FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-O-01-04	2004	3	61

LEGEND

- tsb — Existing Traffic Signal Box
- TSPB — Adjusted/Relocated Traffic Signal Pullbox
- TSPB — New Traffic Signal Pullbox
- --ts-- — Existing Traffic Signal Ductline/Conduit
- --TS-- — New Traffic Signal Ductline/Conduit
- hlpb — Existing Highway Lighting Pullbox
- HLPB — Adjusted/Relocated Highway Lighting Pullbox
- HLPB — New Highway Lighting Pullbox
- hls — Existing Highway Lighting System Standard
- HLS — Adjusted/Relocated Highway Lighting System Standard
- HLS — New Highway Lighting System Standard
- --hl-- — Existing Highway Lighting Ductline/Conduit
- --HL-- — New Highway Lighting Ductline/Conduit
- scmh — Existing Signal Corps Manhole
- SCMH — Adjusted/Relocated Signal Corps Manhole
- tel — Existing Telephone Box
- TEL — New Telephone Box
- TEL — Adjusted/Relocated Telephone Box
- catv — Existing Cable TV Box
- CATV — New Cable TV Box
- CATV — Adjusted/Relocated Cable TV Box
- pp — Existing Power Pole
- tmh — Existing Telephone Manhole
- TMH — New Telephone Manhole
- TMH — Adjusted/Relocated Telephone Manhole
- wv — Existing Water Valve Box
- WV — Adjusted/Relocated Water Valve Box
- WV — New Water Valve Box
- wv — Existing Water Meter
- WV — Adjusted/Relocated Water Meter with New Type "X" Box
- WV — New Water Meter w/ New Type "X" Box
- fh — Existing Fire Hydrant
- mon. — Existing Monument
- cb — Existing Catch Basin
- CB — New Catch Basin
- gdi — Existing Grated Drop Inlet
- sdmh — Existing Storm Drain Manhole
- SDMH — Adjusted/Relocated Storm Drain Manhole
- SDMH — New Storm Drain Manhole
- SDMH — Adjusted/Relocated Storm Drain Manhole
- smh — Existing Sewer Manhole
- Guy — Reconstructed Sidewalk Guy by Verizon
- 8.50 — Existing Elevation
- 8.50 — New Elevation
- TC 8.50 / BC 8.00 — Existing Elevation
- TC 8.50 / BC 8.00 — New Elevation
- x, O, ⊗ — Existing Elevation

