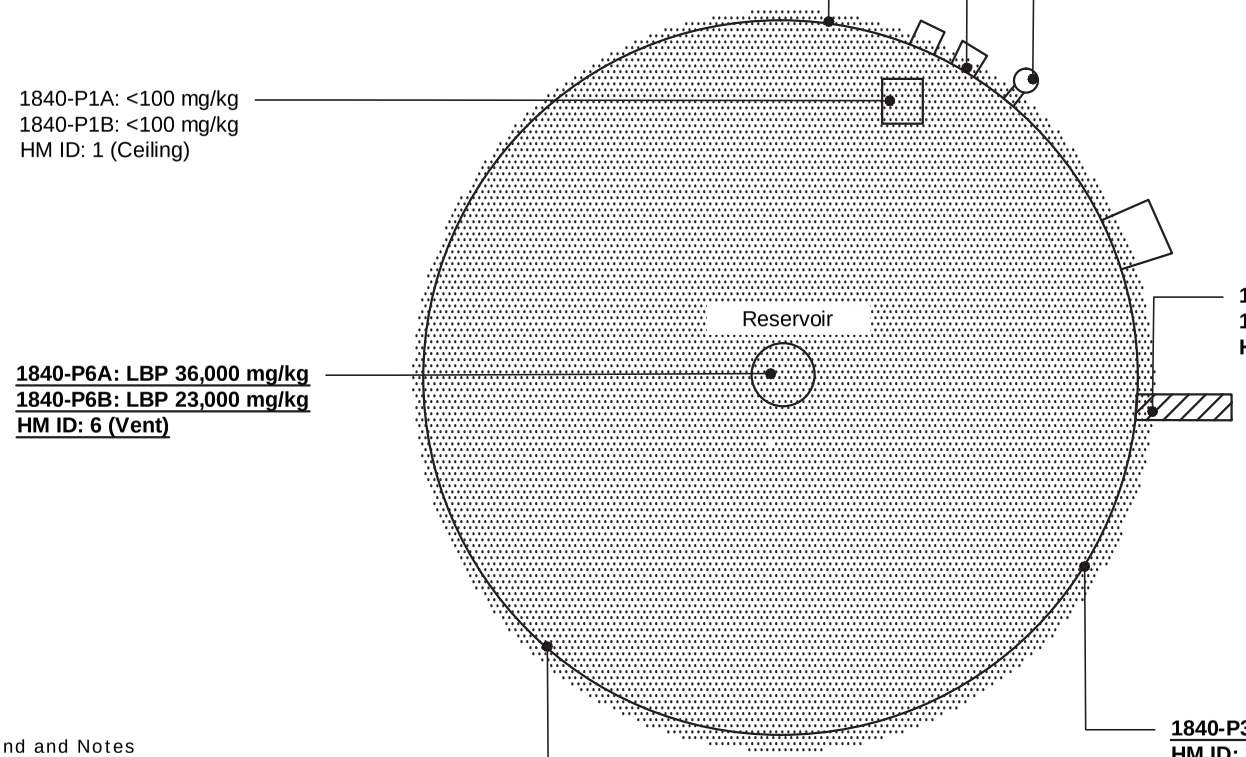
ND - None Detected

Asbestos Sample Locations
Anahola Farm Lots Subdivision
Reservoir
Exterior

Sheet Number

C - 1

HM ID	Locations	Color	Substrate	Results (mg/kg)
2	Ladder, pipes, top, walls	Lt. green	Metal	**LBP 110 - 5,600**
3	Walls	Lt. gray	Metal	**LBP 13,000 - 17,000**
4	Pipe, valve	Dk. green	Metal	**LCP 280 - 710**
5	Electrical box	Off-white	Metal	**LBP 47,000 - 50,000**
6	Vent	Black	Metal	**LBP 23,000 - 36,000**



1840-P2A: LCP 110 mg/kg
HM ID: 2 (Wall)

1840-P5A: LBP 50,000 mg/kg
1840-P5B: LBP 47,000 mg/kg
HM ID: 5 (Electrical box)

1840-P2B: LBP 5,600 mg/kg
HM ID: 2 (Pipe)

1840-P1A: <100 mg/kg
1840-P1B: <100 mg/kg
HM ID: 1 (Ceiling)

1840-P4A: LCP 280 mg/kg
1940-P4B: LCP 710 mg/kg
HM ID: 4 (Pipe)

1840-P6A: LBP 36,000 mg/kg
1840-P6B: LBP 23,000 mg/kg
HM ID: 6 (Vent)

1840-P3B: LBP 13,000 mg/kg
HM ID: 3 (Wall)

1840-P3A: LBP 17,000 mg/kg
HM ID: 3 (Wall)

Scale
10 feet

N

Legend and Notes

Visual Extent of Lead-Based Paint

Visual Extent of Lead-Containing Paint

Bold values indicate results above the detection limit.

HM ID - Hazardous Material Identifier

LBP - Lead-Based Paint ≥ 5,000 mg/kg

LCP - Lead-Containing Paint < 5,000 mg/kg

mg/kg - milligrams per kilogram (equivalent to ppm- parts per million)

Myounghee Noh & Associates, L.L.C.

Lead Paint Sample and Hazardous Material Locations
Anahola Farm Lots Subdivision
Reservoir Interior and Exterior

Sheet Number
C - 2

APPENDIX D

PHOTOGRAPHS

HM ID: 1

Interior
Black paint on metal wall.

Non-LCP
1840-P1A: <100 mg/kg
1840-P1B: <100 mg/kg

HM ID: 2

Exterior
Light green paint on metal wall.

LBP
1840-P2A: 110 mg/kg
1840-P2B: 5,600 mg/kg

HM ID: 3

Exterior
Light gray paint on metal wall.

LBP
1840-P3A: 17,000 mg/kg
1840-P3B: 13,000 mg/kg

HM ID: 4

Exterior
Dark green paint on metal pipe.

LCP
1840-P4A: 280 mg/kg
1840-P4B: 710 mg/kg

HM ID: 5

Exterior
Off-white paint on metal electrical box.

LBP
1840-P5A: 50,000 mg/kg
1840-P5B: 47,000 mg/kg

HM ID: 6

Exterior
Black paint on metal vent.

LBP
1840-P6A: 36,000 mg/kg
1840-P6B: 23,000 mg/kg

HM ID: 7

Exterior
Off-white wrap and mastic on metal electrical box.

Non-ACM
1840-A1A: ND
1840-A1B-Wrap: ND
1840-A1B-Mastic: ND
1840-A1C: ND

APPENDIX E

LABORATORY ANALYTICAL REPORTS

LA Testing
520 Mission Street, South Pasadena, CA 91030
Phone/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com pasadenalab@latesting.com

LA Testing Order: 321508986
CustomerID: 32MYOU50
CustomerPO:
ProjectID:

Attn: **Adam Custer**
Myounghee Noh & Associates, LLC
99-1046 Iwaena Street
Suite 210A
Aiea, HI 96701

Phone: (808) 484-9214
Fax:
Received: 04/21/15 9:10 AM
Analysis Date: 4/23/2015
Collected:

Project: **1890_2 OCEANIT ANAHOLA**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos				Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**		**% Non-Fibrous**		**% Type**
1840-A 1A *321508986-0001*	7	White Fibrous Homogeneous	98%	Glass	2%	Non-fibrous (other)	**None Detected**
1840-A 1B-Wrap *321508986-0002*	7	White Fibrous Homogeneous	98%	Glass	2%	Non-fibrous (other)	**None Detected**
1840-A 1B-Mastic *321508986-0002A*	7	Yellow Non-Fibrous Homogeneous			100%	Non-fibrous (other)	**None Detected**
1840-A 1C *321508986-0003*	7	White Fibrous Heterogeneous	98%	Glass	2%	Non-fibrous (other)	**None Detected**

Analyst(s)

Julie Vong (3)
Rosa Mendoza (1)

Jerry Drapala Ph.D, Laboratory Manager
or other approved signatory

Initial report from 04/23/2015 15:01:27

OrderID: 321508986

Chain of Custody

EMSL Order Number (*Lab Use Only*):

321508986

LATESTING
520 MISSION STREET
SOUTH PASADENA, CA
91030
PHONE: (800) 303-0047
FAX: (323)-254-9982

Company: Myounghee Noh & Associates	EMSL-Bill to: ☐ Same ☐ Different If Bill to Is Different note Instructions in Comments** Third Party Billing requires written authorization from third party
Street: 99-1046 Kwaena St. 210A	
City: Aiea / State/Province: HI	Zip/Postal Code: 96701 / Country: USA
Report To (Name): Adam C	Telephone #: 808-484-9214
Email Address: adam@noh-associates	Fax #: / Purchase Order:
Project Name/Number: 1840_2 Oceanit Anahola	Please Provide Results: ☐ Fax ☒ Email ☐ Mail
U.S. State Samples Taken: HI	Connecticut Samples: ☐ Commercial ☐ Residential

Turnaround Time (TAT) Options* - Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☒ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week

For RUSH TAT's Please Call Ahead to Confirm Lab Hours and Availability. Not all TAT options are valid for every test. Materials Science and IAQ TATs are in Business Days rather than Hours (i.e. 24 Hour = End of Next Business Day)

Asbestos

PCM - Air
☐ NIOSH 7400
☐ w/ 8hr. TWA

TEM– Air ☐ 4-4.5hr TAT(AHERA ONLY)
☐ AHERA 40 CFR, Part 763
☐ NIOSH 7402
☐ EPA Level II
☐ ISO 10312

TEM - Water
Fibers ≥10µm ☐ Waste ☐ Drinking
All Fiber Sizes ☐ Waste ☐ Drinking

PLM - Bulk
☒ PLM EPA 600/R-93/116
☐ PLM EPA NOB (<1%)
☐ NYS 198.1 (friable-NY)
☐ NYS 198.6 (non-friable-NY)
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
Point Count w/ Gravimetric ☐ 400 (<0.25%) ☐ 1000 (<0.1%)

TEM - Dust
☐ Microvac – ASTM D 5755
☐ Wipe-ASTM D6480

TEM - Bulk
☐ TEM EPA NOB
☐ NYS NOB 198.4 (non-friable-NY)
☐ Chatfield SOP

Soil/Rock/Vermiculite
☐ PLM CARB 435 – A (0.25% sensitivity)
☐ PLM CARB 435 – B (0.1% sensitivity)
☐ TEM CARB 435 – B (0.1% sensitivity)
☐ EPA Reg. 1 Screening Protocol (Qualitative)

Other:

Lead (Pb)

Flame Atomic Absorption
☐ Chips SW846-7000B or AOAC 974.02
☐ Soil SW846-7000B/7420
☐ Air NIOSH 7082
☐ Wastewater SM3111B or SW846-7000B/7420
☐ ASTM Wipe SW846-7000B/7420
☐ non ASTM Wipe SW846-7000B/7420
☐ TCLP SW846-1311/7420/SM 3111B

ICP
☐ Air NIOSH 7300 Modified
☐ non ASTM Wipe SW846-6010B or C
☐ ASTM Wipe SW846-6010B or C
☐ Soil SW846-6010 B or C
☐ Waste Water SW846-6010B or C
☐ TCLP SW846-6010B or C

Graphite Furnace Atomic Absorption
☐ Soil SW846-7421 ☐ Wastewater EPA 200.9
☐ Air NIOSH 7105 ☐ Drinking Water EPA 200.9

Other: ☐

Microbiology

Wipe and Bulk Samples
☐ Mold & Fungi – Direct Examination
☐ Mold & Fungi Culture (Genus Only)
☐ Mold & Fungi Culture (Genus & Species)
☐ Bacterial Count & ID (Up to Three Types)
☐ Bacterial Count & ID (Up to Five Types)
☐ MRSA
☐ *Pseudomonas aeruginosa*

Water Samples
☐ Total Coliform & E.coli (P/A)
☐ Fecal Coliform (SM 9222D)
☐ Sewage Screen
☐ Heterotrophic Plate Count (SM 9215)

Air Samples
☐ Mold & Fungi (Spore Trap)
☐ Mold & Fungi Culture (Genus Only)
☐ Mold & Fungi (Genus & Species)
☐ Bacterial Culture & ID (Up to Three Types)
☐ Bacterial Culture & ID (Up to Five Types)
☐ Endotoxin Testing

Real Time Q-PCR (See Analytical Guide for Code)
Code:

Legionella
☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4

Other: ☐

Materials Science

☐ Common Particle ID (large particles)
☐ Full Particle ID (environmental dust)
☐ Basic Material ID (solids)
☐ Advanced Material ID
☐ Physical Testing (Tensile, Compression)
☐ Combustion-by-products (soot, char, etc.)
☐ X-Ray Fluorescence (elem. analysis)
☐ X-Ray Diffraction (Crystalline Part.)
☐ MMVF's (Fibrous glass, RCF's)
☐ Particle Size (sieve/microscopy/laser)
☐ Combustible Dust
☐ Petrographic Examination
Other: ☐

IAQ

Nuisance Dust NIOSH ☐ 0500 ☐ 0600
Airborne Dust ☐ PM10 ☐ TSP
Silica Analysis: ☐ All Species
Silica Analysis – Single Species
☐ Alpha Quartz ☐ Cristobalite ☐ Tridymite
☐ HVAC Efficiency
☐ Carbon Black
☐ Airborne Oil Mist
Radon Testing: Call for Kit and COC
Other: ☐

****Comments/Special Instructions:** See field forms – Positive stop analysis

Client Sample #'s 1840-A1A → A1C	**Total # of Samples:** 3
Relinquished (Client): Adam C **Date:** 4/20/15	**Time:** 1200
Received (Lab): [illegible] **Date:** 4/21/15	**Time:** 9:10AM

Controlled Document-OneChain-R3-11/8/2011

LA TESTING

Chain of Custody

EMSL Order Number (*Lab Use Only*):

321508986

LA TESTING
520 MISSION STREET
SOUTH PASADENA, CA
91030
PHONE: (800) 303-0047
FAX: (323)-254-9982

Analysis Completed in Accordance with EMSL's Terms and Conditions located in the Analytical Price Guide

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
1840-A1A			
1840-A1B	See field forms		
1840-A1C			

*Comments/Special Instructions: See field forms

Analysis Completed in Accordance with EMSL's Terms and Conditions located in the Analytical Price Guide

321508986 -

Hazardous Homogeneous Materials and Sampling Survey Field Form: Asbestos

Project # & Name: 1840_2 Oceanit Kauai Anahola Farm Lots Water System Improvements
Location: Anahola, Kauai
Inspector Initials: AC/
Date & Time: 4/15/15

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
7	Res	1	Ext.	electrical box	O/W	wire wrap insulation	M	G (F) P	Y (N) / TSI S (M)	3	gray

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
1840-A A	Ext.	electrical box	544	
1840-A B				
1840-A C				

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
								G F P	Y N / TSI S M		

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
1840-A A				
1840-A B				
1840-A C				

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Friable ACM / Type	Area Sq. ft or L. ft	Hatch Color
								G F P	Y N / TSI S M		

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
1840-A A				
1840-A B				
1840-A C				

LA Testing
520 Mission Street, South Pasadena, CA 91030
Phone/Fax: (323) 254-9960 / (323) 254-9982
http://www.LATesting.com pasadenalab@latesting.com

LA Testing Order: 321508766
CustomerID: 32MYOU50
CustomerPO:
ProjectID:

Attn: **Adam Custer**
Myounghee Noh & Associates, LLC
99-1046 Iwaena Street
Suite 210A
Aiea, HI 96701

Phone: (808) 484-9214
Fax:
Received: 04/21/15 9:10 AM
Collected:

Project: **1840_2 Oceanit Anahola**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client Sample Description	*Lab ID*	*Collected*	*Analyzed*	*Lead Concentration*
1840-P1A	*321508766-0001*		4/21/2015	<100 ppm
	Site: 1			
1840-P1B	*321508766-0002*		4/21/2015	<100 ppm
	Site: 1			
1840-P2A	*321508766-0003*		4/21/2015	110 ppm
	Site: 2			
1840-P2B	*321508766-0004*		4/21/2015	5600 ppm
	Site: 2			
1840-P3A	*321508766-0005*		4/21/2015	17000 ppm
	Site: 3			
1840-P3B	*321508766-0006*		4/21/2015	13000 ppm
	Site: 3			
1840-P4A	*321508766-0007*		4/21/2015	280 ppm
	Site: 4			
1840-P4B	*321508766-0008*		4/21/2015	710 ppm
	Site: 4			
1840-P5A	*321508766-0009*		4/21/2015	50000 ppm
	Site: 5			
1840-P5B	*321508766-0010*		4/21/2015	47000 ppm
	Site: 5			
1840-P6A	*321508766-0011*		4/21/2015	36000 ppm
	Site: 6			
1840-P6B	*321508766-0012*		4/21/2015	23000 ppm
	Site: 6			

Jerry Drapala Ph.D, Laboratory Manager
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements established by the AIHA-LAP, unless specifically indicated otherwise.

Samples analyzed by LA Testing South Pasadena, CA CA ELAP 2283, AIHA-LAP, LLC ELLAP 102814

Initial report from 04/21/2015 12:55:01

OrderID: 321508766

Chain of Custody

EMSL Order Number (*Lab Use Only*): **321508766**

LATESTING
520 MISSION STREET
SOUTH PASADENA, CA
91030
PHONE: (800) 303-0047
FAX: (323)-254-9982

Company: Myounghee Noh & Associates	EMSL-Bill to: ☐ Same ☐ Different If Bill to is Different note instructions in Comments**
Street: 99-1046 Kwaena St. 210A	Third Party Billing requires written authorization from third party
City: Aiea State/Province: HI	Zip/Postal Code: 96701 Country: USA
Report To (Name): Adam C	Telephone #: 808-484-9214
Email Address: adam@noh-associates	Fax #: Purchase Order:
Project Name/Number: 1840-2 Oceanit Anahola	Please Provide Results: ☐ Fax ☒ Email
U.S. State Samples Taken:	Connecticut Samples: ☐ Commercial ☐ Residential

Turnaround Time (TAT) Options* - Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☒ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week

*For RUSH TAT's Please Call Ahead to Confirm Lab Hours and Availability. Not all TAT options are valid for every test. Materials Science and IAQ TATs are in Business Days rather than Hours (i.e. 24 Hour = End of Next Business Day)

Asbestos

PCM - Air
☐ NIOSH 7400
☐ w/ 8hr. TWA

TEM– Air ☐ 4-4.5hr TAT(AHERA ONLY)
☐ AHERA 40 CFR, Part 763
☐ NIOSH 7402
☐ EPA Level II
☐ ISO 10312

TEM - Water
Fibers ≥10µm ☐ Waste ☐ Drinking
All Fiber Sizes ☐ Waste ☐ Drinking

PLM - Bulk
☐ PLM EPA 600/R-93/116
☐ PLM EPA NOB (<1%)
☐ NYS 198.1 (friable-NY)
☐ NYS 198.6 (non-friable-NY)
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
Point Count w/ Gravimetric
☐ 400 (<0.25%) ☐ 1000 (<0.1%)

TEM - Dust
☐ Microvac – ASTM D 5755
☐ Wipe-ASTM D6480

TEM - Bulk
☐ TEM EPA NOB
☐ NYS NOB 198.4 (non-friable-NY)
☐ Chatfield SOP

Soil/Rock/Vermiculite
☐ PLM CARB 435 – A (0.25% sensitivity)
☐ PLM CARB 435 – B (0.1% sensitivity)
☐ TEM CARB 435 – B (0.1% sensitivity)
☐ EPA Reg. 1 Screening Protocol (Qualitative)

Other:

Lead (Pb)

Flame Atomic Absorption
☒ Chips SW846-7000B or AOAC 974.02
☐ Soil SW846-7000B/7420
☐ Air NIOSH 7082
☐ Wastewater SM3111B or SW846-7000B/7420
☐ ASTM Wipe SW846-7000B/7420
☐ non ASTM Wipe SW846-7000B/7420
☐ TCLP SW846-1311/7420/SM 3111B

ICP
☐ Air NIOSH 7300 Modified
☐ non ASTM Wipe SW846-6010B or C
☐ ASTM Wipe SW846-6010B or C
☐ Soil SW846-6010 B or C
☐ Waste Water SW846-6010B or C
☐ TCLP SW846-6010B or C

Graphite Furnace Atomic Absorption
☐ Soil SW846-7421 ☐ Wastewater EPA 200.9
☐ Air NIOSH 7105 ☐ Drinking Water EPA 200.9

Other: ☐

Microbiology

Wipe and Bulk Samples
☐ Mold & Fungi – Direct Examination
☐ Mold & Fungi Culture (Genus Only)
☐ Mold & Fungi Culture (Genus & Species)
☐ Bacterial Count & ID (Up to Three Types)
☐ Bacterial Count & ID (Up to Five Types)
☐ MRSA
☐ *Pseudomonas aeruginosa*

Water Samples
☐ Total Coliform & E.coli (P/A)
☐ Fecal Coliform (SM 9222D)
☐ Sewage Screen
☐ Heterotrophic Plate Count (SM 9215)

Air Samples
☐ Mold & Fungi (Spore Trap)
☐ Mold & Fungi Culture (Genus Only)
☐ Mold & Fungi (Genus & Species)
☐ Bacterial Culture & ID (Up to Three Types)
☐ Bacterial Culture & ID (Up to Five Types)
☐ Endotoxin Testing

Real Time Q-PCR (See Analytical Guide for Code)
Code:

Legionella
☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4

Other: ☐

Materials Science

☐ Common Particle ID (large particles)
☐ Full Particle ID (environmental dust)
☐ Basic Material ID (solids)
☐ Advanced Material ID
☐ Physical Testing (Tensile, Compression)
☐ *Combustion-by-products* (soot, char, etc.)
☐ X-Ray Fluorescence (elem. analysis)
☐ X-Ray Diffraction (Crystalline Part.)
☐ MMVF's (Fibrous glass, RCF's)
☐ Particle Size (sieve/microscopy/laser)
☐ Combustible Dust
☐ Petrographic Examination
Other: ☐

IAQ

Nuisance Dust NIOSH ☐ 0500 ☐ 0600
Airborne Dust ☐ PM10 ☐ TSP
Silica Analysis: ☐ All Species
Silica Analysis – Single Species
☐ Alpha Quartz ☐ Cristobalite ☐ Tridymite
☐ HVAC Efficiency
☐ Carbon Black
☐ Airborne Oil Mist
Radon Testing: Call for Kit and COC
Other: ☐

****Comments/Special Instructions:** See field forms

Client Sample #'s	1840 - P1A → P6B	**Total # of Samples:** 12	
Relinquished (Client):	Adam C	**Date:** 4/20/15	**Time:** 1200
Received (Lab):	[illegible]	**Date:** 4/21/15	**Time:** 9:10AM

Controlled Document-OneChain-R3-11/8/2011

OrderID: 321508766

Chain of Custody

EMSL Order Number (*Lab Use Only*):

321508766

LATESTING
520 MISSION STREET
SOUTH PASADENA, CA
91030
PHONE: (800) 303-0047
FAX. (323)-254-9982

Analysis Completed in Accordance with EMSL's Terms and Conditions located in the Analytical Price Guide

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
1840 - P1A			
P1B	See Field Forms		
- P6A			
- P6B			

***Comments/Special Instructions:**

Analysis Completed in Accordance with EMSL's Terms and Conditions located in the Analytical Price Guide

Controlled Document-OneChain-R3-11/8/2011

321508766

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 1840_2 Oceanit Kauai Anahola Farm Lots Water System Improvements Location: Anahola, Kauai

Inspector Initials: AC/ Date & Time: 4/15/15

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
1	Res	1	Int.	Walls, ceiling, ladder, hatch	Black	P	M	G F P	9,000	entire interior No hatching

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
1840-P A	Int. ↓	ceiling	527	
1840-P B		ladder		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
2	Res	1	Ext.	Walls, ladder, pipes, top	Lt. green	P	M	G F P	8,000	jade

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
1840-P 2 A	Ext. ↓	wall	518	
1840-P 2 B		pipe		

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
3	Res	1	Ext.	Walls	Lt. gray	P	M	G F P	1500	silver

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
1840-P 3 A	Ext. ↓	wall ↓	522	
1840-P 3 B				

321508766

Hazardous Homogeneous Materials and Sampling Survey Field Form: Lead Paint

Project # & Name: 1840_2 Oceanit Kauai Anahola Farm Lots Water System Improvements
Location: Anahola, Kauai
Inspector Initials: AC/
Date & Time: 9/15/15

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
4	Res	1	Ext.	pipe, valve	Dk green	P	M	G F P	10	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
1840-P 4 A	Ext.	pipe	516	
1840-P 4 B				

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
5	Res	1	Ext.	electrical box	O/W	P	M	G F P	5	X

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
1840-P 5 A	Ext.	electrical box	538	
1840-P 5 B				

HM ID	Building	Flr.	Rooms	Locations	Material Color	Material	Substrate	Condition	Area Sq. ft or L. ft	Hatch Color
6	Res	1	Ext.	Vent	Black	P	M	G F P	10	

Sample ID	Room Sampled	Sample Location	PIC ID	Notes
1840-P 6 A	Ext.	Vent	525	
1840-P 6 B				

GEOTECHNICAL ENGINEERING EXPLORATION

ANAHOLA FARM LOTS

WATER SYSTEM IMPROVEMENTS

ANAHOLA, KAUAI, HAWAII

W.O. 7534-00 OCTOBER 25, 2017

Prepared for

OCEANIT

GEOLABS, INC.
Geotechnical Engineering and Drilling Services

GEOTECHNICAL ENGINEERING EXPLORATION

ANAHOLA FARM LOTS

WATER SYSTEM IMPROVEMENTS

ANAHOLA, KAUAI, HAWAII

W.O. 7534-00 OCTOBER 25, 2017

Prepared for

OCEANIT

GERALD Y. SEKI
LICENSED PROFESSIONAL ENGINEER
No. 5635-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.

SIGNATURE

4-30-18
EXPIRATION DATE
OF THE LICENSE

GEOLABS, INC.
Geotechnical Engineering and Drilling Services
2006 Kalihi Street • Honolulu, HI 96819

Hawaii • California

GEOLABS, INC.

Geotechnical Engineering and Drilling Services

October 25, 2017
W.O. 7534-00

Mr. Jeremy Michelson
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

Dear **Mr. Michelson:**

Geolabs, Inc. is pleased to submit our report entitled "Geotechnical Engineering Exploration, Anahola Farm Lots Water System Improvements, Anahola, Kauai, Hawaii," prepared for the design of the project.

Our work was performed in general accordance with the scope of services outlined in our fee proposal dated September 22, 2016.

Please note that the soil samples and rock cores recovered during our field exploration (remaining after testing) will be stored for a period of two months from the date of this report. The samples will be discarded after that date unless arrangements are made for a longer sample storage period. Please contact our office for alternative sample storage requirements, if appropriate.

Detailed discussion and specific design recommendations are contained in the body of this report. If there is any point that is not clear, please contact our office.

Very truly yours,

GEOLABS, INC.

Gerald Y. Seki, P.E.
Vice President

GS:AJF:as

2006 Kalihi Street • Honolulu, Hawaii 96819
Phone: (808) 841-5064 • Facsimile: (808) 847-1749 • E-mail: hawaii@geolabs.net

Hawaii • California

GEOLABS, INC.

Geotechnical Engineering and Drilling Services

June 13, 2018
W.O. 7534-00(Add.)