GENERAL NOTES

1. The scope of work for this project consists of constructing auxiliary lanes, concrete curb and gutter, median barrier, grade adjustment wall, raised curb and island, curb ramps, sidewalk, catch basins, drain inlets, and driveway; installing traffic and pedestrian signals, guardrails, crosswalks, pavement markers, markings and signs; relocating highway lighting standard; and adjusting or relocating utility hand holes, valve boxes, meter boxes, pull boxes, manhole frames and covers.
2. The Contractor is reminded of the requirements of Subsection 108.01 - Subletting of Contract, which requires him to perform work to not less than 30 percent of the total contract cost less deductible items. Non-compliance with this Subsection may be grounds for rejection of bid.
3. The Contractor's attention is directed to the following Sections of the Special Provisions: Subsection 107.13 - Public Convenience and Safety; Subsection 107.21 - Contractor's Responsibility for Utility Property and Services; and Section 645 - Traffic Control.
4. At the end of each day's work, the Contractor shall remove all equipment and other obstructions to permit free and safe passage of public traffic.
5. The existence and location of underground utilities, manholes, monuments and structures as shown on the plans are from the latest available data, but accuracy is not guaranteed. The encountering of other obstacles during the course of work is possible. The Contractor shall tone for the exact locations and depths of all underground facilities, either shown or omitted from the plans, in areas where work, such as the placement of sign posts, traffic signal conduits, etc. may affect these properties. Toning shall be considered incidental to the various contract items and will not be paid for separately. The Contractor shall be held liable for damages incurred to the existing facilities and/or improvements as a result of his operations.
6. The Contractor shall notify the Engineer in writing, two (2) weeks prior to starting construction operations.
7. The Contractor shall be solely responsible for the protection of adjacent properties, utilities and existing structures from damages due to construction. Repairing any damage shall be at the Contractor's own expense, to the satisfaction of the Engineer.
8. Existing drainage system will be functional at all times during construction. The Contractor shall furnish materials, equipment, labor, tools and incidentals necessary to maintain flow. The work shall be considered incidental to any culvert work and will not be paid for separately.
9. Earth swale shall be graded to drain. The work shall be considered incidental to roadway excavation.
10. Smooth riding connections shall be constructed at all limits of project, including the beginning and end of project, connecting approaches, side streets, walkways and driveways as shown on the plans and/or as directed by the Engineer. This work shall be considered incidental to asphalt concrete and will not be paid for separately.
11. The Contractor shall clean and remove any accumulation of aggregates along the roadside within 10 feet of the edge of pavement. This work shall be considered incidental to roadway excavation and will not be paid for separately.
12. Removal and disposal of existing curb and gutter, curb, sidewalk and asphalt concrete pavement, and any debris shall be considered incidental to their respective bid items.
13. Removal and disposal of existing rock wall shall be considered incidental to Roadway Excavation and shall not be paid for separately.
14. All saw cutting work and related clean-up of slurry shall be considered incidental to asphalt concrete.
15. All curbing angle points within the curb ramps shall be rounded with R=6".
16. Prior to placement of new aggregate subbase course, the existing subbase shall be compacted to a relative compaction greater than or equal to 95%.
17. The top of Plant Mix Glassphalt Concrete Base Course prior to placement of the new A.C. Pavement, Mix No. IV shall comply with the ten-foot straight edge requirement. The variation of the surface from a straight edge with two contacts with the surface, shall not exceed, 3/16".
18. Dressing of shoulder and/or sidewalk shall consist of clearing and grubbing, grading, reshaping and compacting with suitable material, and seeded hydro-mulching the area adjacent to the improvement as shown on the plans and/or as directed by the Engineer and shall be considered incidental to Sidewalk.
19. The Contractor shall provide and maintain access to and from all existing driveways, sidewalks, ADA access routes, side streets and cross streets at all times. This work shall be considered incidental to curb ramps and sidewalks and will not be paid for separately.
20. The Detecable Warning Device required for each of the Curb Ramps shall be considered incidental to Curb Ramps and shall not be paid for separately.
21. Provide smooth transition where new sidewalk construction meets the existing grade or sidewalk. Transition shall not be steeper than 2% cross and longitudinal slopes and not less than 6.0 feet long or as specified on the plans. This work shall be considered incidental to curb ramps and sidewalk and will not be paid separately.
22. The depth for each of the highway lighting standard and the traffic signal ductlines shall be 3 feet minimum within the roadway and 2 feet minimum within the shoulder or sidewalk area. The conduits shall be 2-2" PVC Schedule 80 for each item of work. The new cables shall be the same gauge as the existing. These conduits, cables and materials required to make each system operational shall not be paid for separately but shall be considered incidental to their respective bid items.
23. The Contractor shall remove and dispose of all existing raised pavement markers, thermoplastic line markings, traffic tapes, and epoxy adhesives prior to the overlaying of asphalt concrete. This workshall be considered incidental to asphalt concrete and will not be paid for separately.
24. No material and/or equipment shall be stockpiled or otherwise stored within the highway right-of-way except at locations designated in writing and approved by the Engineer. If use of location is approved by the Engineer, the Contractor shall obtain a permit to use the property within the highway right-of-way from the State Highway Right-of-Way Branch at telephone no. 692-7332.
25. The Contractor shall coordinate with Mr. Garret Hayashi of Verizon Hawaii, Inc. at tel. no. 840-1438, for the reconstruction of the down guy to a sidewalk guy at Waipahu Street 10 days prior to sidewalk excavation. This work coordination shall not be paid for separately but shall be considered incidental to sidewalk.
26. The Contractor shall coordinate with Mr. Marion "Bud" Robinson of the U. S. Army, 30th Signal Corps Battalion. at telephone no. 656-1723, 10 days prior to the adjustment of signal corps manholes. This work coordination and any additional materials required by the U. S. Army shall not be paid for separately but shall be considered incidental to Contract Item 604.4900.
27. The Contractor is reminded that the trees on Honowai Street shall be preserved and to remain. The Contractor shall replace the trees damaged from his construction activities at no cost to the State.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL NOTES AND LEGEND

KUNIA ROAD IMPROVEMENTS
VICINITY OF SOUTH KUPUNA LOOP
to VICINITY OF HONOWAI STREET
PROJECT NO.: HWY-O-01-04

Date: OCT, 2003

SHEET No. 1 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-01-04	2004	4	61

VERIZON HAWAII GENERAL CONSTRUCTION/DESIGN NOTES

1. The Contractor shall procure and pay for all licenses and permits and shall give all notices necessary and incident to the due and lawful prosecution of the work.

2. The Contractor shall obtain excavtaion permits and toning requests from Verizon Hawaii's Excavation Permit Section, located at 3239 Ualena Street, third floor, two weeks prior to the start of construction. Hours of business are 7:00 a.m. to 10:45 a.m. and 11:30 a.m. to 2:45 p.m. Monday through Friday, except holidays.

3. Prior to excavation of the ductline, the Contractor shall request Verizon Hawaii to locate existing ductline wherever required. For underground cable locating and marking, fivr (5) working days advance notice is required. Three (3) working days advance notice is required for any inspection by a designated representative.

4. The locations of existing utilities are approximate only. The Contractor shall exercise extreme caution and shall maintain proper clearances whenever construction crosses or is in close proximity of Verizon Hawaii facilities. The Contractor shall verify their locations and shall be liable for any damages to Verizon Hawaii facilities. Any damages shall be reported immediately to Verizon Hawaii's Repair Station at 611 (24 hours) or to the excavation permit section at 840-1444 (normal working hours, Monday through Friday, except holidays). As a result of his operations, adjustments to the new ductline alignment, if required, shall be made to provide the required clearances.

5. The Contractor shall take necessary precaution not to damage existing cables or ducts. A Verizon Hawaii inspector or designated representative is required to be at any job site whenever there will be a breakage into or entry into any structure that contain Verizon Hawaii facilities. Temporary cable and duct supports shall be provided wherever necessary.

6. The Contractor shall notify Verizon Hawaii's inspector or designated representative a minimumu of 72 hours prior to excavation, bracing, or backfilling of Verizon Hawaii's structure or facilities.

7. All applicable construction work shall be done in accordance with the "Verizon Hawaii Standard Specifications for Placing Underground Telephone Systems" dated March 1999. All subsequent amendments and additions and all other pertinent standards for telephone construction. Contractor shall familarize his personnel by obtaining applicable specifications.

8. When excavation is adjacent to or beneath Verizon Hawaii's existing structure or facilities, the contractor shall:
   a) Sheet and/or brace the excavation to prevent slides, cave-ins, or settlements to ensure no movement to Verizon Hawaii's structures or facilities.
   b) Protect existing structures and/or facilities with beams, struts, or underpinning while excavating beneath them to ensure no movement to Verizon Hawaii's structures or facilities.

9. The Contractor shall brace all poles or light standards near the new ductline, manhole, or handhole during his operations.

10. The Contractor shall saw-cut A.C. pavement and concrete gutter wherever new manholes, handholes, or ductlines are to be placed and shall restore to existing condition or better.

11. The Contractor shall comply with the policy adopted by the Department of Public Works, City and County of Honolulu, concerning the replacement of concrete sidewalks after excavation work.

12. The underground pipes, cables, or ductlines known to exist by the engineer from his search of records are indicated on the plans. The Contractor shall verify the locations and depths of the facilities and exercise proper care in excavation in the area. Wherever connections of new utilities to existing utilities are hown on the plans, the Contractor shall expose the existing lines at the proposed connections to verify their locations and depths prior to excavation for the new lines.

13. Wherever connections to existing utilities are shown on the plans, the contractor shall expose the existing lines prior to excavation of the main trenches to verify their locations and depths.