Mr. Jeremy Michelson
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

Subject: Amendment to Geotechnical Report dated October 25, 2017
Anahola Farm Lots Water System Improvements
Anahola, Kauai, Hawaii

Reference: Report by Geolabs, Inc. dated October 25, 2017
entitled “Geotechnical Engineering Exploration,
Anahola Farm Lots Water System Improvements
Anahola, Kauai, Hawaii"

Dear **Mr. Michelson:**

This amendment provides a change to the recommended minimum compaction of the fill materials below the reservoir tank and Control Building foundations provided in our report entitled "Geotechnical Engineering Exploration, Anahola Farm Lots Water System Improvements, Anahola, Kauai, Hawaii", dated October 25, 2017. A corrected minimum compaction of 95 percent relative compaction is recommended for the fill material below the reservoir tank and Control Building foundations.

We appreciate the opportunity to be of continued service to you on this project. If you have questions or need additional information, please contact our office.

Respectfully submitted,

GEOLABS, INC.

By _____
Gerald Y. Seki, P.E.
Vice President

GERALD Y. SEKI
LICENSED PROFESSIONAL ENGINEER
No. 5635-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.

_____ 4-30-20
SIGNATURE EXPIRATION DATE
OF THE LICENSE

GS:mj

(2 Copies to Addressee)

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GEOTECHNICAL ENGINEERING EXPLORATION

ANAHOLA FARM LOTS

WATER SYSTEM IMPROVEMENTS

ANAHOLA, KAUAI, HAWAII

W.O. 7534-00 OCTOBER 25, 2017

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WATER SYSTEM IMPROVEMENTS

ANAHOLA, KAUAI, HAWAII

W.O. 7534-00 OCTOBER 25, 2017

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Our field exploration generally encountered a pavement structure consisting of about 1.5 inches of asphaltic concrete and 4 inches of granular fill material overlying medium stiff to hard saprolitic soils and medium hard to hard basalt rock formation to the maximum depth explored of about 102 feet below the existing ground surface. The saprolitic soils encountered generally consisted of medium stiff to hard silty clay with varying amounts of sand and weathered gravel and were encountered in our borings to depths ranging from about 18 to 23 feet below the existing ground surface.

A transition zone of extremely weathered basalt rock was encountered between the saprolitic soils and basalt rock formation and generally consisted of medium dense to very dense silty sand with weathered gravel. Medium hard to hard basalt rock formation was encountered underlying this transition zone in Boring No. 1 at a depth of about 21 feet below the existing ground surface. We did not encounter groundwater in the borings at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

Based on the subsurface conditions encountered, we recommend utilizing shallow spread and continuous strip footings, such as perimeter wall footings and isolated interior spread footings, to support the new reservoir structures planned at the project site. In order to provide a uniform bearing surface, we recommend providing a minimum 24-inch thick layer of aggregate subbase material below the footings and concrete/finished floor of the proposed new 0.5 MG and temporary 0.1 MG reservoir tank structures. The aggregate subbase should extend beyond the edges of the reservoir structures by at least 24 inches. An allowable bearing pressure of up to 3,500 psf may be utilized for design of shallow foundations bearing on the aggregate subbase material placed over the on-site clayey soils at the project site.

We understand that the settlement for the new 0.5 MG reservoir tank structure should be minimized; therefore, we recommend incorporating two layers of triaxial geogrid, such as Tensar TriAx Grid TX7, into the 24-inch thick layer of aggregate subbase material beneath the footings and interior concrete floor of the new 0.5 MG reservoir tank structure to spread the load and reduce the loading on the underlying subgrade soils. We recommend placing the two layers of triaxial geogrid within the 24-inch thick aggregate subbase material at 6 and 18 inches above the bottom of the footing subgrade. Due to the temporary nature of the 0.1 MG reservoir tank structure, we believe the two layers of triaxial geogrid may be omitted beneath the footings of this temporary structure.

Prior to placing the aggregate subbase material, a non-woven geotextile fabric, such as Mirafi 180N or equivalent, should be provided below and along the sides of the over-excavation for the footings. Placement of the non-woven geotextile fabric at the bottom and along the sides of the over-excavation would provide separation and reduce the potential for penetration of the aggregate subbase material into the moist soils underlying the project site.

We also recommend supporting the control building addition on a shallow foundation system consisting of spread and/or strip footings. However, due to the relatively light structural loads anticipated for the control building addition, we believe that the 24-inch layer of aggregate subbase material recommended below the reservoir tank foundations may be omitted for the control building foundations. Instead, the footings may bear directly on the on-site soils that are recompacted to a firm and unyielding surface prior to the placement of reinforcing steel or concrete. An allowable bearing pressure of 2,500 psf may be utilized for the design of the control building addition foundations bearing on the recompacted on-site clayey soils.

Based on the results of our field exploration and laboratory testing, the on-site clayey soils exhibit moderate expansion potential when subjected to moisture fluctuations. Therefore, we recommend placing a minimum 18-inch thick layer of aggregate subbase material below the control building slab-on-grade to reduce moisture changes in the slab subgrade soils. Placement of the aggregate subbase layer would reduce the potential for future distress to the slabs-on-grade resulting from shrinking and swelling of the on-site soils due to changes in the moisture content.

Conventional earthwork and construction methods may be used for the proposed project grading. Based on the anticipated grading and our field exploration, this project will generally consist of excavations for foundation construction and infrastructure installation. Some of the excavations may encounter boulders, clusters of cobbles, and hard basalt rock formation. It is anticipated that most of the material may be excavated with normal heavy excavation equipment. However, deep excavations, excavations into basalt rock formation, and excavations encountering boulders may require the use of hoerams.

The text of this report should be referred to for detailed discussions and specific geotechnical recommendations.

END OF SUMMARY OF FINDINGS AND RECOMMENDATIONS

SECTION 1. GENERAL

This report presents the results of our geotechnical engineering exploration performed for the *Anahola Farm Lots Water System Improvements* project in the Anahola area on the Island of Kauai, Hawaii. The project location and general vicinity are shown on the Project Location Map, Plate 1.

This report summarizes the findings and geotechnical recommendations resulting from our field exploration, laboratory testing, and engineering analyses for the project. These findings and geotechnical recommendations are intended for the design of foundations, slabs-on-grade, retaining structures, site grading, underground utilities, and pavements only. The findings and recommendations presented herein are subject to the limitations noted at the end of this report.

1.1 Project Considerations

The project generally consists of improvements to the existing Anahola Farm Lots Water System in Anahola on the Island of Kauai, Hawaii. Based on the information provided, improvements to the existing farm lots water system will generally consist of the following:

- Replacement of an existing 0.5 million-gallon (MG) steel reservoir tank with a new concrete reservoir tank of similar size
- Temporary 0.1 MG steel reservoir tank
- New in-line booster pump assembly
- New emergency generator and fuel tank
- Addition to existing Control Building
- Related underground utilities such as water and drain lines
- New asphaltic concrete pavements

We understand the new 0.5 MG concrete reservoir tank will have an outside diameter of about 48 feet and will be about 40 feet tall. Based on information provided by the project structural engineer, the maximum column and wall loads anticipated for the new 0.5 MG concrete reservoir tank are approximately 85 kips and 15 kips per foot,

respectively. In addition, the slab-on-grade of the new reservoir tank will be subjected to approximately 2.8 kips per square foot of pressure.

We understand the temporary 0.1 MG steel reservoir tank will have a diameter of about 30 feet and will be about 21.5 feet tall. Based on information provided by the project structural engineer, maximum anticipated wall load for the temporary 0.1 MG steel reservoir tank is approximately 750 pounds per foot. We understand an interior tank liner will be used for this temporary reservoir tank structure in lieu of a concrete slab-on-grade or metal tank bottom.

Based on the information provided, we anticipate minimal fills will be required for this water system improvements project. We anticipate the majority of site grading will generally consist of excavations and backfills related to foundation construction and infrastructure installation. However, cuts up to about 6 feet are anticipated for a retaining wall planned for grade separation on the western side of the temporary 0.1 MG steel reservoir tank.

1.2 Purpose and Scope

The purpose of our exploration was to obtain an overview of the surface and subsurface conditions to develop an idealized soil/rock data set to formulate geotechnical engineering recommendations for the design of the project. The work was performed in general accordance with our revised fee proposal dated September 22, 2016. The scope of work for this exploration included the following tasks and work efforts:

1. Research and review of available in-house soils boring data and other geologic information for the project.

2. Mobilization and demobilization of a truck-mounted drill rig and two operators to the project site and back.

3. Drilling and sampling of three borings extending to depths ranging from about 16.5 to 102 feet below the existing ground surface. In addition, collection of one bulk sample of the near-surface soils for California Bearing Ratio (CBR) testing.

4. Performance of shear wave velocity testing within the boring drilled to about 100 feet below the existing ground surface.

5. Coordination of the field exploration and logging of the borings by our geologist.

6. Laboratory testing of selected soil samples obtained during the field exploration as an aid in classifying the materials and evaluating their engineering properties.

7. Analyses of the field and laboratory data to formulate geotechnical engineering recommendations for the design of the project.

8. Preparation of this report summarizing our work and presenting our findings and geotechnical recommendations.

9. Coordination of our overall work on the project by our engineer.

10. Quality assurance of our work and client/design team consultation by our principal engineer.

11. Miscellaneous work efforts, such as drafting, word processing, and clerical support.

Detailed descriptions of our field exploration methodology and the Logs of Borings are presented in Appendix A. Results of the seismic shear wave velocity testing are presented in Appendix B. Results of the laboratory tests performed on selected soil samples are presented in Appendix C. Photographs of the core samples are presented in Appendix D.

END OF GENERAL

SECTION 2. SITE CHARACTERIZATION

2.1 Regional Geology

The Island of Kauai is composed of a single dissected basaltic shield volcano built by the extrusion of lavas of the Waimea Canyon Volcanic Series beginning about 5 to 6 million years ago. The eruption of the Waimea Volcanic Series ended about 2½ million years ago and was followed by a long period of erosion. Following the cessation of this main volcano shield-building phase, about 1½ million years ago, there was renewed volcanic activity with the extrusion of basaltic lavas of the post-erosional Koloa Volcanic Series and the concurrent deposition of the thick alluvial sediments of the Palikea Formation.

Rock formations of the Koloa Volcanic Series are generally characterized as thick lava flows composed of dense basalt extruded from groups of vents aligned in north-south trends at various locales. Associated with the Koloa Volcanic Series lava flows are some deposits of pyroclastic materials (volcanic ash and cinders), which usually form cinder cones surrounding the vent. Rock formations of the Koloa Volcanic Series cover most of the eastern half of the Island of Kauai, including the project site.

During the Pleistocene Epoch, many sea level changes occurred as a result of widespread glaciation in the continental areas of the world. As the great continental glaciers accumulated, the level of the ocean fell since less water was available to fill the oceanic basins. Conversely, as the glaciers receded or melted, global sea levels rose because more water was available. The landmass of Kauai remained essentially stable during these changes, and the fluctuations were eustatic in nature. These glacio-eustatic fluctuations resulted in stands of the sea, which were both higher and lower relative to the present sea level of the Island of Kauai.

The project area is generally composed of basaltic rock built by extrusion of the lavas of the Koloa Volcanic Series. The basalt rock formation observed in the Anahola area appear to be representative of the pahoehoe lava flow type, which spread and ponded as it approached the ocean from inland areas. Pahoehoe lavas are typically

characterized by a smoother, billowy surface and internal structure of vesicular (porous) rock with limited clinker materials.

In some places, in-situ chemical weathering of the Koloa lava flows has formed a mantle of residual and saprolitic soils. In general, saprolite is composed mainly of silty material while residual soils are more clayey. Both residual and saprolitic soils are typical of the tropical weathering of volcanic rocks. The residual and saprolitic soils grade to basaltic rock formation with increased depth. Agricultural development within the last 100 years has brought the area to its present form.

2.2 Existing Site Conditions

The project site is located off the western side of Hokualele Road in Anahola on the Island of Kauai, Hawaii. The site is accessed via a roughly 150-foot long asphaltic concrete access road off the western side of Hokualele Road. The site is generally bordered by Kalalea Mountain to the north, south, and west, and Hokualele Road to the east.

At the time of our field exploration, the site was occupied by an existing 0.5 MG steel reservoir tank and a one-story CMU control building structure on the western and eastern portions of the site, respectively. An asphaltic concrete access road was observed leading to the control building and surrounding the existing tank structure. Mown lawn grass was observed surrounding the asphaltic concrete access road. An approximate 6-foot high chain link fence with barbed wire was observed around the perimeter of the site.

Based on our site observations and topographic survey map provided, the project site generally slopes down from west to east with ground surface elevations ranging from about +352 feet Mean Sea Level (MSL) near the existing 0.5 MG steel reservoir tank to about +344 feet MSL on the eastern side of the existing control building. In addition, the ground surface elevation at the bottom of the existing access road is about +330 feet MSL. At the time of our field exploration, a 4.5-foot tall slope with an inclination of about two horizontal to one vertical (2H:1V) was observed on the eastern side of the existing 0.5 MG steel reservoir tank.

2.3 Subsurface Conditions

We explored the subsurface conditions at the project site by drilling and sampling three borings, designated as Boring Nos. 1 through 3, extending to depths of about 16.5 to 102 feet below the existing ground surface. In addition, one bulk sample of the near-surface soils, designated as Bulk-1, was obtained to evaluate the pavement support characteristics of the near-surface soils. The approximate boring and bulk sample locations are shown on the Site Plan, Plate 2.

Our borings generally encountered a pavement structure consisting of about 1.5 inches of asphaltic concrete and 4 inches of granular fill material overlying medium stiff to hard saprolitic soils and medium hard to hard basalt rock formation to the maximum depth explored of about 102 feet below the existing ground surface. It should be noted that a pavement structure was not encountered in Boring No. 3 since it was located in a grassed area.

The saprolitic soils encountered generally consisted of medium stiff to hard silty clay with varying amounts of sand and weathered gravel and were encountered in our borings to depths ranging from about 18 to 23 feet below the existing ground surface. A transition zone of extremely weathered basalt rock was encountered between the saprolitic soils and basalt rock formation and generally consisted of medium dense to very dense silty sand with weathered gravel. Medium hard to hard basalt rock formation was encountered underlying this transition zone in Boring No. 1 at a depth of about 21 feet below the existing ground surface.

We did not encounter groundwater in the borings at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

Detailed descriptions of our field exploration methodology and the Logs of Borings are presented in Appendix A. Seismic Shear Wave Velocity test results are presented in Appendix B. Results of the laboratory tests performed on selected soil

samples are presented in Appendix C. Photographs of the core samples are presented in Appendix D.

2.4 Seismic Design Considerations

Based on the International Building Code, 2006 Edition (IBC 2006) as amended, the project site may be subject to seismic activity and seismic design considerations will need to be addressed. The following sections provide discussions on the seismicity, soil profile type for seismic design, and the potential for liquefaction at the project site.

2.4.1 Earthquakes and Seismicity

In general, earthquakes throughout the world are caused by shifts in the tectonic plates. In contrast, earthquake activity in Hawaii is primarily linked to volcanic activity; therefore, earthquake activity in Hawaii generally occurs before or during volcanic eruptions. In addition, earthquakes may result from the underground movement of magma that comes close to the surface but does not erupt. The Island of Hawaii experiences thousands of earthquakes each year, but most are so small that they can be detected only by sensitive instruments. However, some of the earthquakes are strong enough to be felt, and a few cause minor to moderate damage.

In general, earthquakes associated with volcanic activity are most common on the Island of Hawaii. Earthquakes that are directly associated with the movement of magma are concentrated beneath the active Kilauea and Mauna Loa Volcanoes on the Island of Hawaii. Because the majority of earthquakes in Hawaii (over 90 percent) are related to volcanic activity, the risk of seismic activity and degree of ground shaking diminishes with increased distance from the Island of Hawaii. The Island of Hawaii has experienced numerous earthquakes greater than Magnitude 5 (M5+); however, earthquakes are not confined only to the Island of Hawaii.

To a lesser degree, the Island of Maui has experienced several earthquakes greater than Magnitude 5. Therefore, moderate to strong earthquakes have occurred in the County of Maui. The effects of earthquakes occurring on the Islands

of Hawaii and Maui may be felt on the Island of Oahu. For example, small landslides occurred on the Island of Oahu as a result of the Maui Earthquake of 1938 (M6.8). Some houses on the Island of Oahu were reportedly damaged as a result of the Lanai Earthquake of 1871 (M7+).

Seismic hazards on the Island of Kauai generally are considered to be low. Earthquakes with a magnitude greater than 5 have not been recorded on the Island of Kauai.

2.4.2 Soil Profile Type for Seismic Design

Seismic shear wave velocity profiling using seismic cone penetration testing (SCPT) equipment was performed in an effort to more closely analyze the seismic design considerations for the project site. Seismic shear wave velocity testing was performed in Boring No. 1 to a depth of about 100 feet below the existing ground surface.

Based on the seismic shear wave velocity test results, the weighted average shear wave velocity for the materials within the upper 100 feet of the soil profile is on the order of about 4,883 feet per second at the test location. Results of the seismic shear wave velocity test are provided in Appendix B.

Based on the subsurface materials encountered at the project and the shear wave velocity profiling performed, we believe the project site may be classified from a seismic analysis standpoint as being a “Rock” site corresponding to a Site Class B soil profile type based on the International Building Code (Table No. 1613.5.2), 2006 Edition. Based on Site Class B, the following seismic design parameters were estimated and may be used for seismic analysis for this project.

SEISMIC DESIGN PARAMETERS	
Parameter	**Value**
Mapped MCE Spectral Response Acceleration, S_S	0.237g
Mapped MCE Spectral Response Acceleration, S_1	0.065g
Site Class	“B”
Site Coefficient, F_a	1.000

SEISMIC DESIGN PARAMETERS	
Parameter	**Value**
Site Coefficient, F_v	1.000
Adjusted MCE Spectral Response Acceleration, S_{MS}	0.237g
Adjusted MCE Spectral Response Acceleration, S_{M1}	0.065g
Design Spectral Response Acceleration, S_{DS}	0.158g
Design Spectral Response Acceleration, S_{D1}	0.043g
Peak Bedrock Acceleration, PBA (Site Class B)	0.101g
Peak Ground Acceleration, PGA (Site Class B)	0.067g

2.4.3 Liquefaction

Based on the International Building Code, the project site may be subjected to seismic activity and should be evaluated for soil liquefaction potential.

Soil liquefaction is a condition where saturated cohesionless soils near the ground surface undergo a substantial loss of strength due to the build-up of excess pore water pressures resulting from cyclic stress applications induced by earthquakes. In this process, when the loose saturated sand deposit is subjected to vibration (such as during an earthquake), the soil tends to densify and decrease in volume causing an increase in pore water pressure. If drainage is unable to occur rapidly enough to dissipate the build-up of pore water pressure, the effective stress (internal strength) of the soil is reduced. Under sustained vibrations, the pore water pressure build-up could equal the overburden pressure, essentially reducing the soil shear strength to zero and causing it to behave as a viscous fluid. During liquefaction, the soil acquires a mobility sufficient to permit both horizontal and vertical movements, and if not confined, will result in significant deformations.

Soils most susceptible to liquefaction are loose, uniformly graded, fine-grained sands and loose silts with little cohesion. It is generally acknowledged that liquefaction will not occur if the deposit is greater than 40 to 50 feet below the ground surface. In deeper deposits, the greater overburden pressure is generally sufficient to prevent liquefaction from occurring. The major factors affecting the liquefaction characteristics of a soil deposit are as follows:

FACTORS	LIQUEFACTION SUSCEPTIBILITY
Grain Size Distribution	Fine and uniform sands and silts are more susceptible to liquefaction than coarse or well-graded sands.
Initial Relative Density	Loose sands and silts are most susceptible to liquefaction. Liquefaction potential is inversely proportional to relative density.
Magnitude and Duration of Vibration	Liquefaction potential is directly proportional to the magnitude and duration of the earthquake.

Based on the subsurface conditions encountered consisting of stiff silty clay and basalt rock formation, the phenomenon of soil liquefaction is not a design consideration for this project site. The risk for potential liquefaction is non-existent based on the subsurface conditions encountered.

END OF SITE CHARACTERIZATION

SECTION 3. DISCUSSION AND RECOMMENDATIONS

In general, our field exploration encountered a pavement structure consisting of about 1.5 inches of asphaltic concrete and 4 inches of granular fill material overlying medium stiff to hard saprolitic soils and medium hard to hard basalt rock formation to the maximum depth explored of about 102 feet below the existing ground surface. We did not encounter groundwater in the borings at the time of our field exploration. However, it should be noted that groundwater levels are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

In general, we believe that the primary geotechnical considerations for the project include the following:

- Adequate foundation support for the planned reservoir tank structures
- Adequate foundation support for the planned control building addition
- Slabs-on-grade and pavement design with respect to the expansive soil conditions

Based on the subsurface conditions encountered at the site, we believe that shallow continuous footings, such as perimeter ring footings, and isolated interior spread footings may be used to support the proposed new 0.5 MG and temporary 0.1 MG reservoir structures. In order to provide a uniform bearing surface for the footings and interior concrete floor of the reservoir structures, we recommend providing a minimum 24-inch thick layer of compacted aggregate subbase material below the footings and concrete/finished floor of the reservoir tank structures. The 24-inch thick aggregate subbase layer should also extend beyond the edges of the reservoirs by at least 24 inches. The aggregate subbase layer should be compacted to a minimum of 90 percent relative compaction.

We understand that the settlement for the new 0.5 MG reservoir tank structure should be minimized; therefore, we recommend incorporating two layers of triaxial geogrid, such as Tensar TriAx Grid TX7, into the 24-inch thick layer of aggregate subbase material beneath the footings and interior concrete floor of the new 0.5 MG reservoir tank structure to spread the load and reduce the loading on the underlying subgrade soils. We recommend placing the two layers of triaxial geogrid within the

24-inch thick aggregate subbase material at 6 and 18 inches above the bottom of the footing subgrade. Due to the temporary nature of the 0.1 MG reservoir tank structure, we believe the two layers of triaxial geogrid may be omitted beneath the footings of this temporary structure.

Prior to placing the aggregate subbase material and triaxial geogrid, a non-woven geotextile fabric, such as Mirafi 180N or equivalent, should be provided below and along the sides of the over-excavation for the footings. Placement of the non-woven geotextile fabric at the bottom and along the sides of the over-excavation would provide separation and reduce the potential for penetration of the aggregate subbase material into the moist subgrade soils underlying the project site.

We also recommend supporting the control building addition on a shallow foundation system consisting of spread and/or strip footings. However, due to the relatively light structural loads anticipated for the control building addition, we believe that the 24-inch layer of aggregate subbase material recommended below the reservoir tank foundations may be omitted for the control building foundations. Instead, the footings may bear directly on the on-site soils that are recompacted to a firm and unyielding surface prior to the placement of reinforcing steel or concrete. All footings, including the reservoir tank footings, should be embedded a minimum of 24 inches below the lowest adjacent finished grades.

Based on the results of our field exploration and laboratory testing, the on-site clayey soils exhibit moderate expansion potential when subjected to moisture fluctuations. Therefore, we recommend placing a minimum 18-inch thick layer of aggregate subbase material below the control building slab-on-grade to reduce moisture changes in the slab subgrade soils. Placement of the aggregate subbase layer would reduce the potential for future distress to the slabs-on-grade resulting from shrinking and swelling of the on-site soils due to changes in the moisture content.

Detailed discussions and recommendations for these items and other geotechnical aspects of the project are presented in the following sections.

3.1 Reservoir Tank Foundations

Based on the subsurface conditions encountered, we recommend utilizing shallow spread and continuous strip footings, such as perimeter wall footings and isolated interior spread footings, to support the new reservoir structures planned at the project site. In order to provide a uniform bearing surface, we recommend providing a minimum 24-inch thick layer of aggregate subbase material below the footings and concrete floor of the proposed new 0.5 MG and temporary 0.1 MG reservoir tank structures. This 24-inch thick layer of aggregate subbase material should also be provided beneath the bottom of the temporary 0.1 MG reservoir tank floor, which we understand consists of a liner in lieu of a concrete slab-on-grade or metal tank bottom.

The aggregate subbase should extend beyond the edges of the reservoir structures by at least 24 inches. The aggregate subbase should be placed in level lifts not exceeding 8 inches in loose thickness, moisture-conditioned to above the optimum moisture content, and compacted to at least 90 percent relative compaction.

As mentioned above, we understand that the settlement for the new 0.5 MG reservoir tank structure should be minimized; therefore, we recommend incorporating two layers of triaxial geogrid, such as Tensar TriAx Grid TX7, into the 24-inch thick layer of aggregate subbase material beneath the footings and interior concrete floor of the new 0.5 MG reservoir tank structure to spread the load and reduce the loading on the underlying subgrade soils. We recommend placing the two layers of triaxial geogrid within the 24-inch thick aggregate subbase material at 6 and 18 inches above the bottom of the footing subgrade. Due to the temporary nature of the 0.1 MG reservoir tank structure, we believe the two layers of triaxial geogrid may be omitted beneath the footings of this temporary structure.

Prior to placing the aggregate subbase material and triaxial geogrid, a non-woven geotextile fabric, such as Mirafi 180N or equivalent, should be provided below and along the sides of the over-excavation for the footings. Placement of the non-woven geotextile fabric at the bottom and along the sides of the over-excavation would provide separation and reduce the potential for penetration of the aggregate subbase material into the moist soils underlying the project site.

An allowable bearing pressure of up to 3,500 pounds per square foot (psf) may be utilized for design of shallow foundations bearing on the aggregate subbase material placed over the on-site medium stiff to hard clayey soils at the project site. This bearing value is for supporting dead-plus-live loads and may be increased by one-third (⅓) for transient loads, such as those caused by wind or seismic forces. For design of the reservoir concrete floors, a modulus of subgrade reaction of up to 200 pounds per square inch per inch of deflection (pci) may be used for the compacted aggregate subbase.

Footing subgrades should be recompacted to a firm and unyielding surface prior to the placement of reinforcing steel or concrete. Soft and/or loose materials encountered at the bottom of footing excavations should be over-excavated to expose the underlying firm materials. The over-excavation should be backfilled with fill materials compacted to a minimum of 90 percent relative compaction, or the footing may be deepened to bear on the underlying firm materials.

In general, the perimeter wall footings should be embedded a minimum of 24 inches below the lowest adjacent finished grade. Footings constructed near tops of slopes, such as the eastern side of the existing reservoir tank structure, or on sloping ground should be embedded deep enough to provide a minimum horizontal setback distance of 6 feet measured from the outside edge of the footings to the slope face.

Foundations next to utility trenches should be embedded below a one horizontal to one vertical (1H:1V) imaginary plane extending upward from the bottom edge of the utility trench, or the foundation should be extended to a depth as deep as the inverts of the utility lines. This requirement is necessary to avoid surcharging adjacent below-grade structures with additional structural loads and to reduce the potential for appreciable foundation settlement.

If foundations are designed and constructed in strict accordance with our recommendations, we estimate total settlements of the foundations to be less than 0.5 inch. Differential settlements between adjacent footings supported on similar materials may be on the order of ¼-inch or less.

Lateral loads acting on the reservoir tank structures may be resisted by friction between the base of the foundation and the bearing materials and by passive earth pressure developed against the near-vertical faces of the embedded portion of foundations. A coefficient of friction of 0.40 may be used for footings bearing directly on the aggregate subbase materials. Resistance due to passive earth pressure may be estimated using an equivalent fluid pressure of 300 pounds per square foot per foot of depth (pcf) assuming that the soils around the footings are well compacted. Unless covered by pavements or slabs, the passive pressure resistance in the upper 12 inches below the finished grade should be neglected.

A Geolabs representative should observe the footing excavations prior to placing the aggregate subbase material, reinforcing steel, and/or concrete to confirm the foundation bearing conditions and the required embedment depths.

3.2 Control Building Addition Foundations

Based on the subsurface conditions encountered, we recommend utilizing shallow spread and/or continuous strip footings to support the new control building addition structure planned at the project site. An allowable bearing pressure of 2,500 pounds per square foot (psf) may be utilized for the design of the control building addition foundations bearing on the recompacted on-site clayey soils. This bearing value is for supporting dead-plus-live loads and may be increased by one-third (1/3) for transient loads, such as those caused by wind or seismic forces.

Footing subgrades should be recompacted to a firm and unyielding surface prior to the placement of reinforcing steel or concrete. Soft and/or loose materials encountered at the bottom of footing excavations should be over-excavated to expose the underlying firm materials. The over-excavation should be backfilled with fill materials compacted to a minimum of 90 percent relative compaction, or the footing may be deepened to bear on the underlying firm materials.

In general, footings should be embedded a minimum of 24 inches below the lowest adjacent finished grades. Footings constructed near tops of slopes or on sloping ground should be embedded deep enough to provide a minimum horizontal set-back

distance of 6 feet measured from the outside edge of the footings to the slope face. Footings adjacent to planned (or existing) retaining walls should be embedded deep enough to avoid surcharging the retaining wall foundations.

Foundations next to utility trenches should be embedded below a one horizontal to one vertical (1H:1V) imaginary plane extending upward from the bottom edge of the utility trench, or the foundation should be extended to a depth as deep as the inverts of the utility lines. This requirement is necessary to avoid surcharging adjacent below-grade structures with additional structural loads and to reduce the potential for appreciable foundation settlement.

If foundations are designed and constructed in strict accordance with our recommendations, we estimate total settlements of the foundations to be less than 1 inch. Differential settlements between adjacent footings supported on similar materials may be on the order of 0.5 inch or less.

Lateral loads acting on the control building addition structure may be resisted by friction between the base of the foundation and the bearing materials and by passive earth pressure developed against the near-vertical faces of the embedded portion of foundations. A coefficient of friction of 0.30 may be used for footings bearing directly on the on-site clayey soils or new compacted fills. Resistance due to passive earth pressure may be estimated using an equivalent fluid pressure of 300 pounds per square foot per foot of depth (pcf) assuming that the soils around the footings are well compacted. Unless covered by pavements or slabs, the passive pressure resistance in the upper 12 inches below the finished grade should be neglected.

A Geolabs representative should observe the footing excavations prior to placing reinforcing steel and/or concrete to confirm the foundation bearing conditions and the required embedment depths.

3.3 Slabs-On-Grade

Based on the results of our field exploration and laboratory testing, the near-surface clayey soils exhibit moderate expansion potential when subjected to moisture fluctuations. Therefore, we recommend placing a minimum 18 and 24-inch

thick layer of aggregate subbase material below the planned concrete slabs-on-grade for the control building addition and reservoir tank structures, respectively, to reduce moisture changes in the slab subgrade soils. Placement of the aggregate subbase layer would reduce the potential for future distress to the slabs-on-grade resulting from shrinking and swelling of the on-site soils due to changes in the moisture content. The aggregate subbase material should be compacted to a minimum of 90 percent relative compaction.

We anticipate that a floor covering will not be used for the control building addition. If a floor covering is used, a minimum 4-inch layer of cushion fill consisting of open-graded gravel (ASTM C33, No. 67 gradation) should be used below the concrete slab to serve as a capillary moisture break. To reduce the potential for future moisture infiltration through the slab and subsequent damage to floor coverings, an impervious moisture barrier is recommended on top of the gravel cushion fill layer.

Prior to placing the aggregate subbase material, we recommend scarifying the subgrade soils to a depth of about 8 inches, moisture-conditioning the soils to at least 2 percent above the optimum moisture content, and compacting to a minimum of 90 percent relative compaction. The underlying subgrade soils and aggregate subbase material should be wetted and kept moist until the final placement of slab concrete. Where shrinkage cracks are observed after compaction of the subgrade, we recommend preparing the soils again as recommended. Saturation and subsequent yielding of the exposed subgrade due to inclement weather and poor drainage may require over-excavation of the soft areas and replacement with engineered fill.

We anticipate exterior concrete walkways may be required for the proposed project. We recommend supporting concrete walkways on a minimum 18 inches of aggregate subbase material. The aggregate subbase material should be compacted to at least 90 percent relative compaction. Control joints should be provided at intervals equal to the width of the walkways with expansion joints at right-angle intersections. The thickened edges of slabs adjacent to unpaved areas should be embedded at least 12 inches below the lowest adjacent grade.

It should be emphasized that the areas adjacent to the slab edges should be backfilled tightly against the edges of the slabs with relatively impervious soils. These areas should also be graded to divert water away from the slabs and to reduce the potential for water ponding around the slabs.

3.4 Retaining Structures

Based on the information provided, we understand that retaining structures up to about 6 feet in height are anticipated for grade separation on the western side of the temporary 0.1 MG steel reservoir tank. Based on the subsurface conditions encountered, the following general guidelines may be used for design of the retaining walls at the project site.

3.4.1 Retaining Structure Foundations

In general, we believe retaining structure foundations may be designed in accordance with the recommendations and parameters presented in the "Control Building Addition Foundations" section herein. In addition, retaining wall foundations should be at least 18 inches wide and should be embedded a minimum of 24 inches below the lowest adjacent finished grades. For sloping ground conditions, the footing should extend deeper to obtain a minimum 6-foot setback distance measured horizontally from the outside edge of the footing to the face of the slope. Wall footings oriented parallel to the direction of the slope should be constructed in stepped footings.

3.4.2 Lateral Earth Pressures

Retaining structures should be designed to resist lateral earth pressures due to the adjacent soils and surcharge effects caused by loads adjacent to the walls. The recommended lateral earth pressures for design of the retaining structures, expressed in equivalent fluid pressures of pounds per square foot per foot of depth (pcf), are presented in the following table.

LATERAL EARTH PRESSURES FOR DESIGN OF RETAINING STRUCTURES			
Backfill Condition	**Earth Pressure Component**	**Active** (pcf)	**At-Rest** (pcf)
Level Backfill	Horizontal	36	54
	Vertical	None	None
Maximum 2H:1V Sloping Backfill	Horizontal	55	71
	Vertical	28	35

The values provided above assume that on-site soils will be used to backfill behind the retaining structures. It is assumed that the backfill behind the retaining structures will be compacted to between 90 and 95 percent relative compaction per ASTM D1557. Over-compaction of the retaining structure backfill should be avoided.

In general, an active condition may be used only for gravity walls or walls that are free to deflect by as much as 0.5 percent of the structure height. If the tops of structures are not free to deflect beyond this degree, or are restrained, the structures should be designed for the at-rest condition. These lateral earth pressures do not include hydrostatic pressures that might be caused by groundwater trapped behind the structures.

Surcharge stresses due to areal surcharges, line loads, and point loads within a horizontal distance equal to the depth of the structure should be considered in the design. For uniform surcharge stresses imposed on the loaded side of the structure, a rectangular distribution with a uniform pressure equal to 35 percent of the vertical surcharge pressure acting over the entire height of the wall, which is free to deflect (cantilever), may be used in the design. For walls that are restrained, a rectangular distribution equal to 52 percent of the vertical surcharge pressure acting over the entire height of the structure may be used for design. Additional analyses during design may be needed to evaluate the surcharge effects of point loads and line loads.

3.4.3 Drainage

The retaining walls should be well drained to reduce the potential for build-up of hydrostatic pressures. A typical drainage system would consist of a 12-inch wide zone of permeable material, such as No. 3B Fine gravel (ASTM C33, No. 67 gradation), placed directly around a perforated pipe (perforations facing down) at the base of the wall discharging to an appropriate outlet or weep holes. As an alternative, a prefabricated drainage product, such as MiraDrain or EnkaDrain, may be used instead of the drainage material. The prefabricated drainage product also should be hydraulically connected to a perforated pipe at the base of the wall.

The backfill from the bottom of the wall to the bottom of the perforated pipe or weep hole should consist of relatively impervious materials to reduce the potential for significant water infiltration into the subsurface. In addition, the upper 12 inches of the retaining structure backfill should consist of relatively impervious materials to reduce the potential for significant water infiltration behind the retaining structure unless covered by concrete slabs at the surface.

3.5 Site Grading

Based on the information provided, we anticipate the majority of site grading will generally consist of excavations and backfills related to foundation construction and infrastructure installation. Minimal fills are anticipated for this water system improvements project. However, cuts up to about 6 feet are anticipated for a retaining wall planned for grade separation on the western side of the temporary 0.1 MG steel reservoir tank. The following grading items are addressed in the succeeding subsections:

1. Site Preparation
2. Fills and Backfills
3. Fill Placement and Compaction Requirements
4. Excavations
5. Cut and Fill Slopes

A Geolabs representative should monitor site grading operations to observe whether undesirable materials are encountered during the site preparation and

excavation, and to confirm whether the exposed soil conditions are similar to those assumed herein.

3.5.1 Site Preparation

At the on-set of earthwork, the area within the contract grading limits should be cleared and grubbed thoroughly. Vegetation, debris, deleterious materials, existing structures and pavements to be demolished, and other unsuitable materials should be removed and disposed of properly off-site or in a designated area to reduce the potential for contamination of the excavated materials.

Soft and yielding areas encountered during clearing and grubbing below areas designated to receive fill and/or future improvements should be over-excavated to expose firm material, and the resulting excavation should be backfilled with well-compacted fill. The excavated soft soils should not be re-used as fill materials and should be properly disposed of off-site or in landscaped areas, if appropriate.

Slabs and foundations of the existing reservoir tank structure, pavements, and walkways to be demolished should be completely removed. Over-excavations resulting from the demolition operations should be backfilled with well-compacted general fill material.

Existing underground utilities to be abandoned should be removed, and the resulting excavation should be properly backfilled with the excavated on-site materials. The on-site materials should be moisture-conditioned to about 2 percent above the optimum moisture content, placed in 8-inch level loose lifts, and compacted to a minimum of 90 percent relative compaction. Utilities to be abandoned in-place should be backfilled by pumping lean concrete or CLSM (Controlled Low Strength Material) under low pressure.

After clearing, grubbing, and demolition, areas to receive fills and finished subgrades in cut areas should be scarified to a depth of 8 inches, moisture-conditioned to at least 2 percent above the optimum moisture content, and compacted to a minimum of 90 percent relative compaction.

Where shrinkage cracks are observed after the subgrade compaction, we recommend preparing the subgrade soil again as recommended above. Saturation and subsequent yielding of the exposed subgrade due to inclement weather and poor drainage may require over-excavating the soft areas and replacing these areas with engineered fill. A Geolabs field representative should evaluate the need for over-excavation due to soft subgrade soil conditions.

3.5.2 Fills and Backfills

In general, the on-site soils may be re-used as a source of general fill material, provided they are free of vegetation, deleterious materials, and rock fragments greater than 3 inches in maximum dimension. Imported fill materials should consist of non-expansive, select granular materials such as crushed basalt or coral. Select granular fill, if required, should be well-graded from coarse to fine with particles no larger than 3 inches in largest dimension and should contain between 10 and 30 percent particles passing the No. 200 sieve. The material should have a laboratory CBR value of 20 or more and should have a maximum swell of less than 1 percent when tested in accordance with ASTM D1883.

Aggregate base course and subbase course materials should consist of crushed basaltic aggregates and should conform to the State of Hawaii, Standard Specifications for Road and Bridge Construction (2005). Imported fill materials should be tested for conformance with these recommendations prior to delivery to the project site for the intended use.

3.5.3 Fill Placement and Compaction Requirements

General fills and backfills should be moisture-conditioned to about 2 percent above the optimum moisture, placed in level lifts not exceeding 8 inches in loose thickness, and compacted to at least 90 percent relative compaction. The finished subgrades of future pavement areas should be compacted to a minimum of 95 percent relative compaction.

Aggregate base course and aggregate subbase materials should be moisture-conditioned to above the optimum moisture content, placed in level lifts

not exceeding 8 inches in loose thickness, and compacted to a minimum of 95 percent relative compaction.

Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density as determined by ASTM D1557. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density. Compaction of fill materials should be accomplished by sheepsfoot rollers, vibratory rollers, or other types of acceptable compaction equipment. Water tamping, jetting, or ponding should not be allowed to compact the fills.

3.5.4 Excavations

Based on the anticipated grading and our field exploration, this project will generally consist of excavations for foundation and infrastructure installation. Some of the excavations may encounter boulders, clusters of cobbles, and hard basalt rock formation. It is anticipated that most of the materials may be excavated with normal heavy excavation equipment. However, deep excavations, boulder excavations, and excavations into the underlying basalt rock formation may require the use of hoerams.

The above discussions regarding the rippability of the subsurface materials are based on field data from the borings drilled at the site. Contractors should be encouraged to examine the site conditions and the subsurface data to make their own reasonable and prudent interpretation.

3.5.5 Cut and Fill Slopes

We envision that cut slopes at the project site generally will expose the medium stiff to very stiff saprolitic soils encountered in the drilled borings. In general, cut slopes and permanent fill slopes constructed of the on-site soils may be designed with a slope inclination of 2H:1V or flatter. Fills placed on slopes steeper than 5H:1V should be keyed and benched into the existing slope to provide stability of the new fill embankment against sliding. The filling operations should start at the

lowest point and continue up in level horizontal compacted layers in accordance with the above general fill placement recommendations.

Fill slopes should be constructed by overfilling and cutting back to the design slope ratio to obtain a well-compacted slope face. Surface water should be diverted away from the tops of slopes, and slope planting should be provided as soon as possible to reduce the potential for erosion of the finished slopes.

3.6 Pavement Design

We understand new flexible asphaltic concrete pavements are being considered for the access road at the project site. In general, we anticipate that vehicle loading for the pavements would be light and would primarily consist of passenger vehicles with some light trucks only. Therefore, we have assumed generally light traffic loading conditions for pavement design purposes.

We have assumed that the pavement subgrade soils will be similar to the clayey soils generally encountered during our field exploration. Based on the site conditions encountered and the above assumptions, we recommend using the following pavement section for preliminary design purposes:

Flexible Pavement for Access Road

2.0-Inch Asphaltic Concrete
6.0-Inch Aggregate Base Course (95 Percent Relative Compaction)
6.0-Inch Aggregate Subbase Course (95 Percent Relative Compaction)
14.0-Inch Total Pavement Thickness on Moist Compacted Subgrade

The pavement subgrade soils should be scarified to a minimum depth of about 8 inches, moisture-conditioned to at least 2 percent above the optimum moisture content, and compacted to not less than 95 percent relative compaction. The subgrade soils should be thoroughly moistened and kept moist until covered by the pavement structural section. We recommend performing CBR and density tests on the actual subgrade soils encountered during pavement construction to confirm the adequacy of the above section. The recommended section also assumes that adequate drainage will be provided for the paved areas.

Where minor shrinkage cracks are observed after subgrade preparation, we recommend thoroughly moistening the soil to close the cracks prior to re-compacting. Saturation and subsequent yielding of the exposed subgrade due to inclement weather and poor drainage may require over-excavation of the soft areas and replacement with well-compacted fill.

As an additional check for stability and uniform compaction, we recommend proof-rolling the subgrade prior to placing the aggregate subbase and base course materials using a pneumatic-tired vehicle with a gross vehicle weight of at least 30,000 pounds, such as a fully-loaded water truck. The equipment used for proof-rolling should be operated at a speed of about 300 feet per minute and make at least two passes over each area designated for proof-rolling. Proof-rolling should also be performed on successive lifts of aggregate subbase and base course materials. Areas with excessive rutting and/or pumping should be over-excavated to expose firm material, and the resulting excavation should be backfilled with either well-compacted fill or aggregate base/subbase material.

Aggregate base course and subbase course materials should consist of crushed basaltic aggregates and should conform to the State of Hawaii, Standard Specifications for Road and Bridge Construction (2005).

The aggregate base and subbase course materials should be moisture-conditioned to above the optimum moisture content and compacted to a minimum of 95 percent relative compaction. Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density as determined by ASTM D1557. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density.

Paved areas should be sloped, and drainage gradients should be maintained to carry surface water off-site. Surface water ponding should not be allowed on the site during or after construction. A subdrain system is recommended to collect the excess water from landscaping irrigation.

3.7 Underground Utility Lines

We anticipate that underground utilities may be required for the project. In general, good construction practices should be utilized for the installation and backfilling of the trenches for the new utilities. The contractor should determine the method and equipment to be used for trench excavation, subject to practical limits and safety considerations. In addition, the excavations should comply with the applicable federal, state, and local safety requirements. The contractor should be responsible for trench shoring design and installation.

In general, we recommend providing granular bedding consisting of 6 inches of open-graded gravel (ASTM C33, No. 67 gradation) under the pipes for uniform support. Free-draining granular materials, such as open-graded gravel (ASTM C33, No. 67 gradation), also should be used for the initial trench backfill up to about 12 inches above the pipes to provide adequate support around the pipes. It is critical to use this free-draining material to reduce the potential for formation of voids below the haunches of pipes and to provide adequate support for the sides of the pipes. Improper trench backfill could result in backfill settlement and pipe damage.

The upper portion of the trench backfill from the level 12 inches above the pipes to the top of the subgrade or finished grade may consist of the excavated on-site soils or select granular fill material. The backfill should be placed in maximum 8-inch level loose lifts and mechanically compacted to not less than 90 percent relative compaction to reduce the potential for appreciable future ground subsidence. The upper 2 feet below the finished grade in areas subjected to vehicular traffic should be compacted to a minimum of 95 percent relative compaction. Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same soil determined in accordance with ASTM D1557.

3.8 Drainage

The finished grades outside the reservoir tanks, control building addition, and other structures should be sloped to shed water away from the foundations and slabs and to reduce the potential for ponding. In addition, it is advised to install roof gutter systems around the buildings and to divert the discharge away from the foundation and

slab areas. Excessive landscape watering near the foundations and slabs also should be avoided.

The foundation excavations should be backfilled properly against the walls or slab edges immediately after setting of the concrete to reduce the potential for appreciable water infiltration into the subsurface. In addition, drainage swales should be provided as soon as possible and should be maintained to drain surface water runoff away from the foundations and slabs.

3.9 Design Review

Preliminary and final drawings and specifications for the project should be forwarded to Geolabs for review and written comments prior to bid solicitation for construction. This review is necessary to evaluate conformance of the plans and specifications with the intent of the foundation and earthwork recommendations provided herein. If this review is not made, Geolabs cannot be responsible for misinterpretation of our recommendations.

3.10 Post-Design Services/Services During Construction

Geolabs should be retained to provide geotechnical engineering services during construction. The critical items of construction monitoring that require "Special Inspection" include the following:

- Observation of shallow foundation excavations
- Observation of subgrade preparation
- Observation of fill and backfill placement

A Geolabs representative also should monitor other aspects of earthwork construction to observe compliance with the design concepts, specifications, or recommendations and to expedite suggestions for design changes that may be required in the event that subsurface conditions differ from those anticipated at the time this report was prepared. Geolabs should be accorded the opportunity to provide geotechnical engineering services during construction to confirm our assumptions in providing the recommendations presented herein.

If the actual exposed subsurface conditions encountered during construction differ from those assumed or considered herein, Geolabs should be contacted to review and/or revise the geotechnical recommendations presented herein.

END OF DISCUSSION AND RECOMMENDATIONS

SECTION 4. LIMITATIONS

The analyses and recommendations submitted herein are based in part upon information obtained from the field borings and bulk sample. Variations of the subsurface conditions between and beyond the field borings and bulk sample may occur, and the nature and extent of these variations may not become evident until construction is underway. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented herein.

The field boring and bulk sample locations indicated herein are approximate, having been estimated by taping from visible features shown on the Site Plan transmitted by Oceanit on May 30, 2017. Elevations of the borings were estimated from spot elevations shown on the same plan. The field boring locations and elevations should be considered accurate only to the degree implied by the methods used.

The stratification breaks shown on the graphic representations of the borings depict the approximate boundaries between soil types and, as such, may denote a gradual transition. We did not encounter groundwater in the borings at the time of our field exploration. However, it must be noted that fluctuation may occur due to variation in seasonal rainfall, and other factors. These data have been reviewed and interpretations made in the formulation of this report.

This report has been prepared for the exclusive use of Oceanit and their project consultants for specific application to the design of the *Anahola Farm Lots Water System Improvements* project in accordance with generally accepted geotechnical engineering principles and practices. No warranty is expressed or implied.

This report has been prepared solely for the purpose of assisting the architect and design engineers in the design of the project. Therefore, this report may not contain sufficient data, or the proper information, to serve as a basis for detailed construction cost estimates.

The owner/client should be aware that unanticipated soil conditions are commonly encountered. Unforeseen subsurface conditions, such as perched

groundwater, soft deposits, hard layers or cavities, may occur in localized areas and may require additional probing or corrections in the field (which may result in construction delays) to attain a properly constructed project. Therefore, a sufficient contingency fund is recommended to accommodate these possible extra costs.

This geotechnical engineering exploration conducted at the project site was not intended to investigate the potential presence of hazardous materials existing at the project site. It should be noted that the equipment, techniques, and personnel used to conduct a geo-environmental exploration differ substantially from those applied in geotechnical engineering.

END OF LIMITATIONS

CLOSURE

The following plates and appendices are attached and complete this report:

-ΩΩΩΩΩΩΩΩΩ-

Respectfully submitted,

GEOLABS, INC.

By _____
Andrew J. Felkel, P.E.
Project Engineer

By _____
Gerald Y. Seki, P.E.
Vice President

GS:AJF:as

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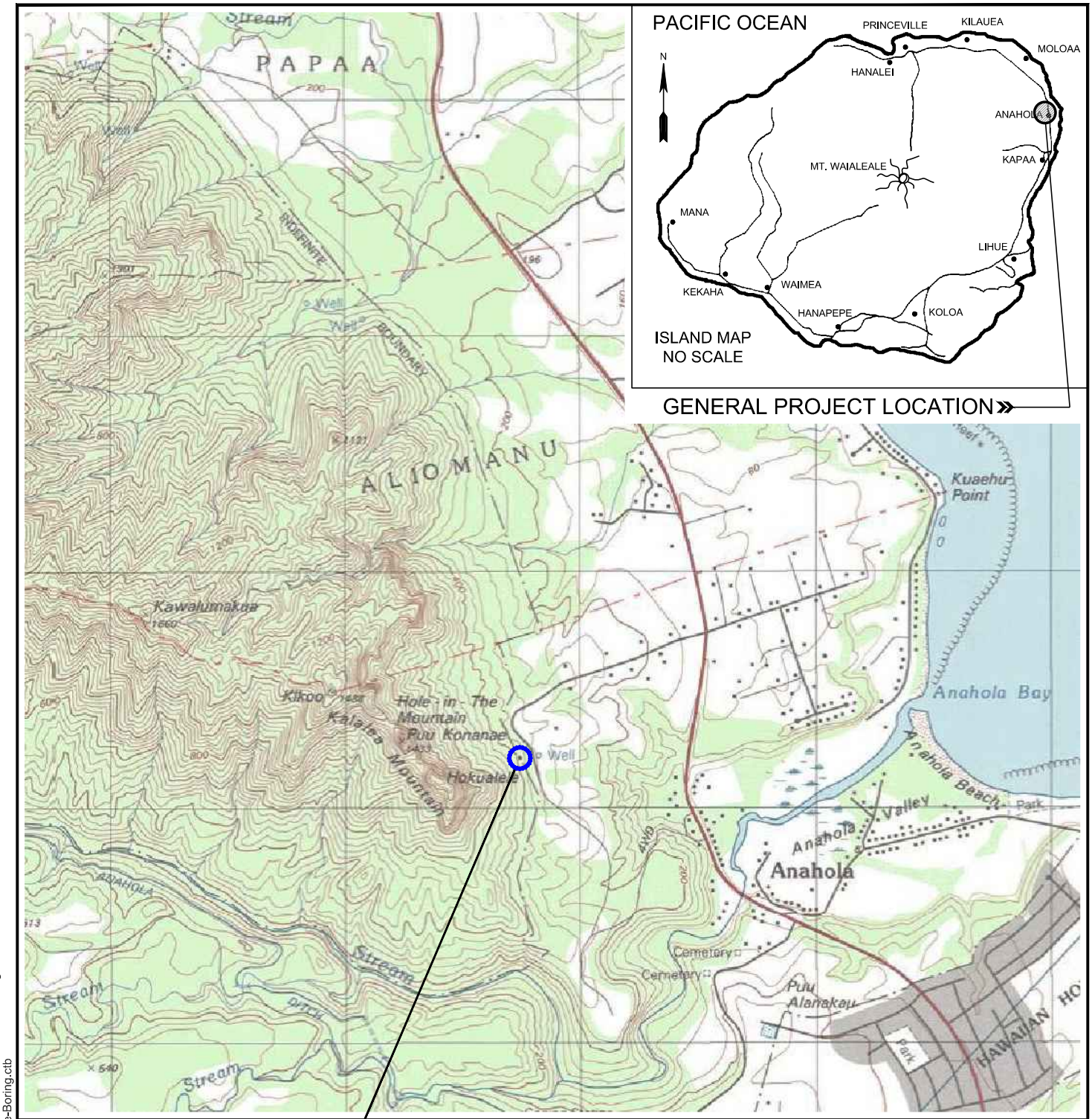
PLATES



PROJECT LOCATION MAP

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

2000 1000 0 2000 FT.

GRAPHIC SCALE

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REFERENCE: MAP CREATED WITH TOPO!® ©2010 NATIONAL GEOGRAPHIC; ©2007 TELE ATLAS, REL. 1/2007.