14. The Contractor, at his own expense, shall keep the project and surrounding area free from dust nuisance. The cost for supplementary meaures, which will be required by the City and County, shall be borne by the Contractor.

15. The Contractor shall pump all manholes dry during final inspection.

16. The Contractor shall notify Verizon Hawaii inspector 24 hours prior to the pouring of concrete or backfilling.

17. When connecting to manhole walls, all existing reinforcing bars shall be left intact. Ducts shall be adjusted in the field in order to clear reinforcing.

18. The Contractor shall be responsible for laying out all required lines and grades and shall preserve all bench marks and working points necessary to lay out the work correctly. The new ductlines shall be adjusted by the Contractor to suit the existing conditions and the details as described in the plans.

19. Minimum Concrete strength shall be:
   For Ductline 2500 psi at 28 days
   For Manhole 3000psi at 28 days or as specified by Verizon

20. Bends in the duct alignment, due to changes in grade shall have a minimum radius of 25 feet. All 90 degree C-bends at a pole or at the building floor slab penetration, shall have a bend radius of ten times the diameter of the duct or greater.

21. After ductline has been completed, a mandrel with a square front not less than 12" long and having a diameter of 1/4" less than the inside diameter of the duct, shall be pulled through each duct after which a brush with stiff bristles shall be pulled through to make certain that no particles of earth, sand, or gravel have been left inside. Ducts shall be completely dry and clean.

22. All ducts and conduits shall have an 1800# polyester mlt-tape NEPTCO, WP1800P, Verizon Hawaii Material Code No. 571154) installed throughout its entire length. All ducts shall be capped to prevent entry of foreign material during construction and at the completion of installation.

ORIGINAL PLAN	
NOTE BOOK dd5/usr2/mq 5kund04gn2.dgn No.	SURVEY PLOTTED BY ___ DATE ___
	DRAWN BY MQ · 11/01/03
	TRACED BY ___ · ___
	DESIGNED BY MQ · 11/01/03
	QUANTITIES BY ___ · ___
	CHECKED BY ___ · ___

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

VERIZON NOTES

KUNIA ROAD IMPROVEMENTS
VICINITY OF SOUTH KUPUNA LOOP
to VICINITY OF HONOWAI STREET
PROJECT NO.: HWY-0-01-04

Date: OCT, 2003

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-01-04	2004	5	61

HAWAIIAN ELECTRIC COMPANY NOTES

1. LOCATION OF HECO FACILITIES
The location of HECO overhead and underground facilities shown on the plans are existing records with varying degrees of accuracy and are not guaranteed as shown. The Contractor shall verify in the field, the locations of the facilities and shall exercise proper care in excavating and working in the area. Wherever connections of new utilities to existing utilities and utility crossings are shown, the Contractor shall expose the existing lines at the proposed connections and crossings to verify the depths prior to excavation for the new lines. The Contractor shall be responsible for any damages to HECO's facilities whether shown or not shown on the plans.

2. COMPLIANCE WITH HAWAII OCCUPATIONAL SAFETY AND HEALTH LAWS
The Contractor shall comply with the State of Hawaii's Occupational Safety and Health Laws and Regulations, including without limitation, those related to working on or near exposed or energized electrical lines and equipment.

3. EXCAVATION PERMIT
The Contractor shall obtain an excavation permit from HECO's Technical Division (543-5654) located at 820 Ward Avenue, 4th floor, two weeks prior to starting construction. Please refer to our request number at that time.

4. CAUTION!!! ELECTRICAL HAZARD!!!
Existing HECO overhead and underground lines are energized and will remain energized during construction unless prior special arrangements have been made with HECO. Only HECO personnel are to handle these energized lines and erect temporary guards to protect these lines from damage. The Contractor shall work cautiously at all times to avoid accidents and damage to existing HECO facilities, which can result in electrocution.

5. OVERHEAD LINES
State laws requires that a worker and the longest object he or she may contact cannot come closer than a minimum radial clearance of 10 feet when working close to or under any overhead lines rated 50KV and below. For each additional 1KV above 50KV, an additional 0.4 inch shall be added to the 10-foot clearance requirement. The preceding information on line clearance requirement is provided as a convenience and it is the Contractor's responsibility to be informed of and comply with any revisions or amendments to the law.