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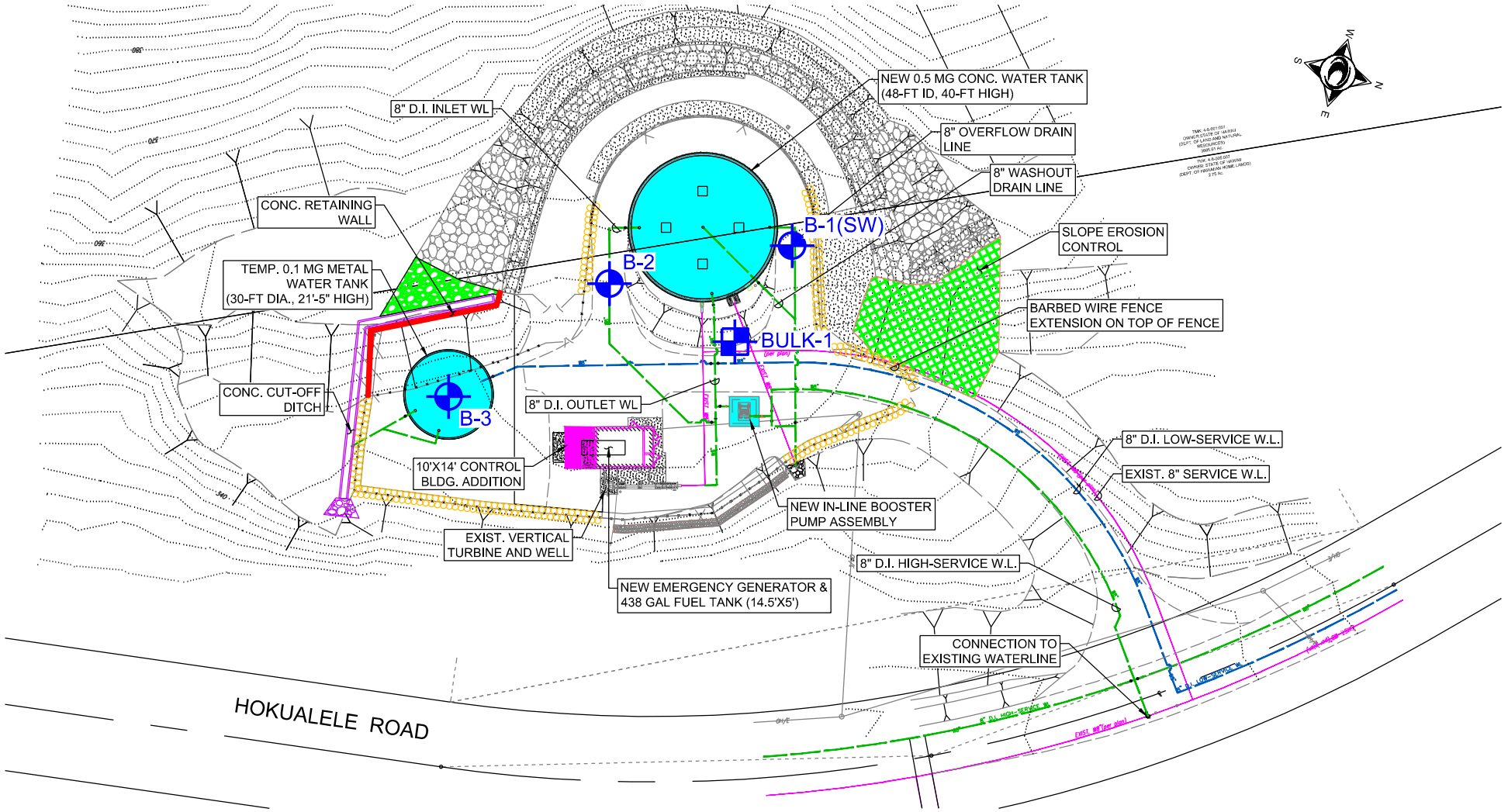
Geotechnical Engineering		
DATE: AUGUST 2017	DRAWN BY: HYC	PLATE: 1
SCALE: 1" = 2,000'	W.O.: 7534-00	

CAD User: HENRY File Last Updated: September 19, 2017 10:37:59am Plot Date: September 19, 2017 - 10:38:50am
File: T:\Drafting\Working\7534-00AnaholaFarmLotsWaterSysImprovements\7534-00SitePlan.dwg\2
Plotter: DWG To PDF-GEO.pc3 Plotstyle: GEO-Color-RBGC_HEAVY.ctb



LEGEND:

- APPROXIMATE BORING LOCATION
- APPROXIMATE BULK SAMPLE LOCATION
- SW — SHEAR WAVE VELOCITY TESTING

REFERENCE: SITE PLAN TRANSMITTED BY OCEANIT ON MAY 30, 2017.

0 10 20 30 40 50 100 150 FT.

GRAPHIC SCALE

SITE PLAN

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
AUGUST 2017	HYC	2
SCALE	W.O.	
1" = 50'	7534-00	

APPENDIX A

A P P E N D I X A

Field Exploration

We explored the subsurface conditions at the project site by drilling and sampling three borings, designated as Boring Nos. 1 through 3, extending to depths of about 16.5 to 102 feet below the existing ground surface. In addition, one bulk sample of the near-surface soils, designated as Bulk-1, was obtained to evaluate the pavement support characteristics of the near-surface soils. The approximate boring and bulk sample locations are shown on the Site Plan, Plate 2. The borings were drilled using a truck-mounted drill rig with continuous flight augers and coring tools.

Our geologist classified the materials encountered in the borings by visual and textural examination in the field in general accordance with ASTM D2488, Standard Practice for Description and Identification of Soils, and monitored the drilling operations on a near-continuous (full-time) basis. These classifications were further reviewed visually and by testing in the laboratory. Soils were classified in general accordance with ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System), as shown on the Soil Log Legend, Plate A-0.1. Deviations made to the soil classification in accordance with ASTM D2487 are described on the Soil Classification Log Key, Plate A-0.2. Graphic representations of the materials encountered are presented on the Logs of Borings, Plates A-1.1 through A-3.

Relatively “undisturbed” soil samples were obtained in general accordance with ASTM D3550 Ring-Lined Barrel Sampling of Soils, by driving a 3-inch OD Modified California sampler with a 140-pound hammer falling 30 inches. In addition, some samples were obtained from the drilled borings in general accordance with ASTM D1586, Penetration Test and Split-Barrel Sampling of Soils, by driving a 2-inch OD standard penetration sampler using the same hammer and drop. The blow counts needed to drive the sampler the second and third 6 inches of an 18-inch drive are shown as the “Penetration Resistance” on the Logs of Borings at the appropriate sample depths. The penetration resistance shown on the Logs of Borings indicates the number of blows required for the specific sampler type used. The blow counts may need to be factored to obtain the Standard Penetration Test (SPT) blow counts.

Pocket penetrometer tests were performed on selected cohesive soil samples retrieved in the field. The pocket penetrometer test provides an indication of the unconfined compressive strength of the sample. Pocket penetrometer test results are summarized on the Logs of Borings at the appropriate sample depths.

Core samples of the rock materials encountered at the project site were obtained by using diamond core drilling techniques in general accordance with ASTM D 2113, Diamond Core Drilling for Site Investigation. Core drilling is a rotary drilling method that uses a hollow bit to cut into the rock formation. The rock material left in the hollow core of the bit is mechanically recovered for examination and description. Rock cores were described in general accordance with the Rock Description System, as shown on the

Rock Log Legend, Plate A-0.3. The Rock Description System is based on the publication "Suggested Methods for the Quantitative Description of Discontinuities in Rock Masses" by the International Society for Rock Mechanics (March 1977).

Recovery (REC) is used as a subjective guide to the interpretation of the relative quality of rock masses. Recovery is defined as the actual length of material recovered from a coring attempt versus the length of the core attempt. For example, if 3.7 feet of material is recovered from a 5.0-foot core run, the recovery would be 74 percent and would be shown on the Logs of Borings as REC = 74%.

The Rock Quality Designation (RQD) is also a subjective guide to the relative quality of rock masses. RQD is defined as the percentage of the core run in rock that is sound material in excess of 4 inches in length without discontinuities, discounting drilling induced fractures or breaks. If 2.5 feet of sound material is recovered from a 5.0-foot core run in rock, the RQD would be 50 percent and would be shown on the Logs of Borings as RQD = 50%. Generally, the following is used to describe the relative quality of the rock, based on the "Practical Handbook of Physical Properties of Rocks and Minerals."

Rock Quality	**RQD** (%)
Very Poor	0 – 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	90 – 100

GEOLABS, INC.

Geotechnical Engineering

Soil Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS — MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE	GRAVELS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS — LESS THAN 5% FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES — MORE THAN 12% FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS — 50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE	CLEAN SANDS — LESS THAN 5% FINES	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES — MORE THAN 12% FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS — 50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE	SILTS AND CLAYS — LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS — LIQUID LIMIT 50 OR MORE		MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

LEGEND

- (2-INCH) O.D. STANDARD PENETRATION TEST
- (3-INCH) O.D. MODIFIED CALIFORNIA SAMPLE
- SHELBY TUBE SAMPLE
- GRAB SAMPLE
- CORE SAMPLE
- WATER LEVEL OBSERVED IN BORING AT TIME OF DRILLING
- WATER LEVEL OBSERVED IN BORING AFTER DRILLING
- WATER LEVEL OBSERVED IN BORING OVERNIGHT

LL	LIQUID LIMIT (NP=NON-PLASTIC)
PI	PLASTICITY INDEX (NP=NON-PLASTIC)
TV	TORVANE SHEAR (tsf)
UC	UNCONFINED COMPRESSION OR UNIAXIAL COMPRESSIVE STRENGTH
TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)

Plate

A-0.1

LOG LEGEND FOR SOIL 7534-00.GPJ GEOLABS.GDT 8/25/17

GEOLABS, INC.

Geotechnical Engineering

Soil Classification Log Key

(with deviations from ASTM D2488)

GEOLABS, INC. CLASSIFICATION*

GRANULAR SOIL (- #200 <50%)

- **PRIMARY** constituents are composed of the largest percent of the soil mass. Primary constituents are capitalized and bold (i.e., **GRAVEL, SAND**)
- **SECONDARY** constituents are composed of a percentage less than the primary constituent. If the soil mass consists of 12 percent or more fines content, a cohesive constituent is used (**SILTY** or **CLAYEY**); otherwise, a granular constituent is used (**GRAVELLY** or **SANDY**) provided that the secondary constituent consists of 20 percent or more of the soil mass. Secondary constituents are capitalized and bold (i.e., **SANDY** GRAVEL, **CLAYEY** SAND) and precede the primary constituent.
- **accessory descriptions** compose of the following:
  with some: >12%
  with a little: 5 - 12%
  with traces of: <5%
  accessory descriptions are lower cased and follow the Primary and Secondary Constituents
  (i.e., SILTY GRAVEL **with a little sand**)

COHESIVE SOIL (- #200 ≥ 50%)

- **PRIMARY** constituents are based on plasticity. Primary constituents are capitalized and bold (i.e., **CLAY, SILT**)
- **SECONDARY** constituents are composed of a percentage less than the primary constituent, but more than 20 percent of the soil mass. Secondary constituents are capitalized and bold (i.e., **SANDY** CLAY, **SILTY** CLAY, **CLAYEY** SILT) and precede the primary constituent.
- **accessory descriptions** compose of the following:
  with some: >12%
  with a little: 5 - 12%
  with traces of: <5%
  accessory descriptions are lower cased and follow the Primary and Secondary Constituents
  (i.e., SILTY CLAY **with some sand**)

EXAMPLE: Soil Containing 60% Gravel, 25% Sand, 15% Fines. Described as: **SILTY GRAVEL** with some sand

RELATIVE DENSITY / CONSISTENCY

Granular Soils			Cohesive Soils			
N-Value (Blows/Foot)		Relative Density	N-Value (Blows/Foot)		PP Readings (tsf)	Consistency
SPT	MCS		SPT	MCS		
0 - 4	0 - 7	Very Loose	0 - 2	0 - 4		Very Soft
4 - 10	7 - 18	Loose	2 - 4	4 - 7	< 0.5	Soft
10 - 30	18 - 55	Medium Dense	4 - 8	7 - 15	0.5 - 1.0	Medium Stiff
30 - 50	55 - 91	Dense	8 - 15	15 - 27	1.0 - 2.0	Stiff
> 50	> 91	Very Dense	15 - 30	27 - 55	2.0 - 4.0	Very Stiff
			> 30	> 55	> 4.0	Hard

MOISTURE CONTENT DEFINITIONS

Dry: Absence of moisture, dry to the touch

Moist: Damp but no visible water

Wet: Visible free water, usually soil is below water table

ABBREVIATIONS

WOH: Weight of Hammer

WOR: Weight of Drill Rods

SPT: Standard Penetration Test Split-Spoon Sampler

MCS: Modified California Sampler

PP: Pocket Penetrometer

GRAIN SIZE DEFINITION

Description	Sieve Number and / or Size
Boulders	> 12 inches (305-mm)
Cobbles	3 to 12 inches (75-mm to 305-mm)
Gravel	3-inch to #4 (75-mm to 4.75-mm)
Coarse Gravel	3-inch to 3/4-inch (75-mm to 19-mm)
Fine Gravel	3/4-inch to #4 (19-mm to 4.75-mm)
Sand	#4 to #200 (4.75-mm to 0.075-mm)
Coarse Sand	#4 to #10 (4.75-mm to 2-mm)
Medium Sand	#10 to #40 (2-mm to 0.425-mm)
Fine Sand	#40 to #200 (0.425-mm to 0.075-mm)

Soil descriptions are based on ASTM D2488-09a, Visual-Manual Procedure, with the above modifications by Geolabs, Inc. to the Unified Soil Classification System (USCS).

Plate

A-0.2

GEOLABS, INC.

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Rock Log Legend

ROCK DESCRIPTIONS

	**BASALT**		**CONGLOMERATE**
	**BOULDERS**		**LIMESTONE**
	**BRECCIA**		**SANDSTONE**
	**CLINKER**		**SILTSTONE**
	**COBBLES**		**TUFF**
	**CORAL**		**VOID/CAVITY**

ROCK DESCRIPTION SYSTEM

ROCK FRACTURE CHARACTERISTICS

The following terms describe general fracture spacing of a rock:

Massive: Greater than 24 inches apart

Slightly Fractured: 12 to 24 inches apart

Moderately Fractured: 6 to 12 inches apart

Closely Fractured: 3 to 6 inches apart

Severely Fractured: Less than 3 inches apart

DEGREE OF WEATHERING

The following terms describe the chemical weathering of a rock:

Unweathered: Rock shows no sign of discoloration or loss of strength.

Slightly Weathered: Slight discoloration inwards from open fractures.

Moderately Weathered: Discoloration throughout and noticeably weakened though not able to break by hand.

Highly Weathered: Most minerals decomposed with some corestones present in residual soil mass. Can be broken by hand.

Extremely Weathered: Saprolite. Mineral residue completely decomposed to soil but fabric and structure preserved.

HARDNESS

The following terms describe the resistance of a rock to indentation or scratching:

Very Hard: Specimen breaks with difficulty after several "pinging" hammer blows.
Example: Dense, fine grain volcanic rock

Hard: Specimen breaks with some difficulty after several hammer blows.
Example: Vesicular, vugular, coarse-grained rock

Medium Hard: Specimen can be broked by one hammer blow. Cannot be scraped by knife. SPT may penetrate by ~25 blows per inch with bounce.
Example: Porous rock such as clinker, cinder, and coral reef

Soft: Can be indented by one hammer blow. Can be scraped or peeled by knife. SPT can penetrate by ~100 blows per foot.
Example: Weathered rock, chalk-like coral reef

Very Soft: Crumbles under hammer blow. Can be peeled and carved by knife. Can be indented by finger pressure.
Example: Saprolite

Plate
A-0.3

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ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Log of Boring 1

Laboratory			Field							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS
	46	75			13	2.5				GP CH
LL=78 PI=45	53				7					
Consol.	42	72			15		5			
	45				12		10			CH
Sieve - #200 = 74.5%	44	72			37	3.5	15			
Sieve - #200 = 31.4%	15		67	0	52/6" +34/2" Ref.		20			SM
	29		89	0	34/6" +25/3" Ref.		25			
	27		83	15	103/6"		30			
							35			

Approximate Ground Surface Elevation (feet MSL): 351.5 *

Description

2-inch **ASPHALTIC CONCRETE**

Brownish gray **SANDY GRAVEL** with a little silt, medium dense, moist (fill)

Brown with multi-color mottling **SILTY CLAY** with some weathered gravel (basaltic), medium stiff, moist (saprolite)

grades with sand at 3 feet

Grayish brown **SILTY CLAY** with a little sand and traces of gravel (basaltic), stiff, moist (saprolite)

grades with more sand, very stiff

Gray with tan mottling **SILTY SAND** with some weathered gravel (basaltic), very dense, moist (weathered basalt)

Brownish gray vesicular **BASALT**, closely to severely fractured, moderately to highly weathered, medium hard (basalt formation)

Dark gray with light gray mottling vesicular **BASALT**, severely fractured, moderately to highly weathered, medium hard to hard (basalt formation)

grades to severely to closely fractured

Date Started:	July 10, 2017	Water Level: ▽	Not Encountered
Date Completed:	July 10, 2017		
Logged By:	N. Vaiana	Drill Rig:	MOBILE B-80 *(Energy Transfer Ratio = 44.9%)*
Total Depth:	102 feet	Drilling Method:	4" Solid Stem Auger & HQ Coring
Work Order:	7534-00	Driving Energy:	140 lb. wt., 30 in. drop

Plate A - 1.1

BORING_LOG 7534-00.GPJ GEOLABS.GDT 9/19/17

GEOLABS, INC.

Geotechnical Engineering

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Log of Boring

1

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	(Continued from previous plate) Description
UC= 2110 psi			95	23			40				
UC= 1120 psi			100	83							Gray **BASALT**, slightly fractured, moderately weathered, hard (basalt formation)
			100	75			45				
			100	92			50				
			100	50			55				
							60				grades to closely to moderately fractured
			100	75			65				
			100	67			70				

Date Started:	July 10, 2017	Water Level: ▽	Not Encountered
Date Completed:	July 10, 2017		
Logged By:	N. Vaiana	Drill Rig:	MOBILE B-80 *(Energy Transfer Ratio = 44.9%)*
Total Depth:	102 feet	Drilling Method:	4" Solid Stem Auger & HQ Coring
Work Order:	7534-00	Driving Energy:	140 lb. wt., 30 in. drop

Plate

A - 1.2

BORING_LOG 7534-00.GPJ GEOLABS.GDT 9/19/17

GEOLABS, INC.

Geotechnical Engineering

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Log of Boring

1

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	(Continued from previous plate) Description
			100	92			75				grades to slightly fractured
			100	92							
			100	95			80				Gray with brown **BASALT**, massive to slightly fractured, moderately weathered, hard (basalt formation)
			100	50			85				
							90				Gray with seams of white **BASALT**, severely fractured, moderately weathered, medium hard (basalt formation)
			100	67			95				Gray with some orangish brown **BASALT**, moderately to slightly fractured, moderately weathered, hard (basalt formation) grades to severely fractured
			100	92			100				Gray **BASALT**, slightly fractured, moderately weathered, hard (basalt formation)
							105				Boring terminated at 102 feet * Elevations estimated from Site Plan transmitted by Oceanit on May 30, 2017.

Date Started:	July 10, 2017	Water Level: ▽	Not Encountered	Plate
Date Completed:	July 10, 2017			
Logged By:	N. Vaiana	Drill Rig:	MOBILE B-80 *(Energy Transfer Ratio = 44.9%)*	
Total Depth:	102 feet	Drilling Method:	4" Solid Stem Auger & HQ Coring	A - 1.3
Work Order:	7534-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 7534-00.GPJ GEOLABS.GDT 9/19/17

GEOLABS, INC.

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ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Log of Boring

2

Laboratory			Field								
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
											Approximate Ground Surface Elevation (feet MSL): 350 *
							0			GP	2-inch **ASPHALTIC CONCRETE**
Sieve - #200 = 80.7%	43	72			17	3.0				CH	Brownish gray **SANDY GRAVEL** with a little silt, medium dense, moist (fill)
	33				8						Brown with multi-color mottling **SILTY CLAY** with some weathered gravel (basaltic), stiff, moist (saprolite)
Direct Shear	37	70			12	2.3	5				grades to medium stiff
										CH	Grayish brown **SILTY CLAY** with a little sand and gravel (basaltic), stiff, moist (saprolite)
LL=80 PI=48	51				9		10				
	46	67			25	2.5	15				grades with more weathered gravel (basaltic)
											Boring terminated at 16.5 feet
							20				
							25				
							30				
							35				

Date Started:	July 13, 2017	Water Level: ▽	Not Encountered	Plate
Date Completed:	July 13, 2017			
Logged By:	N. Vaiana	Drill Rig:	MOBILE B-80 *(Energy Transfer Ratio = 44.9%)*	A - 2
Total Depth:	16.5 feet	Drilling Method:	4" Solid Stem Auger	
Work Order:	7534-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 7534-00.GPJ GEOLABS.GDT 9/19/17

GEOLABS, INC.

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ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Log of Boring

3

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 345.5 *
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					**Description**
	21	82			34					CH	Orangish brown **SILTY CLAY** with some sand and gravel (basaltic), very stiff, moist (saprolite)
	32				15						
TXUU S_u=3.9 ksf	36	83			33	4.3	5			CH	Dark orangish brown **SILTY CLAY**, hard, moist (saprolite)
	45				9		10				grades with sand
	36	74			49	2.8	15			CH	Brownish gray with multi-color mottling **SILTY CLAY** with some sand, weathered gravel, and cobbles (basaltic), very stiff, moist (saprolite)
LL=106 PI=72	42				13		20			CH	Dark brown with gray mottling **SILTY CLAY** with some sand and weathered gravel (basaltic), stiff, moist (saprolite) grades with seems of gray clay
	29	80			27		25			SM	Dark gray with tan mottling **SILTY SAND** with some weathered gravel (basaltic), medium dense, moist (weathered basalt)
	39				17		30				Boring terminated at 31.5 feet
							35				

Date Started:	July 13, 2017	Water Level: ▽	Not Encountered	Plate
Date Completed:	July 13, 2017			
Logged By:	N. Vaiana	Drill Rig:	MOBILE B-80 *(Energy Transfer Ratio = 44.9%)*	A - 3
Total Depth:	31.5 feet	Drilling Method:	4" Solid Stem Auger	
Work Order:	7534-00	Driving Energy:	140 lb. wt., 30 in. drop	

BORING_LOG 7534-00.GPJ GEOLABS.GDT 9/19/17

APPENDIX B

A P P E N D I X B

Seismic Shear Wave Velocity Test

Seismic shear wave velocity profiling of the subsurface materials at the project site was performed using Seismic Cone Penetration Testing (SCPT) equipment. The purpose of the seismic shear wave velocity profiling of the subsurface materials was to more closely analyze the seismic design considerations for the project. Shear wave velocity testing using seismic cone penetration test equipment was performed at a selected boring location, designated as [B-1(SW)] on the Site Plan (Plate 2). The seismic shear wave velocity profiling was performed to a depth of about 100 feet below the existing pavement surface.

In order to conduct the seismic shear wave velocity test in the boring, the test boring was advanced utilizing rotary coring methods to the maximum depth of the boring. Log of the materials encountered in the boring are presented in the Logs of Borings in Appendix A. After the boring was advanced to the maximum depth of the borehole, the bored hole was backfilled with 0.25-inch diameter coated bentonite pellets. The temporary casing from the coring operations was used as a tremie pipe to place the bentonite pellets starting from the bottom and advancing upward. When the bentonite pellets are in contact with the groundwater in the borehole, the pellets start to hydrate slowly. As the bentonite pellets hydrate, they swell and soften. The probe was then pushed through the softened bentonite extending to a depth of about 100 feet below the existing ground surface using seismic piezocone testing equipment (SCPTU).

The seismic shear wave velocity test consists of hydraulically pushing a 10-ton steel electronic subtraction cone with an apex angle of 60 degrees and a projected surface area of 1.55 square inches (10 square centimeters) into the bored hole. The cone carries a uniaxial horizontal accelerator geophone to detect the arrival of a shear wave generated and propagated from the ground surface. The seismic measurements were made when the SCPT had stopped and a shear wave was sent into the subsurface. A shear wave was generated at the surface by striking a loaded plank with a switched hammer. The propagation time of the wave from the hammer blow to the cone was measured at each discrete depth interval. The vector difference of these depths divided by the time difference for the shear wave to arrive at the various depths have provided the average shear wave velocity over the depth interval.

The seismic shear wave velocities measured and the weighted average seismic shear wave velocity calculated for the top 100 feet of the soil profile at the boring location are presented on Plates B-1.1 through B-1.4 in Appendix B. The weighted average shear wave velocity was calculated based on the average shear wave velocity method described in Section 1615.1.5 of the International Building Code (2006 Edition).

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ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Data Plot of Boring

1

Approximate Ground Surface Elevation (feet MSL): 351.5 *

Core Recovery (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description	SHEAR WAVE VELOCITY (feet/sec)
						GP	1.5-inch **ASPHALTIC CONCRETE**	630
	13	2.5				CH	Brownish gray **SANDY GRAVEL** with a little silt, medium dense, moist (fill)	
	7						Brown with multi-color mottling **SILTY CLAY** with some weathered gravel (basaltic), medium stiff, moist (saprolite)	600
	15		5				grades with sand at 3 feet	690
						CH	Grayish brown **SILTY CLAY** with a little sand and traces of gravel (basaltic), stiff, moist (saprolite)	1660
	12		10					970
	37	3.5	15				grades with more sand, very stiff	1100
						SM	Gray with tan mottling **SILTY SAND** with some weathered gravel (basaltic), very dense, moist (weathered basalt)	1590
	52/6" +34/2" Ref.		20					
67							Brownish gray vesicular **BASALT**, closely to severely fractured, moderately to highly weathered, medium hard (basalt formation)	2100
			25					3850
89	34/6" +25/3" Ref.							3830
			30				Dark gray with light gray mottling vesicular **BASALT**, severely fractured, moderately to highly weathered, medium hard to hard (basalt formation)	5390
83	103/6"						grades to severely to closely fractured	
			35					

SHEAR WAVE VELOCITY (feet/sec): 1000, 2000, 3000, 4000

Date Started:	July 10, 2017	Water Level: ▽ Not Encountered	Plate
Date Completed:	July 10, 2017		
Logged By:	N. Vaiana	Drill Rig: MOBILE B-80	B - 1.1
Total Depth:	102 feet	Drilling Method: 4" Solid Stem Auger & HQ Coring	
Work Order:	7534-00	Driving Energy: 140 lb. wt., 30 in. drop	

SHEAR_WAVE_PLOT 7534-00.GPJ GEOLABS.GDT 9/20/17

GEOLABS, INC.

Geotechnical Engineering

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Data Plot of Boring

1

Core Recovery (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	(Continued from previous plate) Description
95			40				
100			45				Gray **BASALT**, slightly fractured, moderately weathered, hard (basalt formation)
100			50				
100			55				
100			60				grades to closely to moderately fractured
100			65				
100			70				

SHEAR WAVE VELOCITY (feet/sec)

1000 2000 3000 4000

5080
9110
7350
4080
5100
4640
7090

Date Started:	July 10, 2017	Water Level: ▽	Not Encountered
Date Completed:	July 10, 2017		
Logged By:	N. Vaiana	Drill Rig:	MOBILE B-80
Total Depth:	102 feet	Drilling Method:	4" Solid Stem Auger & HQ Coring
Work Order:	7534-00	Driving Energy:	140 lb. wt., 30 in. drop

Plate

B - 1.2

SHEAR_WAVE_PLOT 7534-00.GPJ GEOLABS.GDT 9/20/17

GEOLABS, INC.

Geotechnical Engineering

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Data Plot of Boring

1

Core Recovery (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	(Continued from previous plate) Description	SHEAR WAVE VELOCITY (feet/sec) 1000 2000 3000 4000
100			75				grades to slightly fractured	7210
100			80				Gray with brown **BASALT**, massive to slightly fractured, moderately weathered, hard (basalt formation)	5620
100			85					8440
100			90				Gray with seams of white **BASALT**, severely fractured, moderately weathered, medium hard (basalt formation)	
100			95				Gray with some orangish brown **BASALT**, moderately to slightly fractured, moderately weathered, hard (basalt formation)	5420
100			100				grades to severely fractured Gray **BASALT**, slightly fractured, moderately weathered, hard (basalt formation)	7540
			105				Boring terminated at 102 feet * Elevations estimated from Site Plan transmitted by Oceanit on May 30, 2017.	

Date Started:	July 10, 2017	Water Level: ▽ Not Encountered	Plate
Date Completed:	July 10, 2017		
Logged By:	N. Vaiana	Drill Rig: MOBILE B-80	B - 1.3
Total Depth:	102 feet	Drilling Method: 4" Solid Stem Auger & HQ Coring	
Work Order:	7534-00	Driving Energy: 140 lb. wt., 30 in. drop	

SHEAR_WAVE_PLOT 7534-00.GPJ GEOLABS.GDT 9/20/17

SHEAR WAVE VELOCITY TEST RESULTS

Anahola Farm Lots Water System Improvements
Anahola, Kauai, Hawaii

B-1				
Depth (From)	Depth (To)	Layer Thickness (d_i)	Estimated Shear Wave Velocity (V_{si})	Average Travel Time (d_i/V_{si})
(feet)	(feet)	(feet)	(feet/second)	(milliseconds)
0.0	2.2	2.2	634	3.46
2.2	4.2	2.0	598	3.36
4.2	7.4	3.2	690	4.66
7.4	10.6	3.2	1,658	1.92
10.6	13.8	3.2	967	3.32
13.8	17.2	3.3	1,103	3.03
17.2	20.4	3.2	1,586	2.03
20.4	23.6	3.2	2,098	1.52
23.6	26.8	3.2	3,848	0.84
26.8	30.1	3.3	3,834	0.87
30.1	33.3	3.2	5,385	0.60
33.3	36.5	3.2	5,083	0.63
36.5	39.7	3.2	9,111	0.35
39.7	42.9	3.2	7,349	0.43
42.9	49.3	6.4	4,078	1.57
49.3	55.7	6.4	5,096	1.26
55.7	62.3	6.6	4,637	1.42
62.3	68.7	6.4	7,088	0.90
68.7	75.8	7.1	7,214	0.98
75.8	82.1	6.4	5,622	1.13
82.1	88.7	6.6	8,440	0.78
88.7	95.3	6.6	5,415	1.21
95.3	100.0	4.8	7,542	0.63
TOTAL		100.0		36.89

Standard Weighted Average	4,883	feet/second
Computed $V_{s100'}$ Using IBC Formula	2,711	feet/second

APPENDIX C

A P P E N D I X C

Laboratory Tests

Moisture Content (ASTM D2216) and Unit Weight (ASTM D2937) determinations were performed on selected samples as an aid in the classification and evaluation of soil properties. The test results are presented on the Logs of Borings at the appropriate sample depths.

Three Atterberg Limits tests (ASTM D4318) were performed on selected soil samples to evaluate the liquid and plastic limits. The test results are summarized on the Logs of Borings at the appropriate sample depths. Graphic presentation of the test results is provided on Plate C-1.

Three Sieve Analysis tests (ASTM C117 & C136) were performed on selected soil samples to evaluate the gradation characteristics of the soils and to aid in soil classification. Graphic presentation of the grain size distributions is provided on Plate C-2.

Four One-Inch Ring Swell tests were performed on relatively undisturbed and remolded samples to evaluate the swelling potential of the on-site soils. The test results are summarized on Plate C-3.

One Consolidation test was performed on a selected soil sample to evaluate the compressibility characteristic of the on-site soils. The test was performed in accordance with ASTM D2435, and the test results are plotted on Plate C-4.

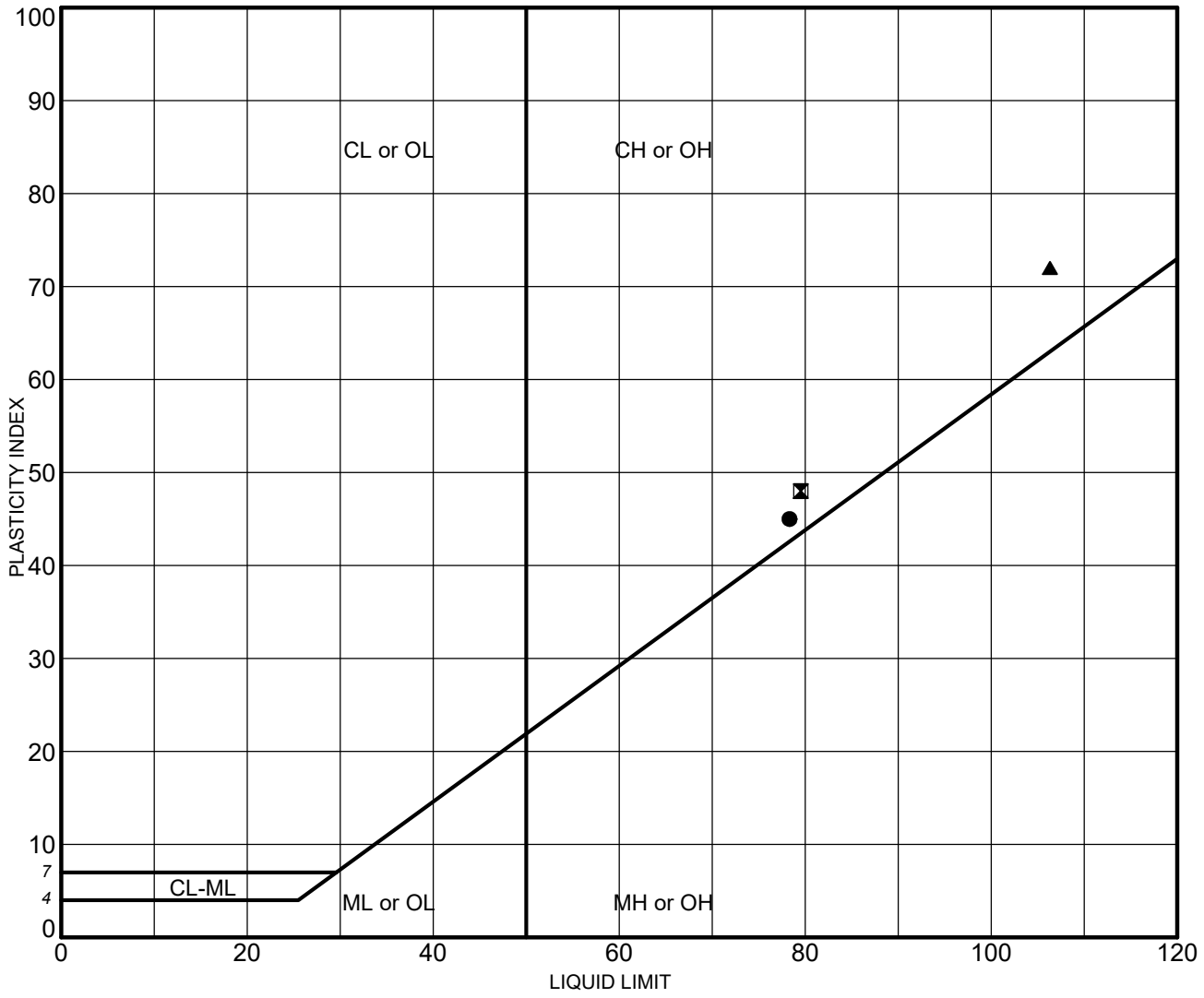
One Direct Shear test (ASTM D3080) was performed on a selected sample to evaluate the shear strength characteristics of the material tested. The test results are presented on Plate C-5.

One Triaxial Unconsolidated Undrained Compression (TXUU) test was performed on a selected in-situ soil sample in accordance with ASTM D2850 to evaluate the undrained shear strength of the soils. The approximate in-situ effective overburden pressure was used as the applied confining pressure for the “undisturbed” sample. The test results and the stress-strain curve are presented on Plate C-6.

Two Uniaxial Compressive Strength tests (ASTM D7012) were performed on selected rock cores to evaluate their unconfined compressive strength of the rock formation encountered. Test results are presented on Plate C-7.

One Modified Proctor compaction test (ASTM D1557) was performed on a bulk sample of the near-surface soils to evaluate the dry density and moisture content relationships. The test results are presented on Plate C-8.

One laboratory California Bearing Ratio test (ASTM D1883) was performed on a bulk sample of the near-surface soils to evaluate the pavement support characteristics of the soils. The test results are presented on Plate C-9.



	Sample	Depth (ft)	LL	PL	PI	Description
●	B-1	2.5-4.0	78	33	45	Brown with multi-color mottling silty clay (CH) with some gravel
⊠	B-2	10.0-11.5	80	32	48	Grayish brown silty clay (CH) with a little sand and gravel
▲	B-3	20.0-21.5	106	34	72	Dark brown silty clay (CH) with some sand and gravel

NP = NON-PLASTIC

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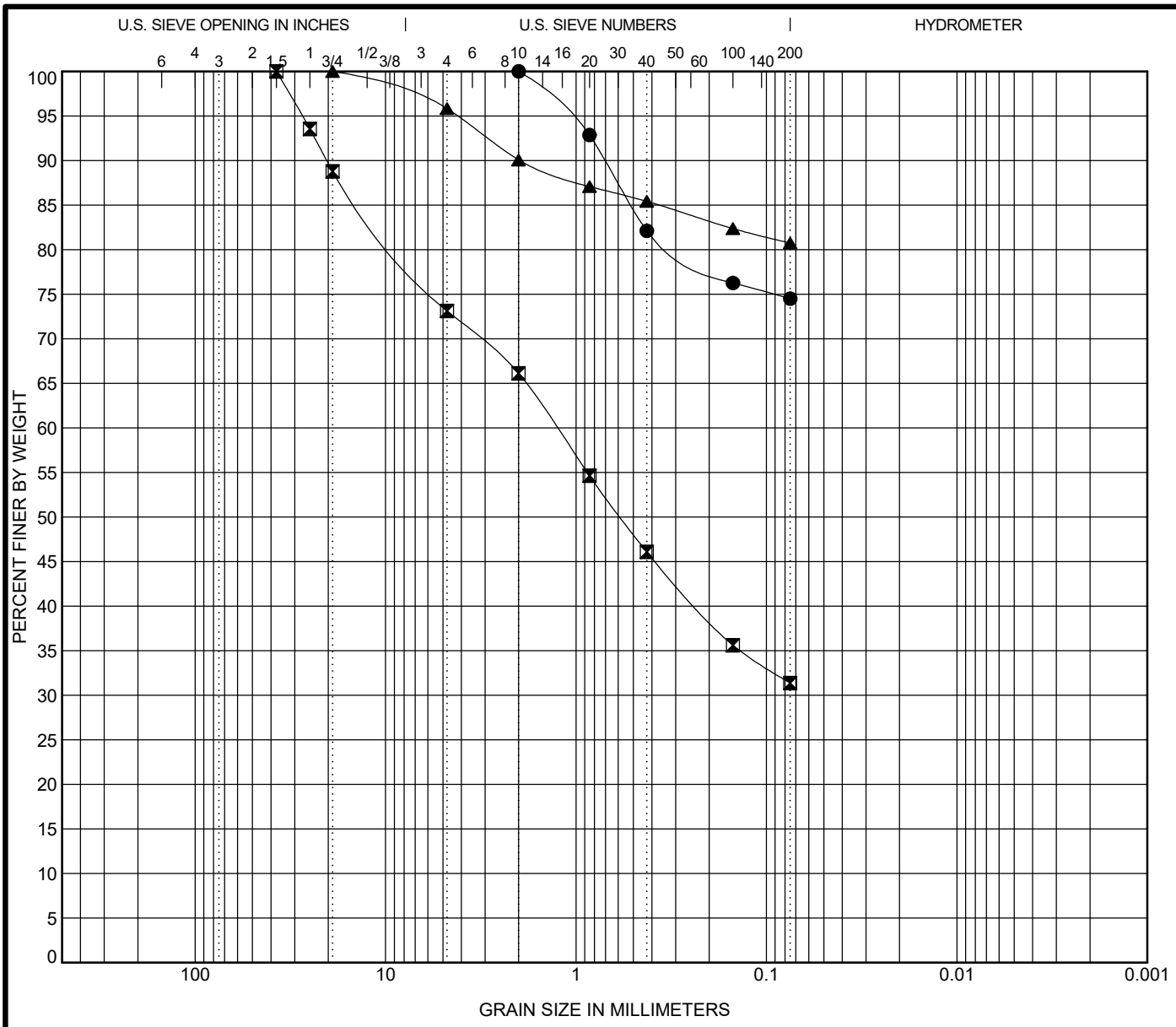
W.O. 7534-00

ATTERBERG LIMITS TEST RESULTS - ASTM D4318

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Plate
C - 1

G ATTERBERG PI-100 LL-120 7534-00.GPJ GEOLABS.GDT 9/19/17



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth (ft)	Description	LL	PL	PI	Cc	Cu
●	B-1	15.0-16.5	Grayish brown silty clay (CH) with some sand					
⊠	B-1	20.0-21.2	Gray with tan mottling silty sand (SM) with some gravel					
▲	B-2	1.0-2.5	Brown with multi-color mottling silty clay (CH) with some sand					

	Sample	Depth (ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Fine
●	B-1	15.0-16.5	2				0.0	25.5	74.5
⊠	B-1	20.0-21.2	37.5	1.268			26.9	41.7	31.4
▲	B-2	1.0-2.5	19				4.2	15.1	80.7

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GRAIN SIZE DISTRIBUTION - ASTM C117 & C136

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Plate
C - 2

G_GRAIN_SIZE_MOD_7534-00.GPJ GEOLABS.GDT 9/19/17

Location	Depth	Soil Description	Dry Density	Moisture Contents			Ring Swell
				Initial	Air-Dried	Final	
	(feet)		(pcf)	(%)	(%)	(%)	(%)
B-1*	1.0 - 2.5	Brown with multi-color mottling silty clay with some weathered gravel	70.1	45.3	39.0	50.7	1.7
B-2**	2.5 - 4.0	Brown with multi-color mottling silty clay with some weathered gravel	89.6	30.9	27.8	45.8	10.6
B-3*	1.0 - 2.5	Orangish brown silty clay with some sand and gravel	70.9	32.4	28.3	48.4	6.7
B-3**	2.5 - 4.0	Orangish brown silty clay with some sand and gravel	89.1	31.3	27.8	36.8	14.9

NOTE: Samples tested were either relatively undisturbed or remolded in 2.4-inch diameter by 1-inch high rings. They were air-dried overnight and then saturated for 24 hours under a surcharge pressure of 55 psf.

* Relatively Undisturbed
** Remolded

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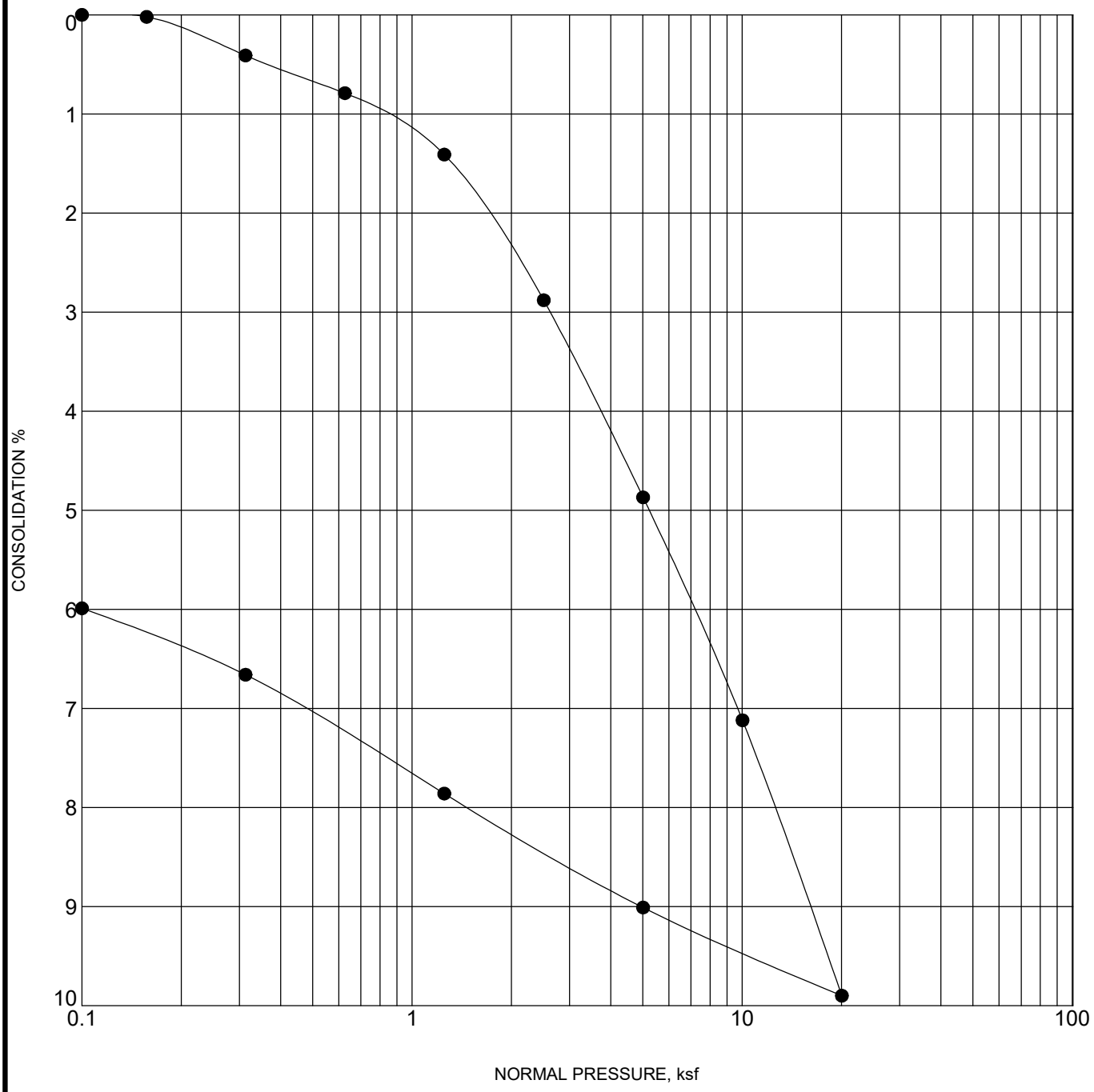
SUMMARY OF RING SWELL TESTS

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Plate
C - 3

G_RING_SWELL_TEST_7534-00.GPJ GEOLABS.GDT 9/19/17



Sample: B-1

Depth: 5.0 - 6.5 feet

Description: Brown with multi-color mottling silty clay with some weathered gravel

Liquid Limit = N/A Plasticity Index = N/A

	Initial	Final
Water Content, %	52.0	54.5
Dry Density, pcf:	64.7	64.7
Void Ratio	1.301	1.301
Degree of Saturation, %	95.3	100.0
Sample Height, inches	1.0000	0.9328

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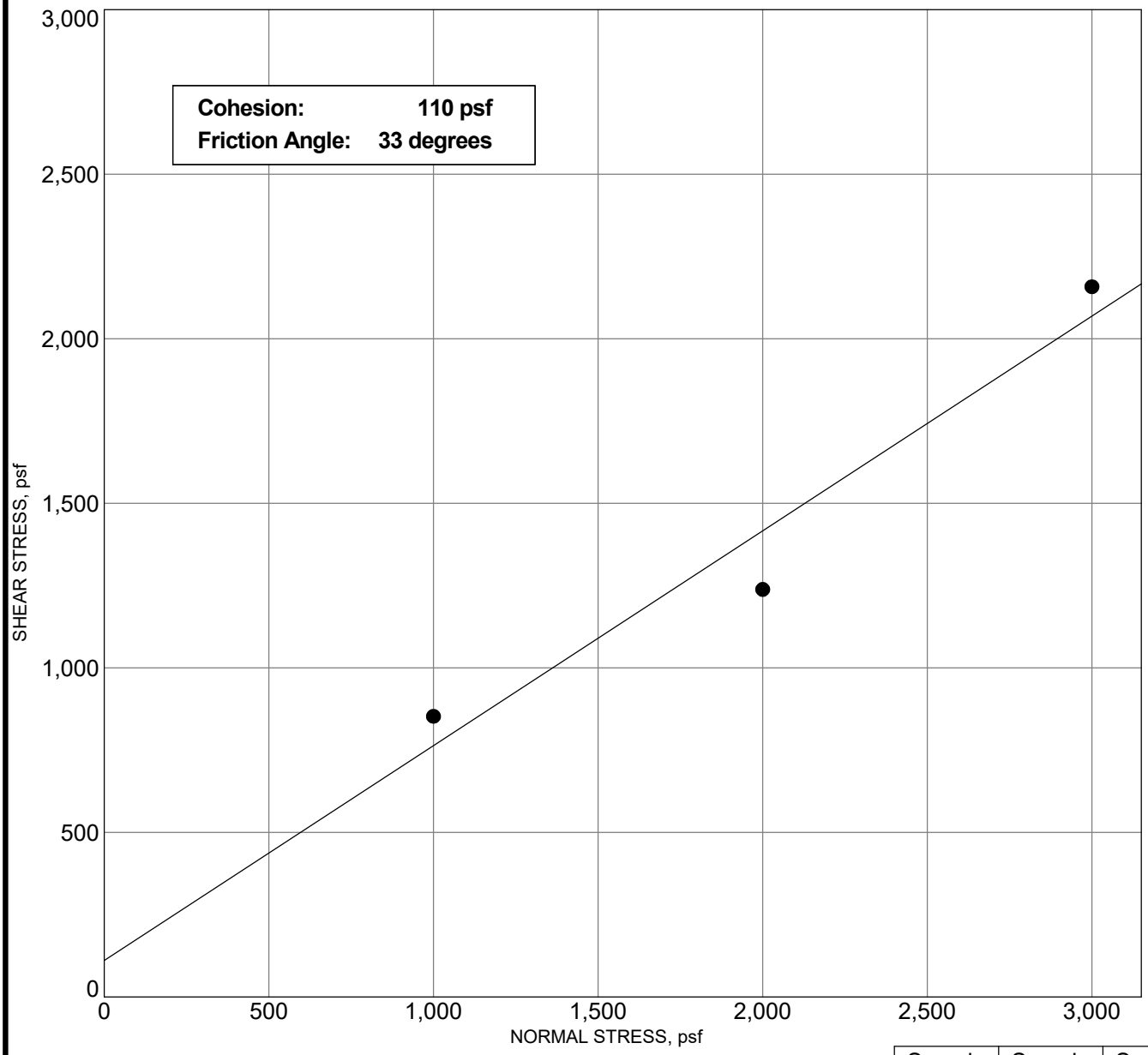
CONSOLIDATION TEST - ASTM D2435

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Plate
C - 4

G CONSOL 7534-00.GPJ GEOLABS.GDT 9/19/17



		Sample #1	Sample #2	Sample #3
INITIAL	Moisture Content, %	57.6	57.4	58.1
	Dry Density, pcf	59.8	61.7	62.4
	Height, inches	1.00	1.00	1.00
FINAL	Moisture Content, %	64.7	61.2	60.9
	Dry Density, pcf	59.8	62.9	62.8
	Height, inches	0.999	0.981	0.995
	Diameter, inches	2.42	2.42	2.42
	Deformation Rate, inch/minute	0.0025	0.0021	0.0022
	Normal Stress, psf	**1000**	**2000**	**3000**
	Peak Shear Stress, psf	**853**	**1238**	**2158**
	Shear Displacement, inches	0.43	0.41	0.43

Sample: B-2
Depth: 5.0 - 6.5 feet
Description: Brown with multi-color mottling silty clay with some gravel

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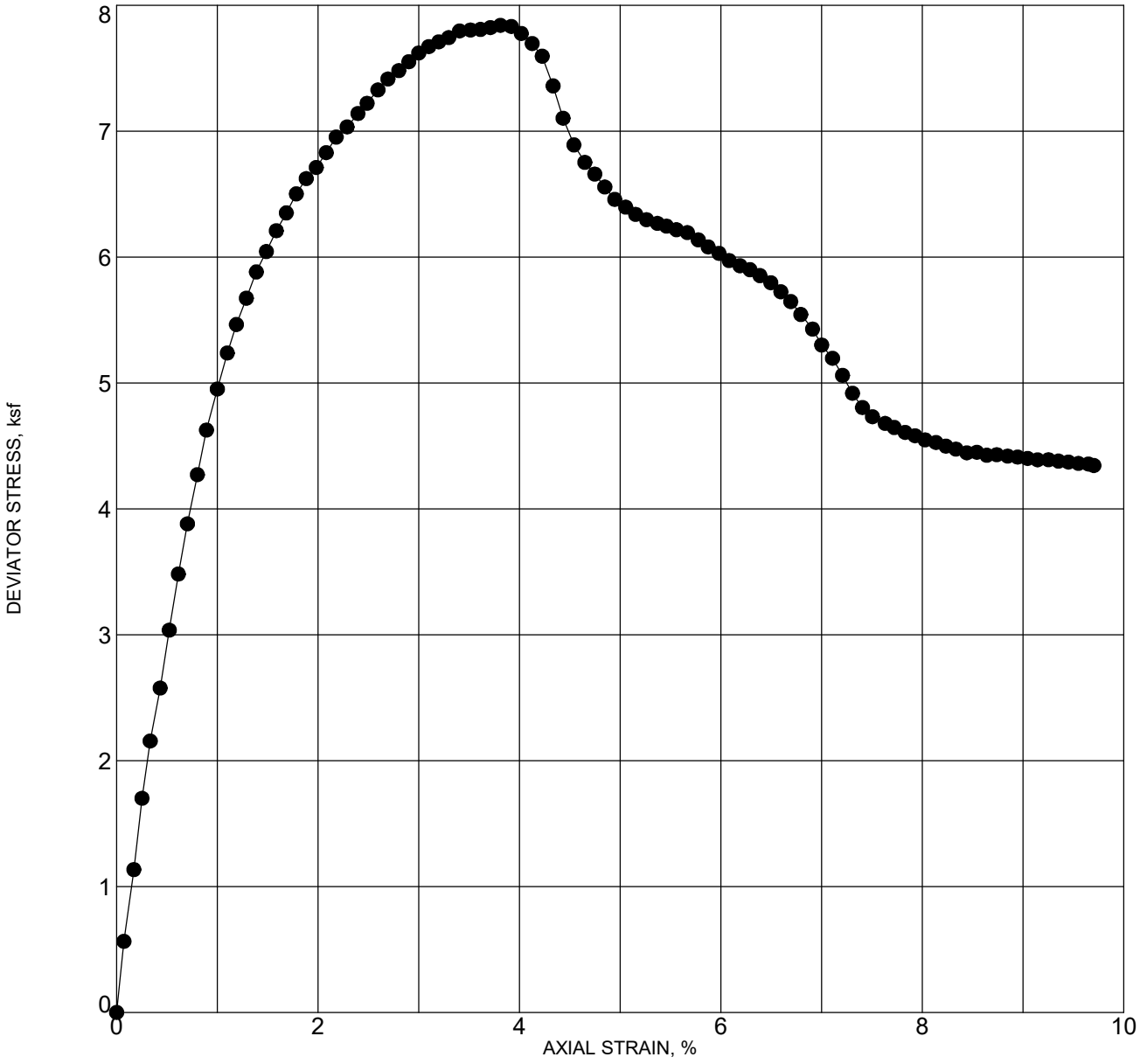
DIRECT SHEAR TEST - ASTM D3080

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Plate
C - 5

G DIRECT SHEAR 7534-00.GPJ GEOLABS.GDT 9/19/17



Max. Deviator Stress (ksf):	7.8
Confining Stress (ksf):	0.6

Location: B-3
Depth: 5.0 - 6.5 feet
Description: Dark orangish brown silty clay
Test Date: 7/25/2017

Dry Density (pcf)	82.9	Sample Diameter (inches)	2.373
Moisture (%)	36.4	Sample Height (inches)	4.953
Axial Strain at Failure (%)	7.8	Strain Rate (% / minute)	1.02

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TRIAXIAL UU COMPRESSION TEST - ASTM D2850