Should the Contractor anticipate that his work will result in the need to encroach within the minimum required clearance at any time, the Contractor shall notify HECO at least four (4) weeks prior to the planned encroachment so that, if feasible, the necessary protections (e.g. relocation, de-energize, or blanket HECO lines) can be put in place. HECO's cost of safeguarding its line will be charged to the contractor.

Contact HECO's Customer Installation Department at 543-7846 for assistance in identifying and safeguarding overhead powerlines.

Refer to Section X of HECO's Electric Service installation Manual for additional guidelines when working around HECO's facilities. A copy may be obtained from HECO's Customer Installations Department.

6. POLE BRACING
A minimum clearance of 10 feet must be maintained when excavating around utility poles and/or their anchor system to prevent weakening or pole support failure. Should work require excavating within 10 feet of a pole and/or its anchor system, the Contractor shall protect, support, secure and take all other precautions to prevent damage to or leaning of these poles. The Contractor is responsible for all associated costs to brace, repair, or straighten poles. All means of structural support for the pole proposed by the Contractor shall first be reviewed by HECO before implementation. For pole bracing instructions, the Contractor shall call the HECO Construction and Maintenance Dept., Customer ¢ System Superintendent at 543-4223 a minimum of two (2) weeks in advance.

7. UNDERGROUND LINES
The Contractor shall exercise extreme caution whenever construction crosses or is in close proximity of underground lines. HECO's existing electrical cables are energized and will remain energized during construction. Only HECO personnel are to break into existing HECO facilities, handle these cables, and erect temporary guards to protect these cables from damage. The cost of HECO's assistance in providing proper support and protection of its underground lines will be charged to the Contractor. Special precautions are required when excavating near HECO's 138 KV underground lines (see HECO instructions to Consultant/Contractors on "Excavating Near HECO's Underground 138KV Lines" for detailed requirements.)

For verification of underground lines, the Contractor shall call HECO's Underground Division at 543-7049 a minimum of 72 hours in advance.

For assistance in providing proper support and protection of these lines, the Contractor shall call HECO's Construction and Maintenance Dept., Customer ¢ System Superintendent, at 543-4223, a minimum of two (2) weeks in advance,

8. EXCAVATIONS
When trench excavation is adjacent to or beneath HECO's existing structures or facilities, the Contractor is responsible for:
a) Sheeting and bracing the excavation and stabilizing the existing ground to render it safe and secure and to prevent possible slides, cave-ins, and settlements.
b) Properly supporting existing structures or facilities with beams, struts, or under-pinnings to fully protect it from damage.
c) Backfilling with proper backfill material including special thermal backfill where existing (refer to Engineering Department for thermal backfill specifications).

9. RELOCATION OF HECO FACILITIES
Any work required to relocate or modify HECO facilities shall be done by HECO, or by the Contractor under HECO's supervision. The Contractor shall be responsible for all coordination, and shall provide necessary support for HECO's work, which may include, but not to be limited to, excavation and backfill, permits and traffic control, barricading, and restoration of pavement, sidewalk and other facilities.
All costs associated with any relocation or modification (either temporary or permanent for the convenience of the Contractor, or to enable the Contractor to perform his work in a safe and expeditious manner in fulfilling his contract obligations shall be borne by the Contractor.

10. CONFLICTS
Any design or relocation of HECO's facilities not shown on the plans may be cause for lengthy delays. The Contractor acknowledges that HECO is not responsible for any delay or damage that may arise as a result of any conflicts discovered or identified with respect to the location or construction of HECO's electrical facilities in the field, regardless of whether the Contractor has met the requested minimum advance notices. In order to minimize any delay or impact arising from such conflicts, HECO should be notified immediately upon discovery or identification of such conflict.

11. DAMAGE TO HECO FACILITIES
The Contractor shall be responsible for the protection of all HECO surface and subsurface utilitities and shall be responsible for any damages to HECO's facilities as a result of his operations. The Contractor shall immediately report such damages to HECO's Trouble Dispatcher at 548-7961. Repair work shall be done by HECO or by the Contractor under HECO's Supervision. Costs for damages to HECO facilities shall be borne by the Contractor.