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Plate
C - 6

G_TXUU_7534-00.GPJ GEOLABS.GDT 9/19/17

Location	Depth	Length	Diameter	Length/ Diameter Ratio	Density	Load	Compressive Strength
	(feet)	(inches)	(inches)		(pcf)	(lbs)	(psi)
B-1	37 - 42	4.520	2.410	1.88	150.2	9,630	2,110
B-1	42 - 47	4.550	2.400	1.90	125.5	5,050	1,120

ASTM D7012 (METHOD C)

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UNIAXIAL COMPRESSIVE STRENGTH TEST

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Plate
C - 7

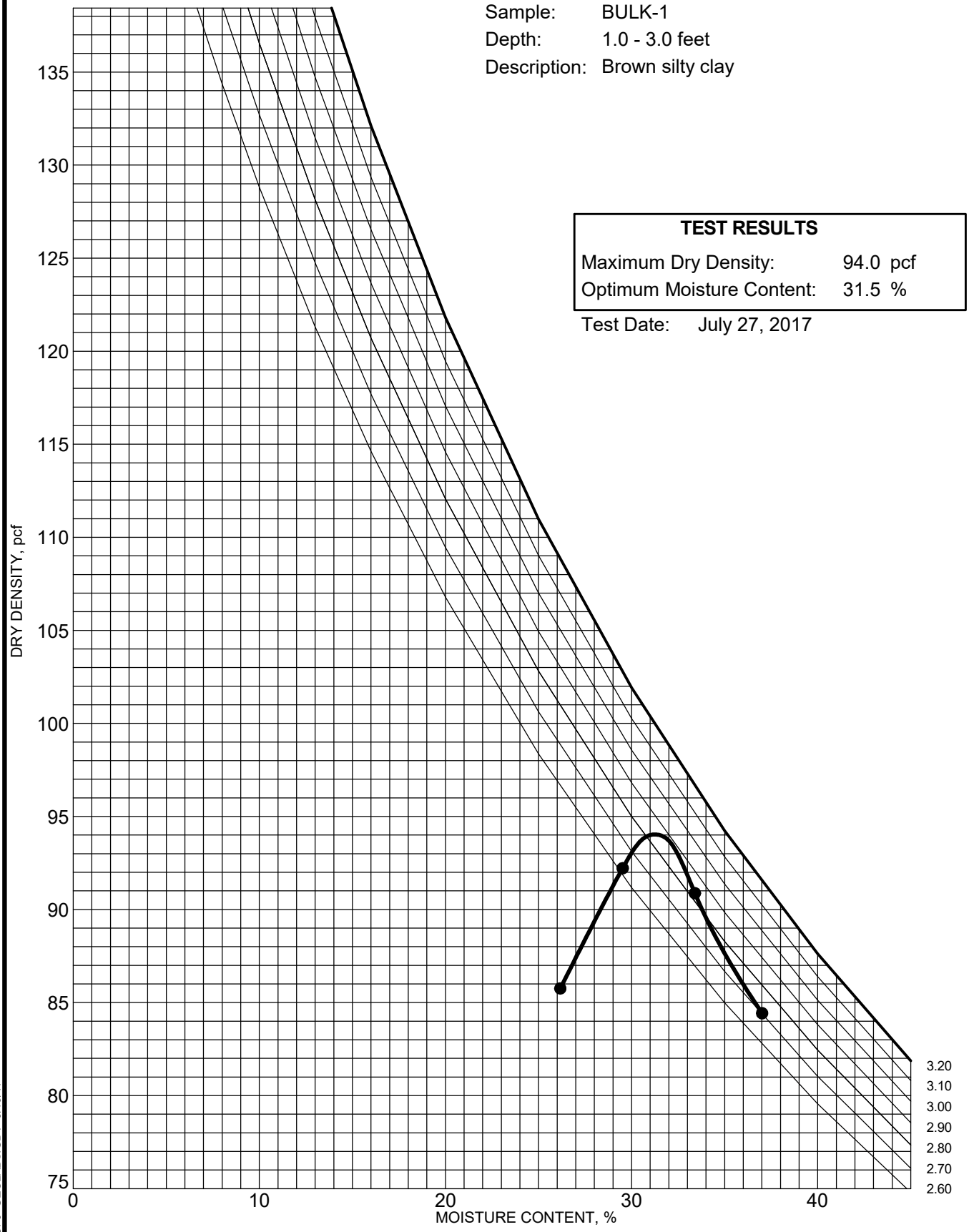
G_ROCK_UC_TEST_PORTRAIT_7534-00.GPJ_GEOLABS.GDT_9/19/17

Sample: BULK-1
Depth: 1.0 - 3.0 feet
Description: Brown silty clay

TEST RESULTS

Maximum Dry Density:	94.0 pcf
Optimum Moisture Content:	31.5 %

Test Date: July 27, 2017



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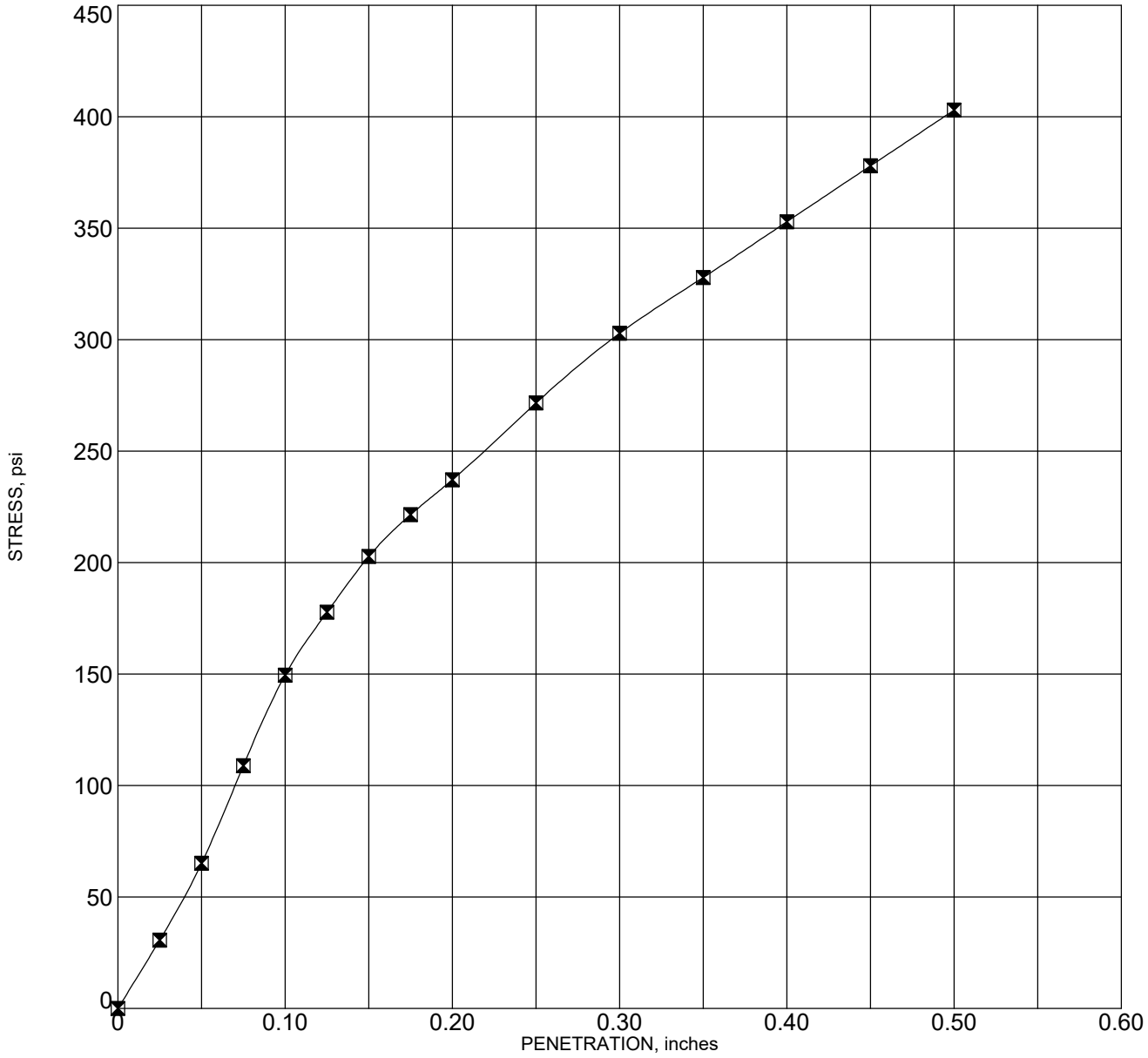
W.O. 7534-00

MOISTURE-DENSITY RELATIONSHIP - ASTM D1557 A

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Plate
C - 8

G COMPACTION 7534-00.GPJ GEOLABS.GDT 9/19/17



Corr. CBR @ 0.1"	16.4
Corr. CBR @ 0.2"	16.4
Swell (%)	1.96

Sample: BULK-1
Depth: 1.0 - 3.0 feet
Description: Brown silty clay

Molding Dry Density (pcf)	91.3	Hammer Wt. (lbs)	10
Molding Moisture (%)	30.4	Hammer Drop (inches)	18
Days Soaked	5	No. of Blows	56
Aggregate	3/4 inch minus	No. of Layers	5

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W.O. 7534-00

CALIFORNIA BEARING RATIO - ASTM D1883

ANAHOLA FARM LOTS
WATER SYSTEM IMPROVEMENTS
ANAHOLA, KAUAI, HAWAII

Plate
C - 9

G_CBR_7534-00.GPJ GEOLABS.GDT 9/19/17

APPENDIX D

B-1 22.0' TO 53.5'

22.0' **35.5'** **45.0'**

35.5' **45.0'** **53.5'**

B-1 53.5' TO 70.5'

53.5' **62.0'**

62.0' **70.5'**

B-1 70.5' TO 95.5'

70.5' **79.0'** **87.0'**

79.0' **87.0'** **95.5'**

B-1 95.5' TO 102.0'

95.5'

102.0'

DAVID Y. IGE
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
EMD/CWB

R10F642.FNL.18

September 28, 2018

The Honorable William Aila, Jr.
Deputy to the Chairman
Department of Hawaiian Home Lands
PO Box 1879
Honolulu, Hawaii 96813

Attention: Mr. Stewart Matsunaga
Master-Planned Community Development Manager

Dear Mr. Aila:

Subject: NOTICE OF GENERAL PERMIT COVERAGE (NGPC)
National Pollutant Discharge Elimination System (NPDES)
Anahola Farm Lots Subdivision Water System Improvements Phase II
Anahola, Island of Kauai, Hawaii
File No. HI R10F642

This NGPC supersedes the document R10F594.FNL, dated July 26, 2018.

This letter is to notify you that the **DEPARTMENT OF HAWAIIAN HOME LANDS, LAND DEVELOPMENT DIVISION** (hereinafter PERMITTEE) is now covered under the NPDES General Permit authorizing discharges of storm water associated with construction activities. Coverage under this general permit authorizes you to discharge only storm water to the receiving State waters discharge point(s) from the project location(s) identified in the Notice of Intent (NOI), dated August 28, 2018, **provided that you comply with Hawaii Administrative Rules (HAR) 11-54; HAR 11-55; HAR 11-55, Appendix A; HAR 11-55, Appendix C; and the information submitted in the NOI.** Discharges of non-storm water, toxics, and other water pollutants to State waters are not authorized by this NPDES General Permit. HAR 11-54 and 11-55 are available on the Department of Health (DOH), Clean Water Branch (CWB) website at: http://health.hawaii.gov/cwb/.

This NGPC will take effect on the date of this notice. This NGPC will expire at midnight, December 5, 2018, or when amendments to HAR, Chapter 11-55, Appendix C, are adopted, whichever occurs first. Failure to comply with HAR 11-54; HAR 11-55; HAR 11-55, Appendix A; HAR 11-55, Appendix C; and information provided in the NOI is an enforceable violation and your NGPC may be terminated. If you violate Hawaii Revised Statutes (HRS), Chapter 342D, you may be subject to penalties of up to $25,000 per violation per day and up to two (2) years in jail.

Falsification of information, including providing information in the NOI that does not match what is actually occurring at the project site/facility and failure to prepare the Storm Water Pollution Prevention Plan (SWPPP) prior to NOI submission, may result in criminal penalties for the Permittee and their authorized representative as provided in Clean Water Act, Section 309 and HRS, Section 342D-35.

As a reminder, this general permit requires the Permittee to:

1. Notify DOH of the construction start date within seven (7) calendar days before the start of construction activities.
2. Complete and submit the Solid Waste Disclosure Form for Construction Sites to the DOH, Solid and Hazardous Waste Branch, Solid Waste Section, as specified on the form at least 30 calendar days before the start of the construction activities. The form can be downloaded at: https://health.hawaii.gov/shwb/files/2018/04/swdiscformapr2018.pdf.
3. Implement the SWPPP in accordance with HAR 11-55, Appendix C. The Director reserves the right to require the Permittee to modify the SWPPP.
4. Submit a new NOI with filing fee and obtain a new NGPC for any revisions to the information submitted in the NOI (with the exception of changes to contact person information for non-transfer of ownerships and changes to the SWPPP). This NGPC cannot be modified.
5. Complete and submit the Notice of Cessation (NOC) within seven (7) calendar days after the end of the month that the subject project was completed.

All NGPC compliance submittals, including the NOC shall be submitted on the CWB Compliance Submittal Form for Individual NPDES Permits and NGPCs. This form shall be completed on the e-Permitting Portal located at: https://eha-cloud.doh.hawaii.gov/epermit/.

The Permittee is responsible for obtaining other Federal, State, or local authorizations as required by law.

Please complete the DOH Customer Satisfaction Survey regarding your request for General Permit coverage. This brief survey is available on the e-Permitting Portal located at: https://eha-cloud.doh.hawaii.gov/epermit/. Please use the Application Finder button and search for the "Customer Satisfaction Survey."

If you have any questions, please contact the Enforcement Section or Mr. Glenn Haae of the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

for

BRUCE S. ANDERSON, Ph.D.
Director of Health

c: Mr. Stewart Matsunaga, DHHL
[via e-mail Stewart.T.Matsunaga@hawaii.gov only]
Mr. Jeremy Michelson, Oceanit [via e-mail jmichelson@oceanit.com only]
Mr. Jordan Moniuszko, Oceanit [via e-mail jmoniuszko@oceanit.com only]
CWB, Kauai District Health Office [via e-mail only]

State of Hawaii, Department of Health, Clean Water Branch
NOI Form C
NOI for HAR, Chapter 11-55, Appendix C - NPDES General Permit Authorizing Discharges of Storm Water Associated With Construction Activities (as defined in 40 CFR §§122.26(b)(14)(x) and 122.26(b)(15)(i))

All sections of this form MUST be completed for National Pollutant Discharge Elimination System (NPDES) General Permit compliance.

C.1 – General Information

You are required to fulfill all requirements and check the box below. If you do not check the box, your NOI will be considered incomplete, and the CWB may deny your request for NPDES permit coverage with prejudice.

☒ *I certify that:*

- *I prepared a Storm Water Pollution Prevention Plan (SWPPP) in accordance with HAR, Chapter 11-55, Appendix C, Section 7 prior to submitting this NOI.*
- *I will comply with all terms, conditions, and requirements in HAR Chapter 11-55, Appendix C.*
- *I will implement, operate, and maintain my SWPPP to ensure that storm water discharges associated with construction activities will not violate HAR, Chapter 11-54; HAR, Chapter 11-55; and HAR, Chapter 11-55, Appendix C.*

C.2 - Existing Pollution Sources/ History of Land Use

Describe the history of land use at the existing Facility/Project site: Water storage tank site and agricultural lots.

Determine if the existing Facility/Project site may contain any existing pollution source(s) by using the following references. Place a check next to all references you utilized to determine existing pollution source(s). You are required to check at least one reference.

☐ *a. DOH, Solid and Hazardous Waste Branch-Hawaii Underground Storage Tank- Leaking Underground Storage Tank database*

☐ *b. DOH, Hazard Evaluation and Emergency Response Office records*

☐ *c. Phase I and/or Phase II Environmental Site Assessments, as applicable*

☐ *d. Recent site inspections*

☒ *e. Past land use history*

☐ *f. Soil sampling data, if available*

☐ *g. Other (specify):* _____

Describe any existing pollution source(s) identified in the references you checked above: *None*

Describe any corrective measures that have been undertaken for any existing pollution source(s): _____

C.3 - Construction Site Estimates

Please provide the following estimates for the construction site.

Total project area including areas to be left undisturbed: *8.2* *acres*

Construction site area to be disturbed including storage and staging areas: *4.1* *acres*

Impervious area before construction: *0.9* *acres*

Impervious area after construction: *0.9* *acres*

C.4 - Quantity of Storm Water Runoff

Estimate the quantity of storm water runoff during construction when the greatest and/or maximum area of disturbance occurs. Provide the supporting calculations in an attachment or insert in this section.

4.94 Mgd *Millions of Gallons per Day (MGD)*

or

9.18 cfs *Cubic Feet per Second (CFS)*

Q = CIA

where, Q = Storm runoff rate (cfs)
C = Runoff coefficient
I = Rainfall intensity (i) corrected for a duration equal to the time of concentration (Tc)

A = Drainage Area (acres)

Storm recurrence interval (Tm) = 2 year, 1-hr storm

Intensity of 1-hr rainfall (i) = 2.7 in/hr (Plate 3)

Drainage Area 1

C for pavement, 2 year	0.87	From Table 1 County of Kauai
C for roofs, 2 year	0.80	From Table 1 County of Kauai
C for lawns, clayey soil	0.20	From Design and Construction of Sanitary and Storm Sewers, ASCE, Heavy soil, 2-7% slope

C for forest	0.15	From McCuen, 2004, Hydrologic Soil Group C, 2-6% slope
Total Area (A)	3.00	ac
Area of pavement	8375 sf, 6.4% of total area	
Area of roofs	2331 sf, 1.8% of total area	
Area of lawns, clayey soil	3590 sf, 2.8% of total area	
Area of forest	116,384 sf, 89% of total area	
Weighted Runoff Coefficient (C) = 6.4% pavement * (C=0.87) + 1.8% roofs * (C=0.8) + 2.8% lawns * (C= 0.20) + 89% forest * (C= 0.15) =		
Weighted Runoff Coefficient (C)	0.21	
Corrected Intensity (I)	7.56	in/hr
Q = CIA	**4.75**	**cfs**

Drainage Area 2

(C) for lawns, clayey soil	0.20	From Design and Construction of Sanitary and Storm Sewers, ASCE, Heavy soil, 2-7% slope
Total Area (A)	0.93	ac
Corrected Intensity (I)	7.56	in/hr
Q = CIA	**1.41**	**cfs**

Drainage Area 3

(C) for lawns, clayey soil	0.20	From Design and Construction of Sanitary and Storm Sewers, ASCE, Heavy soil, 2-7% slope
Total Area (A)	1.00	ac
Corrected Intensity (I)	7.56	in/hr
Q = CIA	**1.51**	**cfs**

Drainage Area 4

(C) for lawns, clayey soil	0.20	From Design and Construction of Sanitary and Storm Sewers, ASCE, Heavy soil, 2-7% slope
Total Area (A)	1.00	ac
Corrected Intensity (I)	7.56	in/hr
Q = CIA	**1.51**	**cfs**

Total Quantity of Storm Water Runoff	**9.18**	**cfs**

C.5 - Soil Characterization

Describe the nature of the soil on the project site (including the potential to encounter contaminated soil) and the nature of the fill material to be used: Based on soil maps, soils to be encountered will mostly consist of silty clay. Based on past land use the chances of encountering contaminated soil are unlikely.

C.6 - Nature and Sequence of Construction Activity

What is the function of the construction activity (Please check all applicable activity(ies))?

☐ Residential ☐ Commercial ☐ Industrial ☐ Road Construction ☒ Linear Utility
☒ Other (please specify): Water Tank

What is being constructed? Water tank, pumps, lines, and appurtenances
Describe the scope of work and major construction activities you wish to be covered in this NOI, including baseyards and staging areas. You may only include project areas where the locations of impervious structures are known; project areas where the final grades are known; and work areas that will be performed by one (1) general contractor. A separate NOI will be required for all other project areas.
Phase II of the project involves replacement of the 0.5 MG water storage tank and appurtenances, installation of a temporary 0.1 MG water storage tank, 1,036 lf of water and drain pipe including fittings and appurtenances, well pump replacement, booster pump, emergency generator, control building expansion, retaining wall, installation of fencing surrounding the water tank site, chlorination and flushing, select site demolition, electrical work, and restoration of 795 square yards of asphaltic pavement. There will be staging three areas available mauka and makai of Kuhio Highway. The water tank lot may also provide areas for staging.

C.7 - Existing or Pending Permits, Licenses, or Approvals

Place a check next to all applicable Federal, State, or County permits, Licenses, or approvals for the project and specify the permit number.

☒ Other NPDES Permit or NGPC File No.: NPDES/NOI-F (Hydrotesting), by contractor
☐ Department of the Army Permit (Section 404):
If your project requires work in, above, under or adjacent to State waters, please contact the Army Corps of Engineers (COE) Regulatory Branch at (808) 438-9258 regarding their permitting requirements. Provide a copy of the COE permitting jurisdictional determination (JD) or the JD with COE Person's Name, Phone Number, and Date Contacted.
☐ Facility on SARA 313 List (identify SARA 313 chemicals on project site:
☐ RCRA Permit (Hazardous Wastes):
☐ Section 401 Water Quality Certification:
☒ Other (Specify): SHPD Clearance for Section 106

County-approved Erosion and Sediment Control Plan and/or Grading Permit

a. Is a County-approved Erosion and Sediment Control Plan and/or Grading Permit, where applicable for the activity and schedule for implementing each control, required?
   ☐ Yes. Please complete Section C.7.b below and skip Section C.7.c.
   ☒ No. Please complete Section C.7.c below and skip Section C.7.b.

b. *Is a copy County-approved Erosion and Sediment Control Plan and/or Grading Permit, as appropriate for the activity and schedule for implementing each control, attached?*

☐ *Yes, see Attachment* _____

☐ *No, the County-approved Erosion and Sediment Control Plan and/or Grading Permit, as appropriate for the activity and schedule for implementing each control, will be submitted at least 30 calendar days before the start of construction activities.*

c. *Please select and complete at least one (1) of the following items to demonstrate that a County-approved Erosion and Sediment Control Plan and/or Grading Permit, as appropriate for the activity and schedule for implementing each control, is not required.*

☐ *See Attachment* _____ *for the County written determination.*

☒ *Provide the County contact person information (Name, Department, Phone Number, and Date Contacted):* Stanford Iwamoto, County of Kauai DPW Engineering, (808) 241-4896, August 8, 2017

☐ *The project is a Federal Project and does not require County approval.*

☐ *Other (specify):* _____

C.8 - Project Site Maps and Construction Plans/Drawings

Attach, title, and identify all maps (pdf - minimum 300 dpi) listed below, in Attachment A.

Please reference which maps account for the features listed below.

a. *Island on which the project is located.* Attachment A Figure 1
b. *Vicinity of the project on the island.* Attachment A Figure 1
c. *Legal boundaries of the project.* Attachment A Figure 2, TMKs 4-8-005:030, 4-8-005:037, 4-8-005:016, 4-8-018:011, & 4-8-001:001
d. *Receiving State water(s) from Section 6 of e-Permitting form and receiving separate drainage system(s) from Section 7 of e-Permitting form, identified and labeled.* Attachment A Figure 3
e. *Location of ALL discharge points from Section 6 of e-Permitting form with identification numbers.* Attachment A Figure 3
f. *Boundaries of 100-Year flood plans.* Attachment A Figure 4
g. *Areas of soil disturbance.* Attachment A Figure 5
h. *Location(s) of impervious structures (including buildings, roads, parking lots, etc.) after construction is completed.* Attachment A Figure 6
i. *Pre-Construction Topography including approximate slopes and drainage patterns for the entire Facility/Project site to the receiving storm water drainage system (if applicable) or to the receiving State water(s) (with flow arrows).* Attachment A Figure 7

j. During-Construction Topography (after major grading activities) including approximate slopes and drainage patterns for the entire Facility/Project site to the receiving storm water drainage system (if applicable) or to the receiving State water(s) (with flow arrows). *Attachment A Figure 3*

k. Post-Construction Topography including approximate slopes and drainage patterns for the entire Facility/Project site to the receiving storm water drainage system (if applicable) or to the receiving State water(s) (with flow arrows). *Attachment A Figure 6*

C.9 - Construction Schedule

Provide the following estimated dates:

The date when construction activity will begin. *January 2019*

The date when each major construction activity begins. *Well pump replacement: April 2019, Temporary Tank Installation: August 2019, Water Tank Construction: January 2020*

The date when the Notice of Cessation form will be submitted. *February 2021*

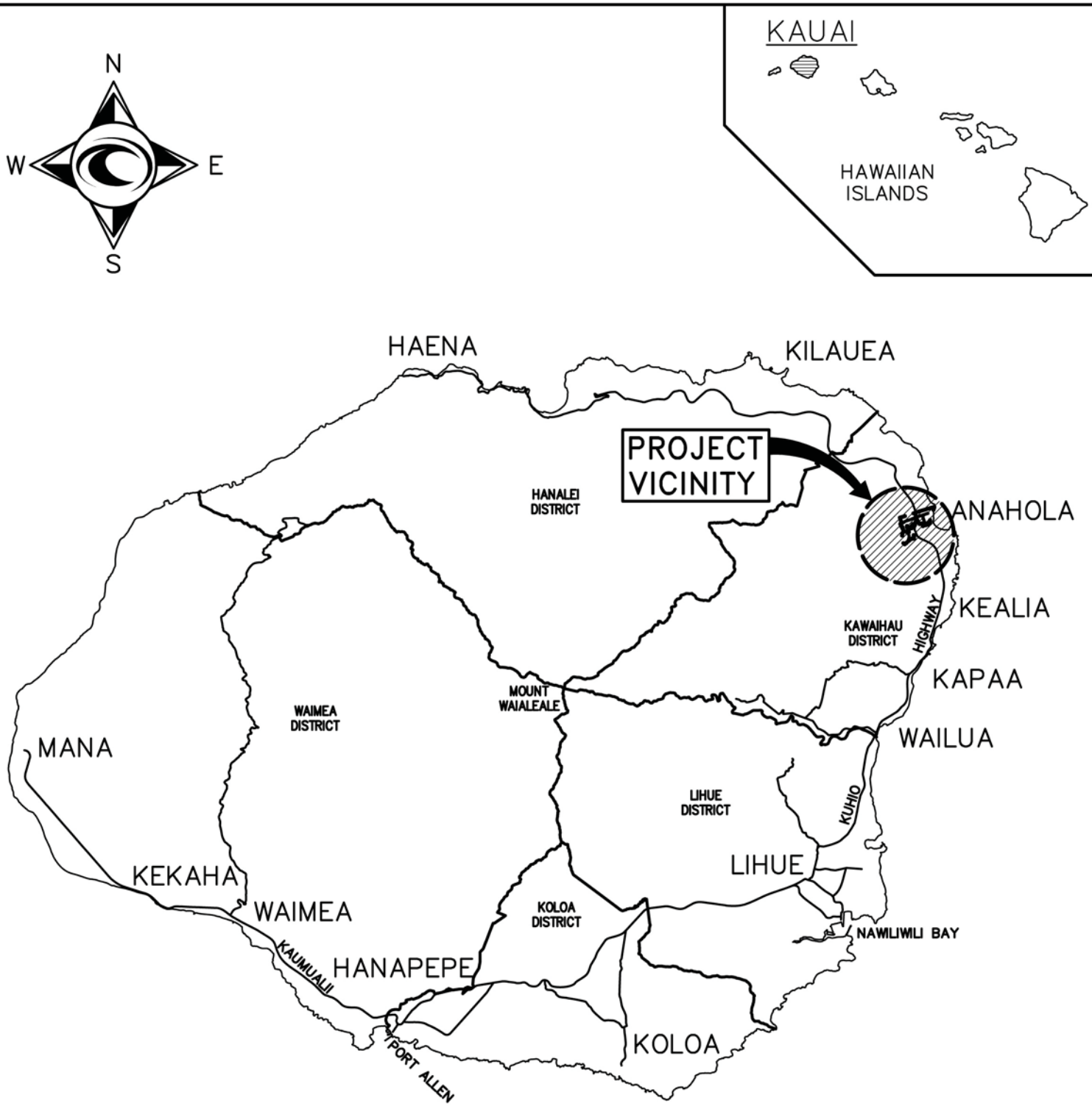
Site Specific BMPs Plan Attachments

Attachment A - Project Site Maps and Construction Plans/Drawings (Section C.8)

PROJECT SITE MAPS, CONSTRUCTION PLANS/DRAWINGS

Figure 1: Vicinity Map
Figure 2: Location Map
Figure 3: Receiving Waters and Flow Chart
Figure 4: Boundaries of 100-Year Floodplain
Figure 5: Grading Plan
Figure 6: General Site Plan (Final Condition)
Figure 7: Existing Site, Demolition and Erosion Control Plan
Figure 8: Erosion Control Typical Details

VICINITY MAP



ISLAND OF KAUAI

NOT TO SCALE

Figure 1

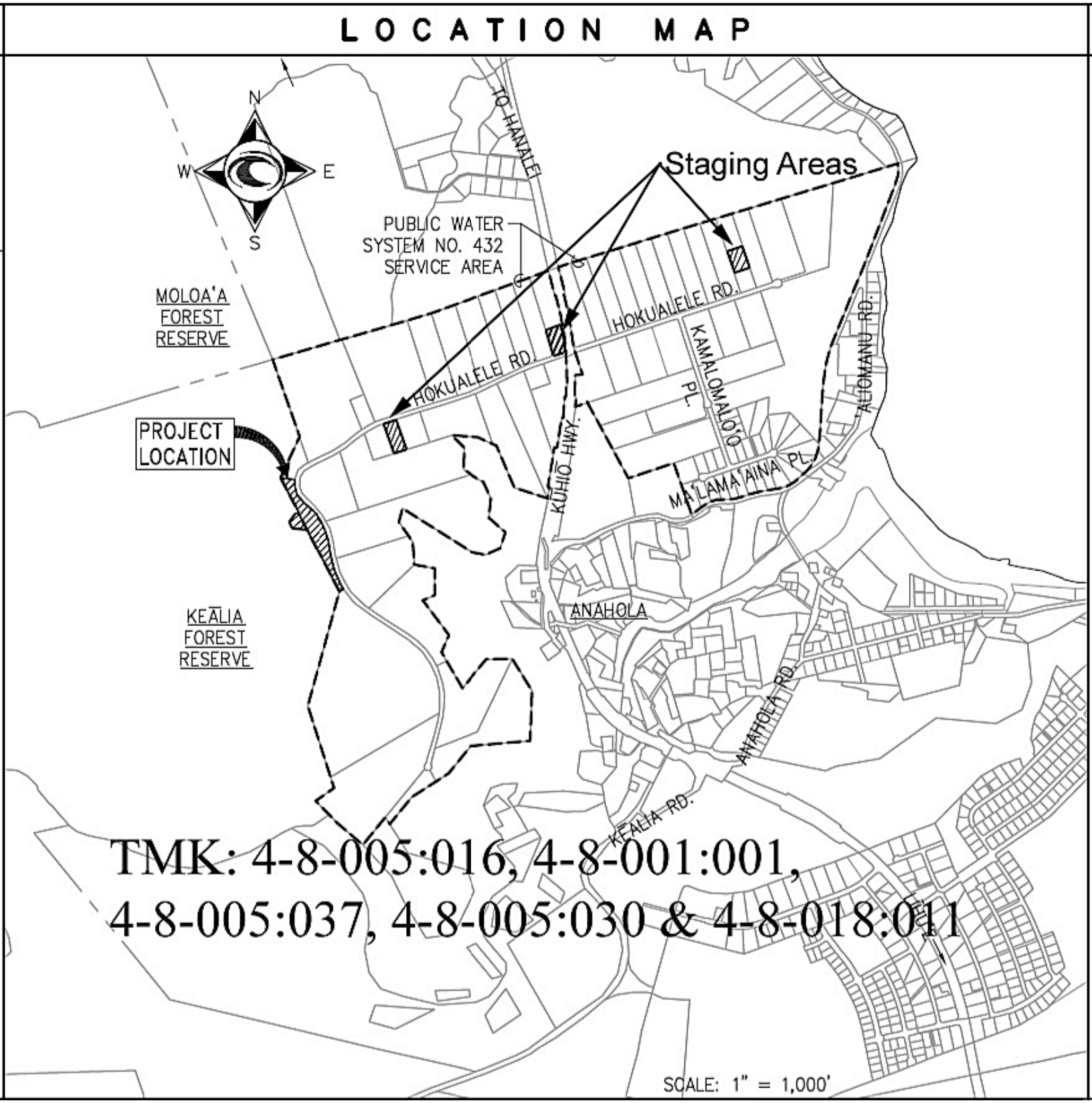
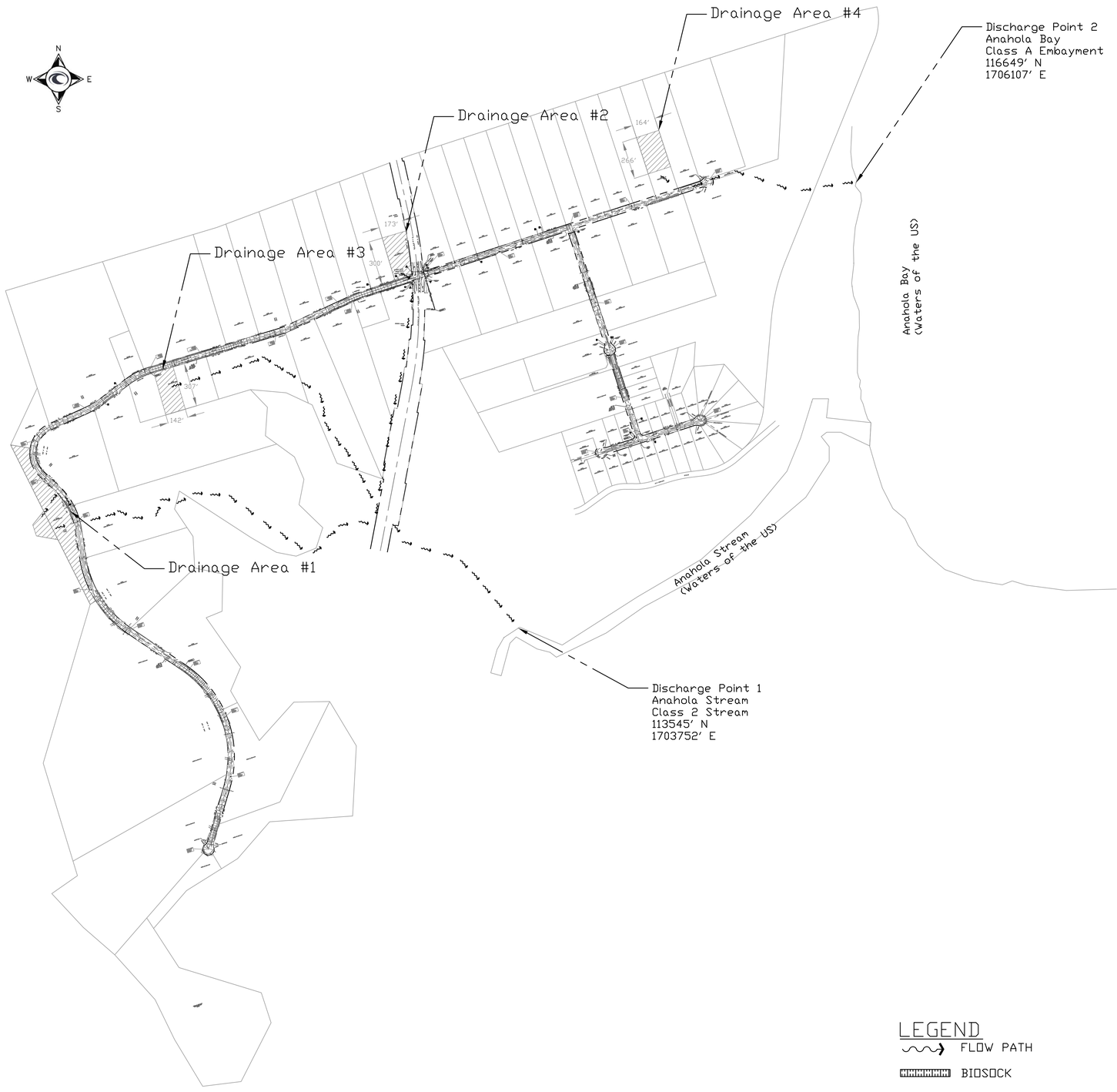
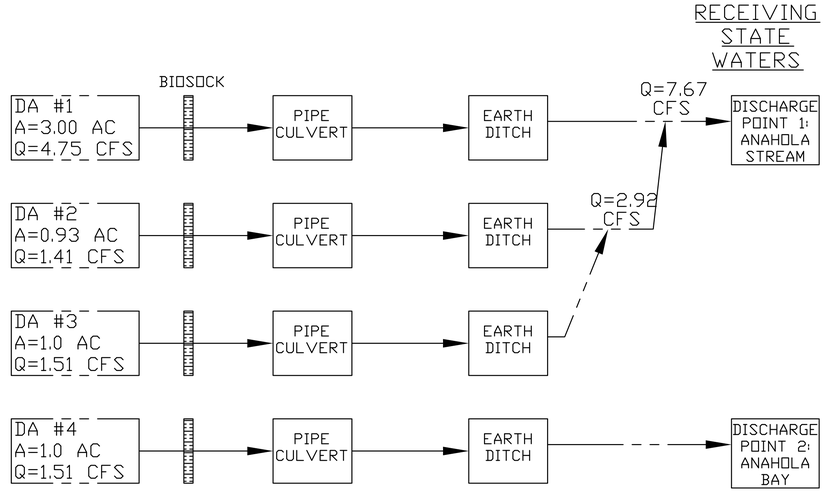

LOCATION MAP
N
W
E
S
TO HANALEI
Staging Areas
PUBLIC WATER SYSTEM NO. 432 SERVICE AREA
MOLOA'A FOREST RESERVE
HOKUALELE RD.
HOKUALELE RD.
KAMALOMALO'O PL.
ALIOMANU RD.
PROJECT LOCATION
KUHIO HWY.
MA'LAMA'AINA PL.
KEĀLIA FOREST RESERVE
ANAHOLA
ANAHOLA RD.
KEALIA RD.
TMK: 4-8-005:016, 4-8-001:001,
4-8-005:037, 4-8-005:030 & 4-8-018:011
SCALE: 1" = 1,000'

Figure 2





LEGEND

FLOW PATH

BIOSOCK

RECEIVING WATERS – ANAHOLA FARMLOTS SUBDIVISION

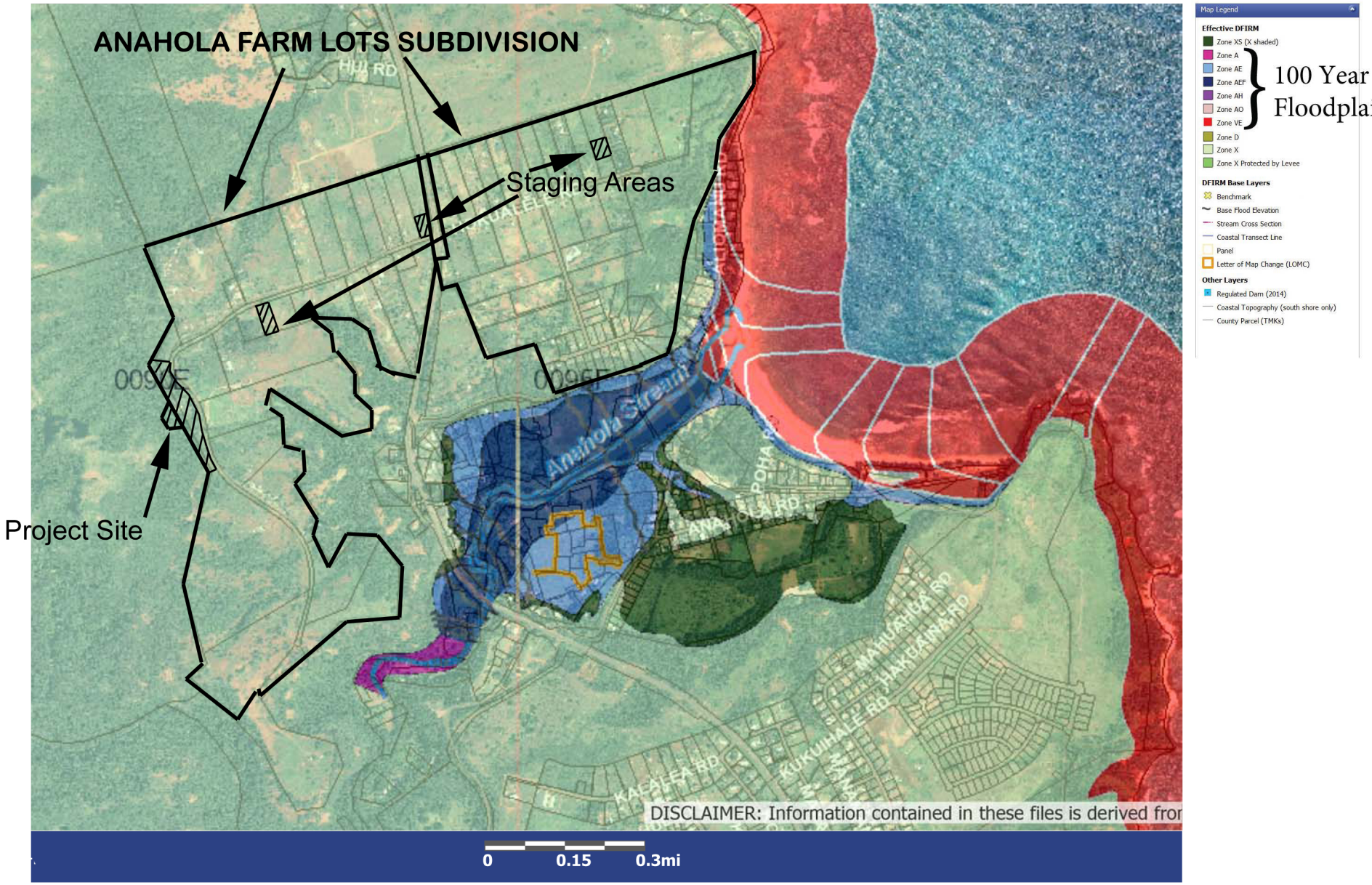
SCALE: 1/32" = 1'-0"

oceanit

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

FIGURE 3
RECEIVING WATERS AND FLOW CHART

ANAHOLA FARMLOTS SUBDIVISION
WATER SYSTEM IMPROVEMENTS, PHASE II



Boundaries of 100-Year Floodplain

Figure 4

TRUE NORTH
SCALE: 1 in. = 10 FT.

TMK: 4-8-001:001
OWNER: STATE OF HAWAII
(DEPT. OF LAND AND NATURAL RESOURCES)
3685.61 Ac.

TMK: 4-8-005:037
OWNER: STATE OF HAWAII
(DEPT. OF HAWAIIAN HOME LANDS)
2.75 Ac.

NEW ANAHOLA 390' 0.44 MG TANK
O.F.=390.00
F.F.=353.08

TEMPORARY 0.1 MG TANK
O.F.=367.50
F.F.=347.50

INSTALL 525 SF. 2' THICK GROUTED RIPRAP W/ GEOTEXTILE FABRIC, SEE DET. 3 C-5 DT-2

INSTALL 418 S.F. TURF REINFORCEMENT MAT ALONG SLOPES DOWNSTREAM OF NEW DRAINAGE CHANNEL APRON EXTENSION, SEE DET. 3 C-5 DT-4

INSTALL CRM DIVERSION CURB, SEE DET. 5 C-5 DT-2

INSTALL 1,600 S.F. TURF REINFORCEMENT MAT ALONG SLOPES DOWNSTREAM OF EXIST. DRAINAGE CHANNEL APRON, SEE DET. 5 C-5 DT-4

INSTALL 2' THICK GROUTED RIPRAP TRANSITION W/ GEOTEXTILE FABRIC, SEE DET. 3 C-5 DT-2

INSTALL 2' THICK GROUTED RIPRAP TRANSITION W/ GEOTEXTILE FABRIC, SEE DET. 3 C-5 DT-2

6" PERIMETER DRAIN LINE

8" OVERFLOW LINE

8" EFFLUENT LINE

8" WASHOUT LINE

8" INFLUENT LINE

8" TEMP. TANK INFLUENT/EFFLUENT (LOW-SERVICE)

8" LOW-SERVICE EFFLUENT LINE

8" HIGH-SERVICE EFFLUENT LINE

6" DRAIN

6" WELL BLOW OFF LINE

8" TEMP. TANK OVERFLOW

8" TEMP. TANK WASHOUT

CONSTRUCT NEW CONC. SIDEWALK AROUND CONTROL BUILDING EXPANSION, SEE DET. 5 C-5 DT-7

CONSTRUCT NEW CONC. RING WALL FOUNDATION AS PER TANK SUPPLIER'S RECOMMENDATION

CONSTRUCT NEW CRM GRADE ADJUSTMENT WALL, SEE DET. 1 C-5 DT-4

BACKFILL REGION BETWEEN TOP BANK AND CRM GRADE ADJUSTMENT WALL

STA. 1+00 WASHOUT & STA. 0+66.94 DRAIN
DRAIN OUTLET STRUCTURE
INV. W_8 ELEV.=340.83
INV. D_6 ELEV.=340.83
TOP HEADWALL ELEV.=344.36

STA. 0+25 TEMP. TANK WASHOUT
DRAIN OUTLET STRUCTURE
INV. W_8 ELEV.=340.50
TOP HEADWALL ELEV.=343.28

EXIST. DRAIN INLET MANHOLE

EXIST. Ø42-INCH CMP DRAINAGE CULVERT

HOKUALELE ROAD (COUNTY MAINTAINED)

8" D.I. HIGH-SERVICE WL (N.I.C.)

8" D.I. LOW-SERVICE (N.I.C.)

LIMITS OF GRADING/ GRAVEL

BASELINE (℄)

0+00

1+00

2+00

STA. 0+61 O/S 23.5' Lt. TW=357.5

STA. 0+62.86 O/S 28.3' Lt. TW=357.5

STA. 0+60 O/S 16.6' Lt. FG=346.9

STA. 0+23 O/S 17.0' Lt. TW=357.5

STA. 0+20 O/S 7.0' Rt. TW=348.5

STA. 0+50 O/S 9.0' Rt. FF=347.5

STA. 0+40 O/S 34.6' Rt. FG=346.5

STA. 1+59± O/S 33'± Rt. TW=344.25 BW/EG=342.01

STA. 1+53± O/S 38'± Rt. TW=344.25 BW/EG=341.90

STA. 1+36± O/S 50'± Rt. TW=344.25 BW/EG=341.59

STA. 1+05± O/S 52'± Rt. TW=344.25 BW/EG=342.67

STA. 1+01± O/S 52'± Rt. TW=344.25 BW/EG=342.90

EG/FG=357.5
EG/FG=356.7
EG/FG=355.8
EG/BW/FG=355.5
EG/FG=350.3
EG/FG=349.5
EG/FG=346.8
EG/FG=346.7
EG/FG=345.5
EG/FG=344.7
EG/FG=344.4
EG/FG=345.2
EG/FG=344.8
EG/FG=344.9

EARTHWORK SUMMARY
(FOR GRADING PERMIT PURPOSES ONLY)

TEMPORARY TANK PAD GRADING:

AREA TO BE GRADED:	3,715 SF
CUT:	110 C.Y.
FILL:	109 C.Y.

CRM GRADE ADJUSTMENT WALL

AREA TO BE GRADED:	416 SF
CUT:	26 CY
BACKFILL:	28 CY

CONTRACTOR TO CONDUCT HIS OWN QUANTITY SUMMARY

GRADING PLAN
SCALE: 1" = 10'-0"

GRAPHIC SCALE:
10' 5' 0 10' 20'
SCALE: 1" = 10'

DAYANANDA H. VITHANAGE
LICENSED PROFESSIONAL ENGINEER
NO. C-9348
HAWAII USA

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

Signature 4/30/20 Expiration Date of the License

oceanit

DESCRIPTION	DATE	APPROVED

DEPARTMENT OF HAWAIIAN HOME LANDS

91-5420 Kapolei Parkway
Kapolei, Hawai'i 96707

ANAHOLA FARM LOTS WATER PROJECT

Phase II - Water Tank Replacement & Facility Impr.
Anahola, Island of Kaua'i

TMK:
4-8-001:001; 4-8-005:037 & 039

GRADING PLAN

Figure 5

90% PLANS: ANAHOLA FARM LOTS - PHASE II - WATER TANK REPLACEMENT & FACILITY IMPROVEMENTS

DRAWING NAME: I:\2017\05-DHHL_ANAHOLA_PHII_WATER_SYSTEM_IMPROVEMENTS\D_GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\04_FINAL\PHASE II - WATER TANK\12_GRA EDIT TIME: 05-30-18, 3:04 PM EDITED BY: JMICHELSON

TRUE NORTH
SCALE: 1 in. = 10 Ft.

"+" CUT ROCK M6
ELEV=358.58
FB 3073/73

INSTALL BRACKET FOR WALL MOUNTED BARBED WIRE FENCE 6" FROM END OF WALL

173°35'57.41": 73.46'
(CUT ROCK M6 TO CENTER 0.44 MG TANK)

INSTALL 525 SF. 2' THICK GROUTED RIPRAP W/ GEOTEXTILE FABRIC, SEE DET. 3/C-3|DT-2

INSTALL CRM DIVERSION CURB, SEE DET. 4/C-3|DT-2

INSTALL 418 S.F. TURF REINFORCEMENT MAT ALONG SLOPES DOWNSTREAM OF NEW DRAINAGE CHANNEL APRON EXTENSION, SEE DET. 3/C-3|DT-4

℄ STA. 0+62.86
O/S 28.3' Lt.

℄ STA. 0+80 (O/S 28.0' Lt.)
INSTALL 14 WIDE DOUBLE SWING ACCESS GATE (AS PER WSS STD DET. F1 THRU F5)

℄ STA. 0+91.06,
(O/S 28.6' Lt.)
INSTALL CORNER POST, CONN. TO EXIST. CHAIN LINK FENCE

11 L.F. NEW CLF

4 L.F. NEW CLF

5'-0" MIN.

℄ STA. 0+23
O/S 17.0' Lt.

CONSTRUCT 68 L.F. CONC. RETAINING WALL AND 6-FOOT TALL CHAIN LINK FENCE, SEE DETS. 5/C-3|DT-2 2/C-3|DT-5

INSTALL 2' THICK GROUTED RIPRAP TRANSITION W/ GEOTEXTILE FABRIC, SEE DET. 3/C-3|DT-2

℄ STA. 0+61
O/S 23.5' Lt.

℄ STA. 1+40
BEGIN NEW ACCESS ROAD EXTENSION

0+00

10'-0" MIN.

℄ STA. 0+20
O/S 7.0' Rt.

5'-0" MIN.

INSTALL 2' THICK GROUTED RIPRAP TRANSITION W/ GEOTEXTILE FABRIC, SEE DET. 3/C-3|DT-2

INSTALL CONC. BOLLARDS AROUND CONC. PAD, SEE ELECTRICAL DWGS.

℄ STA. 0+45.75
(O/S 13.3' Rt.)

℄ STA. 0+62.75
(O/S 13.3' Rt.)

10'-0" GRAVEL ACCESS ROAD

R5'-0"

8" TEMP. TANK INFLUENT/EFFLUENT (ABANDONED IN PLACE)

8" TEMP. TANK OVERFLOW (ABANDONED IN PLACE)

8" TEMP. TANK WASHOUT (ABANDONED IN PLACE)

NEW DRAIN OUTLET STRUCTURE (ABANDONED IN PLACE), SEE DET. 2/C-3|DT-3

BASELINE (℄)

CMU CONTROL BLDG. EXPANSION, SEE STRUCTURAL DWGS.

INSTALL NEW 4'Wx17'L CONC. PAD, EMERGENCY GENERATOR & DIESEL TANK, SEE STRUCTURAL & ELECTRICAL DRAWINGS

LIMITS OF GRADING/ GRAVEL

REPLACE EXIST. WELL PUMP, DISCHARGE PIPING AND ALL ASSOCIATED APPURTENANCES, SEE MECHANICAL DWGS.

℄ STA. 0+97±, O/S 48'± Rt.
BEGIN NEW CHAIN LINK FENCE

℄ STA. 1+01, O/S 52'± Rt.
BEGIN NEW CRM GRADE ADJUSTMENT WALL

EXIST. DRAIN INLET MANHOLE

CONN. TO EXIST. 6-INCH BLOWOFF

EXIST. ø42-INCH CMP DRAINAGE CULVERT

6" PERIMETER DRAIN LINE

4' O.C. TYP

1'-2" O.C.

OUTSIDE FACE TANK WALL R=24'-0"

R=24'-6" OUTSIDE FACE OF FOOTING

R=23'-0" INSIDE FACE OF TANK WALL (UPPER)

R=22'-4" INSIDE FACE OF TANK WALL (LOWER)

℄ STA. 1+30.94
O/S 49.8' Lt.

NEW ANAHOLA 390'
0.44 MG TANK
O.F.=390.00
FF.=353.08

8" INFLUENT LINE

3'x5' CONC. LANDING, SEE STRUCTURAL DWGS.

STA. 1+75.79 LOW-SERVICE
CUT AND PLUG ABANDONED TEMP. TANK INFLUENT/ EFFLUENT
1-8" BLIND FLANGE
1-8" PLUG
1-CONC. BLK.

8" EFFLUENT LINE

MIDPOINT CONC. SLAB
℄ STA. 1+44.99
O/S 9.1' Rt.

GATE VALVES TO BE SECURED IN THE CLOSED POSITION

6" DRAIN

LIMITS OF BACKFILL

6" WELL BLOW OFF LINE

2'-0" TYP.

BACKFILL REGION BETWEEN TOP BANK AND CRM GRADE ADJUSTMENT WALL

CONSTRUCT 59 L.F. NEW CRM GRADE ADJUSTMENT WALL, SEE DET. 1/C-3|DT-4

REPLACE 68 L.F. 6-FOOT HIGH CHAIN LINK FENCE, SEE DET. 1/C-3|DT-5

INSTALL WALL MOUNTED BARBED WIRE FENCE ALONG TOP OF EXIST. 8-INCH THK CONC. WALL, SEE DET. 3/C-3|DT-5

INSTALL BRACKET FOR WALL MOUNTED BARBED WIRE FENCE 6" FROM END OF WALL

8" OVERFLOW LINE

℄ STA. 1+50.37,
(O/S 32.1' Lt.)
TANK LEVEL TRANSMITTER ASSEMBLY, SEE DET. 2/C-3|DT-2

GATE VALVE TO BE SECURED IN THE CLOSED POSITION

WATER LEVEL INDICATOR, SEE STRUCTURAL DWGS.