In case of damage or suspected damage to HECO's fuel pipeline, the Contractor shall immediately notify HECO's Honolulu Power Plant Shift Supervisor at 533-2102 (a 24-hour number) so HECO personnel can secure the damaged section and report any oil spills to the proper authorities. All costs associated with the damage, repair, and oil spill cleanup shall be borne by the Contractor.

12. HECO STAND-BY PERSONNEL
The Contractor may request HECO to provide an inspector to stand-by during construction near HECO's facilities. The cost of such inspection will be charged to the Contractor.

The Contractor shall call the HECO Construction and Maintenance Dept., Customer ¢ System Superintendent at 543-4223 a minimum of 5 working days in advance to arrange for HECO stand-by personnel.

13. CLEARANCES
The following clearances shall be maintained between HECO's ductline and all adjacent structures (charted and uncharted) in the trench:

STRUCTURE TYPE	MINIMUM CLEARANCE (INCHES)
Water Lines, parallel	36
Water Lines, crossing	12 (A)
Sewer Lines, parallel	36 (B)
Sewer Lines, crossing	24 (C)
Drain Lines, parallel	12
Drain Lines, crossing	6 (D)
Electrical and Gas Lines, parallel	12
Electrical and Gas Lines, crossing	12
Telephone Lines, parallel	6(D)
Telephone Lines, crossing	6(D)
Chevron Oil Lines, parallel	36
Chevron Oil Lines, crossing	48 below oil line (E)

A. The minimum vertical clearances to water lines crossing electrical ductlines can be reduced to 6 inches if the electrical ductline structure is smaller than 16 inches, is concrete encased, and is below the water line.
B. A minimum horizontal clearance of 36 inches is required between new handholes and existing sewer laterals.
C. The minimum horizontal clearances to sewer pipes crossing electrical ductlines can be reduced to 12 inches if the sewer pipe is jacketed in concrete.
D. The minimum clearances shall be increased to 12 inches if the elctrical ductline is direct buried.
E. The minimum vertical clearances to oil lines crossing electrical ductlines can be reduced to 24 inches below oil lines if the crossings are encased in 6 inches of concrete.
F. The Contractor shall notify the Construction Manager ¢ HECO of any heat sources (power cable duct bank, steamline, etc.) encountered that are not properly identified on the drawing

14. INDEMNITY
The Contractor shall indemnify, defend and hold harmless HECO from and against all losses, damages, claims, and actions including but not limited to reasonable attorney's fees and costs based upon or arising out of damage to property or injuries to persons, or other tortious acts caused or contributed to by the Contractor or anyone acting under its direction or control or on its behalf; provided Contractor's indemnity shall not be applicable to any liability based upon the sole negligence of HECO.

ORIGINAL PLAN
NOTE BOOK dd5/usr2/mq 5kund05gn3.dgn
No. ____

SURVEY PLOTTED BY ____ DATE ____
DRAWN BY MQ ____ 10/21/03
TRACED BY ____
DESIGNED BY MQ ____ 10/21/03
QUANTITIES BY ____
CHECKED BY ____

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HECO NOTES

KUNIA ROAD IMPROVEMENTS
VICINITY OF SOUTH KUPUNA LOOP
to VICINITY OF HONOWAI STREET
PROJECT NO.: HWY-0-01-04
Date: OCT, 2001

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-01-04	2004	6	61

BOARD OF WATER SUPPLY NOTES:

1. Unless otherwise specified, all materials and construction of water system facilities and appurtences shall be in accordance with the City and County of Honolulu Board of Water Supply's "WATER SYSTEM STANDARDS" VOLUME 1, DATED 1985, THE "APPROVED MATERIAL LIST AND STANDARD DETAILS FOR WATER SYSTEM CONSTRUCTION", VOLUME 2, DATED 1985, THE "WATER SYSTEM EXTERNAL CORROSION CONTROL STANDARDS", VOLUME 3, DATED 1991, and all subsequent amendments and additions.