℄ STA. 1+37.50,
(O/S 23.3' Lt.)
INSTALL CHLORINE RESIDUAL ANALYZER ASSEMBLY, SEE DET. 1/C-3|DT-2

8" WASHOUT LINE

INSTALL NEW 6'Wx8'-6"L CONC. PAD & BOOSTER PUMP ASSEMBLY, SEE MECHANICAL DWGS.

NEW DRAIN OUTLET STRUCTURE, SEE DET. 3/C-3|DT-3

℄ STA. 1+59±, O/S 29'± Rt.
END NEW CHAIN LINK FENCE

℄ STA. 1+58, O/S 32'± Rt.
END NEW CRM GRADE ADJUSTMENT WALL

INSTALL 1,600 S.F. TURF REINFORCEMENT MAT ALONG SLOPES DOWNSTREAM OF EXIST. DRAINAGE CHANNEL APRON, SEE DET. 2/C-3|DT-4

8" LOW-SERVICE EFFLUENT LINE

8" HIGH-SERVICE EFFLUENT LINE

CONN. TO 8-INCH LOW-SERVICE WATERLINE INSTALLED IN PHASE I

CONN. TO 8-INCH HIGH-SERVICE WATERLINE INSTALLED IN PHASE I

8" D.I. HIGH-SERVICE WL (N.I.C.)

8" D.I. LOW-SERVICE (N.I.C.)

HOKUALELE ROAD (COUNTY MAINTAINED)

TMK: 4-8-001:001
OWNER: STATE OF HAWAII
(DEPT. OF LAND AND NATURAL RESOURCES)
3685.61 Ac.

TMK: 4-8-005:037
OWNER: STATE OF HAWAII
(DEPT. OF HAWAIIAN HOME LANDS)
2.75 Ac.

T.M.K.: (4) 4-8-05:37 Lot 20

NOTES:

1. CONTRACTOR TO DEMO AND REMOVE TEMPORARY TANK, RING WALL FOUNDATION AND ALL ABOVE GROUND APPURTENANCES AFTER SERVICES HAVE BEEN TRANSFERRED TO NEW ANAHOLA 390' 0.44 MG RESERVOIR.
2. RISER PIPES FOR WATERLINES SERVICING TEMPORARY TANK SHALL BE REMOVED AND CAPPED 24 INCHES MINIMUM BELOW GRADE. TEMPORARY TANK WATERLINES SHALL BE ABANDONED IN PLACE.
3. CONTRACTOR SHALL LAYOUT NEW GRAVEL ACCESS ROAD AND INSTALL NEW CONC. PAD, BOLLARDS & EMERGENCY GENERATOR AT THE GRADED AREA FOR THE FORMER TEMPORARY TANK.

GENERAL SITE PLAN (FINAL CONDITION)

SCALE: 1" = 10'-0"

GRAPHIC SCALE:
10' 5' 0 10' 20'
SCALE: 1" = 10'

DRAWING NAME: I:\2017\05-DHHL_ANAHOLA_PHII_WATER_SYSTEM_IMPROVEMENTS\0 GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\04_FINAL\PHASE II - WATER TANK\10_ST EDIT TIME: 05-30-18, 3:05 PM EDITED BY: JMICHELSON

DAYANANDA H. VITHANAGE
LICENSED PROFESSIONAL ENGINEER
NO. C-9348
HAWAII USA

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

Signature 4/30/20 Expiration Date of the License

oceanit

DESCRIPTION	DATE	APPROVED	MADE BY

DEPARTMENT OF HAWAIIAN HOME LANDS

91-5420 Kapolei Parkway
Kapolei, Hawai'i 96707

ANAHOLA FARM LOTS WATER PROJECT

Phase II - Water Tank Replacement & Facility Impr.
Anahola, Island of Kaua'i

TMK:
4-8-001:001; 4-8-005:037 & 039

GENERAL SITE PLAN (FINAL CONDITION)

Figure 6

90% PLANS: ANAHOLA FARM LOTS - PHASE II - WATER TANK REPLACEMENT & FACILITY IMPROVEMENTS

TRUE NORTH
SCALE: 1 in. = 10 Ft.

EXIST. 8-INCH THICK CONC. WALL

SAWCUT, DEMO AND REMOVE EXITING AC PAVEMENT 36 INCHES MIN. BEYOND OUTSIDE FACE OF EXISTING CONC. RINGWALL

4'-0" MAX.

3'-0" MIN.

DEMO. AND REMOVE EXIST. STEEL 0.5. MG TANK., CONC. RINGWALL AND ALL ASSOCIATED APPURTENANCES

"+" CUT ROCK M6
ELEV=358.58
FB 3073/73

194°19'33.59": 121.56'
(CUT ROCK M6 TO ℄ STA. 1+62.37, P.C.)

EXIST. 0.50 MG RESERVOIR

B-1 (SW)

MAG NAIL M5
ELEV=362.38
FB 3073/66

EXIST. CUTOFF DITCH DISCHARGE APRON

TMK: 4-8-001:001
OWNER: STATE OF HAWAII
(DEPT. OF LAND AND NATURAL RESOURCES)
3685.61 Ac.

TMK: 4-8-005:037
OWNER: STATE OF HAWAII
(DEPT. OF HAWAIIAN HOME LANDS)
2.75 Ac.

EXIST. 6-FOOT HIGH CHAIN LINK FENCE

295°30'42.20": 86.62'
(CUT ROCK M6 TO ℄ STA. 0+00)

EXIST. CUTOFF DITCH DISCHARGE APRON

B-2

DEMO AND REMOVE POR. OF EXIST. AC 8-INCH DIA. RESERVOIR INFLUENT/EFFLUENT LINE AND PLUG AT TEE DURING TANK DEMOLITION

EXIST. 8" RESERVOIR OVERFLOW & WASHOUT LINES TO BE DEMOLISHED AND REMOVED DURING TANK DEMOLITION

TANK SITE MAINTENANCE ACCESS GATE

PLUG DOWNSTREAM END OF EXIST. WYE

BULK-1

TANK SITE MAINTENANCE ACCESS GATE

DEMO AND REMOVE GATE & 90 L.F. CHAINLINK FENCE FROM CORNER POST

EXIST. 8-INCH DIA. RESERVOIR INLUENT/EFFLUENT LINE (TO BE ABANDONED AFTER CONSTRUCTION)

INSTALL 80 L.F. FILTER SOCK, SEE DET. 2 C-1 DT-6

0+00

162°46'09.60" — 162.37' — 1+00

BASELINE (℄)

2+00

B-3

157° 09' 03.26" — 192.07'

MAG NAIL M4
ELEV=347.01
FB 3073/51

DEMO AND REMOVE EXIST. AC 8-INCH DIA. RESERVOIR WASHOUT LINE PRIOR TO INSTALLATION OF NEW 8-INCH WATERLINES.

DEMO AND REMOVE AC-PAVEMENT AS NECESSARY FOR TEMPORARY TANK PAD AND GRAVEL ACCESS ROAD

DEMO AND REMOVE EXIST. SIDEWALK

EXIST. CONTROL BUILDING

HUB M7
ELEV=344.60
FB 3073/65,69

PIPE W/CAP M3
ELEV=345.36
FB 3073/63

DEMO AND REMOVE EXIST. WASHOUT CRM DRAIN OUTLET STRUCTURE

78.08' — 350° 53' 52.58"

89.11' — 342° 48' 48.34"

EXIST. 6-FOOT HIGH CHAIN LINK FENCE

DEMO, REMOVE AND REPLACE EXIST. WELL PUMP, DISCHARGE PIPING AND ALL ASSOCIATED APPURTENANCES, SALVAGE & PROTECT EXIST. CONC. PUMP FOUNDATION AND PIPE SUPPORT PEDESTALS, SEE MECHANICAL DWGS.

DEMO, REMOVE AND REPLACE 68 L.F. CHAIN LINK FENCE

INSTALL 235 L.F. SILT FENCE, SEE DET. 3 C-1 DT-6

EXIST. AC 8-INCH DIA. RESERVOIR EFFLUENT LINE (TO BE ABANDONED AFTER CONSTRUCTION)

334°33'18.02": 19.85'
(PIPE W/CAP M2 TO ℄ STA. 3+08.98, P.T.)

STABILIZED CONSTRUCTION ENTRANCE, SEE DET. 1 C-1 DT-6

PIPE W/CAP M2
ELEV=331.68
FB 3073/51

270°42'31.53": 31.53'
(PIPE W/CAP M2 TO ℄ STA. 3+37.96)

EXIST. DRAIN INLET MANHOLE

DEMO AND REMOVE POR. OF EXISTING WELL BLOWOFF LINE. CONTRACTOR TO VERIFY LOCATION.

INSTALL FILTER SOCK AROUND DRAIN INLET MANHOLE

EXIST. ø42-INCH CMP DRAINAGE CULVERT

EXIST. CONC. DRAINAGE SWALE

℄ STA. 3+37.96, INTERSECTION WITH HOKUALELE ROAD

8" D.I. LOW-SERVICE (N.I.C.)

PHASE I NEW 8" LOW-SERVICE WATERLINE (N.I.C.)

PHASE I NEW 8" HIGH-SERVICE WATERLINE (N.I.C.)

8" D.I. HIGH-SERVICE WL (N.I.C.)

EXIST. 8-INCH WATERLINE (TO BE ABANDONED)

HOKUALELE ROAD (COUNTY MAINTAINED)

BENCH MARK
STREET MON.
ELEV=326.83

℄ CURVE DATA
Δ = 70° 00' 00.00"
Δ/2 = 35° 00' 00.00"
R = 120.00'
T = 84.02'
Lc = 146.61'
Cd = 197° 46' 09.60"
Ch = 137.66'

LEGEND:

- EXISTING ITEM OR STRUCTURE TO BE DEMOLISHED OR REMOVED.
- EXISTING STURUCTURE/CONC. PAVEMENT/SLAB TO BE DEMOLISHED AND REMOVED DOWN TO SUBGRADE
- STABILIZED CONSTRUCTION ENTRANCE
- SF — SF — SILT FENCE
- FSK — FILTER SOCK
- BORING LOG LOCATION

GRAPHIC SCALE:
10' 5' 0 10' 20'
SCALE: 1" = 10'

NOTE:

1. TOPOGRAPHIC SURVEY CONDUCTED BY PAREN INC.
2. UNDER GROUND PUBLIC UTILITIES SHOWN HEREON ARE FOR INFORMATION ONLY,. NO GUARANTEE IS MADE ON THE ACCURACY OR COMPLETENESS OF SAID INFORMATION.
3. ORIGIN OF COORDINATES: COORDINATES ARE REFERRED TO HAWAII STATE PLANE NAD83 ZONE 4.
4. ORIGIN OF BENCH MARK: BENCH MARK REFERRED TO P.O.C. STREET MONUMENT 34+30, TOP OF BRASS PIN, ELEVATION = 326.83. AS SHOWN ON "AS-BUILT" PLANS "ANAHOLA/MOLOAA AGRICULTURAL LOT SUBDIVISION" PLAN & PROFILE HOKUALELE RD-STA 25+00 TO 38+00.

DATE OF TOPO: APRIL 27, 2015
FB. NO.: 3073/41

EXISTING SITE, DEMOLITION AND EROSION CONTROL PLAN

SCALE: 1" = 10'-0"

DRAWING NAME: i:\2017\05-04\HI_ANAHOLA_PHII_WATER_SYSTEM_IMPROVEMENTS\0_GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\04_FINAL\PHASE II - WATER TANK\05_EXI EDIT TIME: 05-30-18, 2:59 PM EDITED BY: JMICHELSON

DAYANANDA H. VITHANAGE
LICENSED PROFESSIONAL ENGINEER
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HAWAII USA

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

Signature 4/30/20 Expiration Date of the License

oceanit

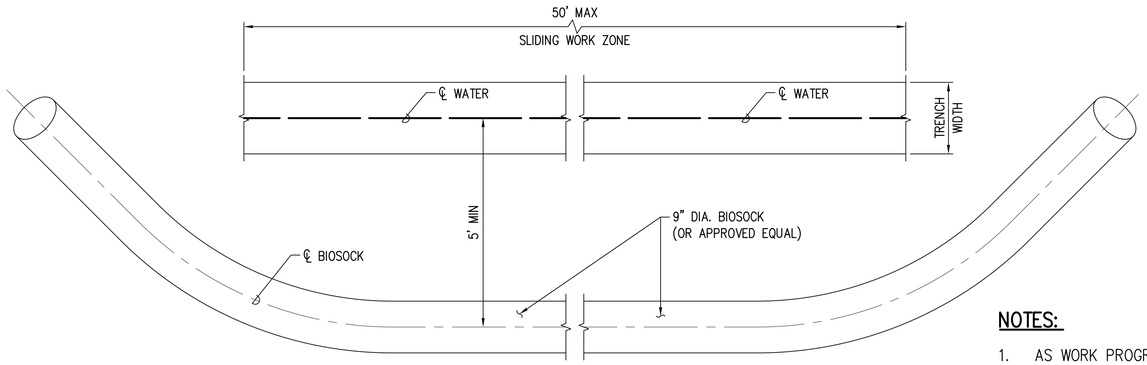
DESCRIPTION	DATE	APPROVED
90% PLANS: ANAHOLA FARM LOTS - PHASE II - WATER TANK REPLACEMENT & FACILITY IMPROVEMENTS		

DEPARTMENT OF HAWAIIAN HOME LANDS
91-5420 Kapolei Parkway
Kapolei, Hawai'i 96707

ANAHOLA FARM LOTS WATER PROJECT
Phase II - Water Tank Replacement & Facility Impr.
Anahola, Island of Kaua'i
TMK:
4-8-001:001; 4-8-005:037 & 039

EXISTING SITE, DEMOLITION AND EROSION CONTROL PLAN

Figure 7



OPEN TRENCH SEDIMENT BARRIER
NOT TO SCALE

NOTES:

1. AS WORK PROGRESSES, FIBER ROLLS SHALL BE RELOCATED AROUND THE WORK AREA IN A CONFIGURATION THAT WILL BEST CAPTURE RUNOFF POLLUTANTS.

2. FIBER ROLLS LOCATED ON GROUND WITH STEEPER THAN A 4:1 GRADE SHALL REQUIRE ANCHORING.

EROSION CONTROL NOTES AND BEST MANAGEMENT PRACTICES (BMPS):

1. MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SHALL BE IN PLACE BEFORE ANY TRENCHING WORK IS INITIATED. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PERMANENT GROUND COVER IS FULLY ESTABLISHED.

2. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN TEMPORARY FIBER ROLL BARRIER AS INDICATED ON THIS SHEET. FIBER ROLL ALIGNMENT AND LENGTH SHOWN ARE APPROXIMATE. CONTRACTOR SHALL ADJUST ACTUAL LOCATIONS TO ACCOMMODATE HIS/HER CONSTRUCTION METHODS AND RETAIN SILT ON-SITE.

3. CONSTRUCTION SHALL BE SEQUENCED TO MINIMIZE THE EXPOSURE TIME OF CLEARED SURFACE AREA. PRE-CONSTRUCTION VEGETATIVE GROUND COVER SHALL NOT BE DESTROYED, REMOVED OR DISTURBED MORE THAN TWENTY (20) CALENDAR DAYS PRIOR TO SITE DISTURBANCE.

4. TEMPORARY STOCKPILING OF EXCAVATED MATERIAL SHALL NOT BE PERMITTED AT THE PROJECT SITE. ALL EXCESS EXCAVATED MATERIAL SHALL BE REMOVED FROM THE SITE DAILY.

5. GOOD HOUSEKEEPING SHALL BE UTILIZED TO ENSURE PROTECTION OF ROADWAYS FROM MUD, DIRT AND DEBRIS.

6. THE CONTRACTOR SHALL ENSURE THAT ALL TIRES OF CONSTRUCTION VEHICLES ARE SUFFICIENTLY CLEANED OFF SO THAT DIRT OR DEBRIS IS NOT TRACKED OFF THE CONSTRUCTION SITE. WASHING OFF TIRE WILL NOT BE ACCEPTABLE UNLESS THE RUNOFF IS CONTAINED AND DOES NOT ENTER THE STORM DRAIN SYSTEM.

7. AT THE END OF TRENCHING OPERATIONS AND AT THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL INSPECT ALL CATCH BASIN, DRAIN INLET AND DRAIN MANHOLE SURROUNDING THE PROJECT SITE. ANY ACCUMULATED SEDIMENT AND DEBRIS FOUND IN THE STORM DRAIN STRUCTURES SHALL BE REMOVED. FLUSHING INTO THE DRAIN STRUCTURES IS PROHIBITED.

8. ANY DIRT OR GRASSED AREA DISTURBED SHALL BE RESTORED BY RE-GRASSING THE AREA OR BY SEEDED HYDROMULCH. THE GRASS SHALL BE FULLY ESTABLISHED AT COMPLETION OF THE PROJECT.

9. STORM WATER FLOWING TOWARD THE CONSTRUCTION AREA SHALL BE DIVERTED BY USING APPROPRIATE CONTROL MEASURES AS PRACTICAL. ADDITIONALLY, STORM WATER SHALL NOT BE PERMITTED TO SHEETFLOW OVER THE OPEN DRILL PITS.

10. REMOVE ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS WITHIN 24 HOURS.

MAINTENANCE:

1. INSPECT AND FIBER ROLL DAILY AND IMMEDIATELY AFTER EACH RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

2. SHOULD THE FABRIC ON A FIBER ROLL DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL BE NECESSARY, THE FIBER ROLL SHALL BE REPLACED PROMPTLY.

3. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT. SEDIMENT SHALL BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-THIRD THE HEIGHT OF THE BARRIER.

4. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE FIBER ROLL IS NO LONGER REQUIRED SHALL BE REMOVED BY THE CONTRACTOR.

FILTER SOCK NOTES:

1. COMPOST FILTER SOCKS SHOULD BE EITHER PREFABRICATED OR ASSEMBLED AT SITE.

2. COMPOST USED FOR FILTER SOCK FILLER MATERIAL SHALL NOT CONTAIN ANY BIOSOLIDS AND SHALL COMPLY WITH ALL LOCAL, STATE AND FEDERAL GUIDELINES.

3. FILTER SOCK MATERIALS ARE:

   A. HIGH DENSITY POLYETHYLENE (HDPE) EXPANDABLE, TUBULAR, BIODEGRADABLE OR PHOTODEGRADABLE;

   B. POLYESTER KNITTED MESH NETTING FABRIC SOCK; OR

   C. COMPOSITE TWO LAYERED COMPOST SOCK CAN BE CONSTRUCTED USING A POLYESTER KNITTED MESH NETTING FABRIC SOCK AS THE OUTERMOST LAYER AND HDPE EXPANDABLE, TUBULAR, BIODEGRADABLE OR PHOTODEGRADABLE NETTING AS THE INNERMOST LAYER.

4. LOCATE COMPOST FILTER SOCKS ON LEVEL CONTOURS SPACED AS FOLLOWS:

   A. SLOPE INCLINATION OF 4:1 (H:V) OR FLATTER: COMPOST FILTER SOCKS AND/OR BERMS SHOULD BE PLACE AT A MAXIMUM INTERVAL OF 20 FT.

   B. SLOPE INCLINATION BETWEEN 4:1 AND 2:1 (H:V): COMPOST FILTER SOCKS (USE OF BERMS NOT RECOMMENDED) SHOULD BE PLACED AT A MAXIMUM INTERVAL OF 15 FT. (A CLOSER SPACING IS MORE EFFECTIVE).

   C. SLOPE INCLINATION OF 2:1 (H:V) OR GREATER: COMPOST FILTER SOCKS SHOULD BE PLACED AT MAXIMUM INTERVAL OF 10 FT.

5. TURN THE ENDS OF THE COMPOST FILTER SOCKS UP SLOPE TO PREVENT RUNOFF FROM GOING AROUND THE ROLL.

6. STAKE COMPOST FILTER SOCKS WITH STAKES WITH A MINIMUM LENGTH OF 14 IN AND SPACED 4 FT ON CENTER.

7. IF MORE THAN ONE COMPOST FILTER SOCKS IS PLACED IN A ROW, THE ROLLS SHOULD BE OVERLAPPED A MINIMUM OF 6 INCHES, NOT ABUTTED.

8. A SANDBAG SHALL BE PLACED ON THE DOWN SLOPE SIDE OF THE FILTER SOCK BARRIER AT A SPACING OF 6 FEET ON CENTER AND AT EACH OVERLAP.

9. THE OUTERMOST LAYER OF THE FILTER SOCK SHALL HAVE AN APPARENT OPENING SIZE NO GREATER THAN ⅜".

10. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT. SEDIMENT SHALL BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-THIRD THE HEIGHT OF THE BARRIER.

11. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER SOCK IS NO LONGER REQUIRED SHALL BE REMOVED BY THE CONTRACTOR.

SILT FENCE NOTES:

1. THE HEIGHT OF A SILT FENCE SHALL NOT EXCEED 36 INCHES (HIGHER FENCES MAY IMPOUND VOLUMES OF WATER SUFFICIENT TO CAUSE FAILURE OF THE STRUCTURE).

2. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND SECURELY SEALED.

3. POSTS SHALL BE #6 REBAR SPACED A MAXIMUM OF 6 FEET APART AT THE BARRIER LOCATION AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 18 INCHES).

4. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 6 INCHES WIDE AND 6 INCHES DEEP ALONG THE LINE OF POSTS AND UPSLOPE FROM THE BARRIER.

5. FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 18 INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH AS A LINER. THE TRENCH SHALL BE BACK FILLED WITH AN 6-INCH THICK LAYER OF NATIVE SAND. THE FABRIC SHALL NOT EXTEND MORE THAN 24 INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.

6. SILT FENCES SHALL BE NOT BE REMOVED UNTIL THE COMPLETION OF CONSTRUCTION ACTIVITIES AND THE SITE HAS BEEN RESTORED TO THE SATISFACTION OF THE OWNER.

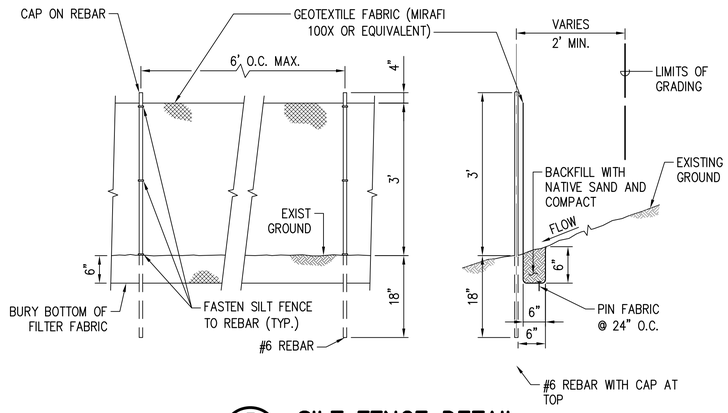
7. FILTER FABRIC SHALL BE MIRAFI SILT FENCE, AMOCO SILT STOP (WIDTH 4'- 6") #1380 OR APPROVED EQUAL.

PERMANENT EROSION CONTROL NOTES:

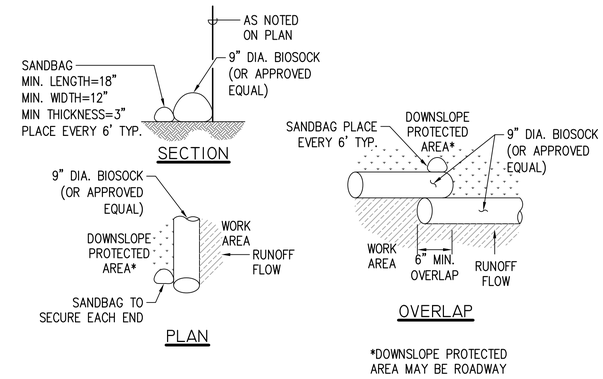
1. THE CONTRACTOR SHALL GRASS THE ENTIRE PROJECT SITE, EXCEPT PAVED AREAS WITH BERMUDA GRASS SPRIGS. THE GRASS SHALL BE PLANTED, FERTILIZED, AND MAINTAINED IN ACCORDANCE WITH THE "HAWAI'I STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2005" AND ITS AMENDMENTS.

2. THE CONTRACTOR SHALL GRASS ALL EXPOSED AREAS THAT HAVE BEEN CONSTRUCTED TO FINAL GRADES WITHIN A PERIOD OF 30 CALENDAR DAYS.

3. IN LIEU OF GRASS SPRIGS (NOTE 1), THE CONTRACTOR MAY USE HYDROMULCH AND IRRIGATION SPRINKLER SYSTEM.

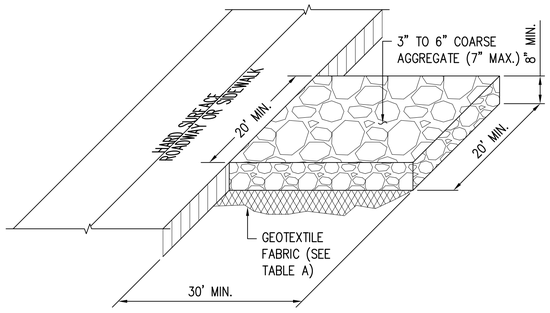


3 SILT FENCE DETAIL
C-1 | DT-6 NOT TO SCALE



*DOWNSLOPE PROTECTED AREA MAY BE ROADWAY

2 FILTER SOCK DETAIL
C-1 | DT-6 NOT TO SCALE



NOTE:
REFER TO BMP FACT SHEET TR-1.

TABLE A GEOTEXTILE REQUIREMENTS	
PHYSICAL PROPERTY	REQUIREMENTS
GRAB TENSILE STRENGTH	220 LB (ASTM D1682)
ELONGATION FAILURE	60% (ASTM D1682)
MULLEN BURST STRENGTH	430 LB (ASTM D3768)
PUNCTURE STRENGTH	125 LB (ASTM D751, MODIFIED)
EQUIVALENT OPENING	SIZE 40-80 (U.S. STD SIEVE, CW-02215)

1 STABILIZED CONSTRUCTION ENTRANCE
C-1 | DT-6 NOT TO SCALE

DAYANANDA H. VITHANAGE
LICENSED PROFESSIONAL ENGINEER
No. C-9348
HAWAII USA

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Signature 4/30/20 Expiration Date of the License

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REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

DEPARTMENT OF HAWAIIAN HOME LANDS

91-5420 Kapolei Parkway
Kapolei, Hawai`i 96707

ANAHOLA FARM LOTS WATER PROJECT

Phase II - Water Tank Replacement & Facility Impr.
Anahola, Island of Kaua`i

TMK:
4-8-001:001; 4-8-005:037 & 039

EROSION CONTROL TYPICAL DETAILS

Figure 8

90% PLANS: ANAHOLA FARM LOTS - PHASE II - WATER TANK REPLACEMENT & FACILITY IMPROVEMENTS

DRAWING NAME: I:\201705-DHHL_ANAHOLA_PHII_WATER_SYSTEM_IMPROVEMENTS\0_GRAPHICS\DRAWINGS\CONTRACT DOCUMENTS\03_PREFINAL\PHASE II - WATER TANK\WORK EDIT TIME: 05-03-18, 12:30 PM EDITED BY: AKEANE