2. All plans approved by the Board of Water Supply are based solely on the adequacy of the water supply. All other features of the water system, such as lines, grades, fittings, drainage, etc., and other features of improvements shall not be the responsibility of the Board of Water Supply.

3. Test pressure shall be one of the following: 150 psi (250 psi for the 12" waterline.

4. The Contractor shall notify the BWS Maintenance Unit-Engineering, Construction Section in writing and submit five sets of approved construction plans, one week prior to commencing work on the water system.

5. The Contractor shall chlorinate the entire inside surface of each pipe and fitting with disinfection solution of 5 ounces of sodium hypochlorite mixed with 10 gallons of water. (For connection only)

6. The Contractor shall be responsible for the protection of all water lines during construction. The Contractor shall be especially careful when excavating behind water lines, tees, and bends wherever there is a possibility of water line movement due to the removal of the supporting earth beyond the existing reaction blocks. The Contractor shall take whatever measure necessary to protect the water lines, such as constructing special reaction blocks (with BWS approval) and/or modifying his construction method.

7. The existence and location of underground utilities and structures as shown on the plans are from the latest available data but is not guaranteed as to the accuracy or the encountering of other obstacles during the course of the work. The Contractor shall be responsible and shall pay for all damages to existing utilities. The Contractor shall not assume that where no utilities are shown, that none exist.

8. Prior to installation, the Contractor shall submit for approval by Board of Water Supply, the manufacturer's certification that all cast iron (gray or ductile) fittings for the project conform in all respects to the Water System Standards, dated 1985. Polygon shape for mechanical joint glands as described on AWWA Standard CIII shall be "sraight-sided" or an approved equal or a job to job basis.

9. Polygon shape for mechanical joint glands as described in AWWA Standard CIII shall be "Straight Sides" or an approved equal on a job to job basis.

10. Re-approval shall be required if this project is not under construction within a period of two years.

11. The Contractor shall cut and plug all existing unused laterals at the main whether or not shown on the plans. The damaged area shall be repaired to an equal or better condition than the immediate area. All work shall be done at the expense of the Contractor.

12. The Contractor shall obtain a NPDES permit prior to chlorination and/or dewatering. A copy of the permit shall be submitted to the Board of Water Supply, Maintenance Unit - Engineering Construction Section.

13. Pipe cushion shall be of high resistivity material. The Contractor shall submit a soil certification that high resistant cushion material has a resistivity greater than 5,000 OHM-CM. Remainder of the backfill material shall be as specified in Volume 1 of the Water System Standards. Pipe cushion and backfill material shall contain no hazardous substances above regulatory action levels including but not limited to lead, asbestos, mercury, chromium, cadmium, zinc, strontium, and polychlorinated biphenyls (PCB).

14. All ductile iron pipe, fittings and valves shall be wrapped with two layers of 8 mil. polyethylene wrap and shall be considered incidental to the various waterline relocation.

15. The Contractor shall coordinate the securing of the existing water system with the BWS prior to excavating behind or removing any existing thrust blocks, structural struts or reaction beams, or any fittings such as tees, plugs, caps, bends, offsets, and valves, or any other pipeline appurtenance. The Contractor shall be responsible for all associated damages resulting from failure to adequately secure the existing system.

16. The Contractor shall adjust all manhole frames/valve boxes/ meter boxes within the resurfaced area. The Contractor shall be responsible for "referencing" these manholes/ valve boxes/ meter boxes to facilitate the adjustments.

17. Maintain 3'-0" minimum cover for all existing waterlines (18" minimum for service laterals) from new finish grade. The Contractor shall probe the waterline and service laterals and submit the probing data to BWS Construction Section. Any adjustments to the existing water system to meet the minimum cover and the requirements of the BWS standards, whether shown on plans or not, shall be done by the Contractor at no cost to BWS. Waterline probing shall be considered incidental to the various contract items.

18. The Contractor shall have existing water mains toned before construction in their vicinity. Call the Investigation Section at 527-5296 for toning services. Guardrail post locations are to be kept to a minimum clearance of 18" to any 2-½" water line or meter box. No post driving will be allowed when post is to be installed closer than 3' from water main. Excavated areas shall be restored to their original condition.

19. The Contractor shall verify all existing service lateral locations whether shown or not shown on plans prior to commencing with any of the work and shall not assume that where no services are shown, none exist.

20. Any adjustments to the existing water system required during construction shall meet BWS Standards, whether shown on the plans or not, shall be done by the contractor at no cost to the board.

21. Prior to any excavating, the Contractor shall verify in the field the location of existing water mains and appurtenances.

22. Two-way blue reflective hydrant markers Type DB shall be installed at all fire hydrant locations.

23. Install 4 mil. thick, non-metallic, blue colered, 6 inches wide warning tape over centerline of the pipe and below the base course along the entire length of trench. Tape should be marked with "CAUTION WATER LINE BURIED BELOW".

24. Cleaning shall be use of "pigs" introduced into the pipeline and run completely through all installed pipelines and all branch lines for fire hydrants. "Pigging" of service laterals is not required. Bare foam "pigs" shall be used to swab piping clean as each length of the pipeline is installed. Each "pig" shall consist of a cylindrical piece of polyurethane foam with a density of 3-7 pounds per cubic foot and a vinyl-coated nose. Outside diameter of the 'pig" shall be equal to 1-1/4 to 1-1/2 times the inside diameter of the pipe being installed. The length of the "pig" shall be 1-1/2 to 2 times its diameter. Prior to use, the "pig" shall be submerged in a chlorine solution of 1 oz. of 5% chlorine bleach in 5 gallons of water. "Pigging" of the pipeline shall be considered incidental to the installation of the new pipeline.

CHLORINATION NOTE:

A. The following chlorination and water sample collection procedure shall apply to all water pipeline projects:

Step 1: Chlorinate main by filling pipline with water and introducing chlorine in sufficient quantity to obtain a minimum chlorine concentration of 50 parts per million (ppm). Leave chlorinated water in main overnight.

Step 2: Test chlorinated water left in main for chlorine content. If chlorine content is less than 25 ppm, repeat Step 1. If chlorine content is equal to or greater than 25 ppm, go to Step 3.

Step 3: Flush main of all chlorine. Take bacteriological sample. Stop flushing and hold water in main for three (3) hours. After three (3) hours, take bacteriological sample of water being held. Indicate on the sample bottle label the amount of chlorine residual detected at the time of sampling as follows:

++ high residual CL2 (greater than 0.1 ppm)
+ trace residual CL2 (0.05 to 0.1 ppm)
- no residual CL2 (less than 0.05 ppm)

Leave water in main overnight.

Step 4: Take bacteriological sample of water left overnight. Flush main to have a minimum of one change over. Stop flushing and hold water in main for three (3) hours. After three (3) hours, take bacteriological sample of water being held. Indicate on the sample bottle label the amount of chlorine residual detected at the time of sampling.

B. Two (2) consecutive water pipeline bacteriological samples collected 24 hours apart must be within the following guidelines: contain zero total and fecal coliform, and less than 200 colony forming units (CFU) of total bacteria when there is no residual chlorine.

C. Chlorination, flushing, sampling and testing will be extended should unsatisfactory results be encountered. Any sample that shows positive coliform presence or total bacteria greater than 200 CFU is unsatisfactory.

D. Water samples that show the presence of atypical colonies, debris or results inconsistent with existing water are subject to reconfirmation. BWS reserves the right to request and test additional water samples in the interest of safeguarding public health and safety.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BOARD OF WATER SUPPLY NOTES

KUNIA ROAD IMPROVEMENTS
VICINITY OF SOUTH KUPUNA LOOP
to VICINITY OF HONOWAI STREET
PROJECT NO.: HWY-0-01-04

Date: OCT, 2003

SHEET No. 4 OF 4 SHEETS

ORIGINAL PLAN
NOTE BOOK dd5/usr2/mq/5kund06gn4.dgn No.
SURVEY PLOTTED BY ____ DATE
DRAWN BY MQ ____ 11/06/03
TRACED BY
DESIGNED BY MQ ____ 11/06/03
QUANTITIES BY
CHECKED BY