DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII
HILO, HAWAII

CONTRACT SPECIFICATIONS AND PLANS

JOB NO. 71-167-A
PAPAIKOU-KAIEIE-KALAOA WATER SYSTEM IMPROVEMENT
PHASE I
DRILLING OF EXPLORATORY WELL

PAPAIKOU, DISTRICT OF SOUTH HILO
COUNTY OF HAWAII - STATE OF HAWAII

MAY 1972
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STANDARD SPECIFICATIONS FOR CONSTRUCTION WORK (Bound Separately)
INVITATION TO BIDDERS

Sealed proposals for furnishing all materials, labor, transportation, tools, machinery and equipment necessary to drill, case and test approximately 400-foot well in place complete, JOB NO. 71-167-A, PAPAIKOU-KAIIEIE-KALAOA WATER SYSTEM IMPROVEMENT, PHASE I, DRILLING OF EXPLORATORY WELL, Papaikou, District of South Hilo, County of Hawaii, State of Hawaii, will be received by the Department of Water Supply, County of Hawaii, until June 16, 1972, at 2:00 P.M., when they will be publicly opened and read aloud. Bids received after the time fixed for opening will not be considered.

Act 124, SLH 1963, provides preference for Hawaii products; however, such preference shall be given only upon submittal of a bidder's written statement that his product has been qualified and registered with the Hawaii Product List, on file in the Office of the Comptroller, State of Hawaii.

The Department of Water Supply reserves the right to reject any or all bids, to waive informalities therein, and to accept any bid it may deem best for the interest of the Department of Water Supply, County of Hawaii.

No bidder may withdraw his bid after the hour set for the opening thereof, or before award of contract, unless said award is delayed for a period exceeding thirty (30) days.

Plans, specifications and forms may be obtained at the office of the Manager, 25 Aupuni Street, Hilo, Hawaii, upon deposit of legal tender or certified check of Twenty-five Dollars ($25.00) for each set.

"Standards for Water System" covering General Requirements and Covenants, Standard Specifications for Materials and Construction and Standard Details, as amended, dated March 1965, is hereby made a part of the contract documents and may be purchased at the office of the Manager at a cost of $3.00 per copy.

Dated at Hilo, Hawaii, this 16th day of May, 1972.

BY AUTHORITY OF THE DEPARTMENT OF WATER SUPPLY, COUNTY OF HAWAII

Akira Fujimoto, Manager

Hawaii Tribune Herald

May 19, 21, 23, 25, and 28, 1972
INSTRUCTION TO BIDDERS

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INSTRUCTION TO BIDDERS

1 - SECURING DOCUMENTS: Drawings and specifications may be secured at the office of the Manager, 25 Aupuni Street, Hilo, Hawaii.

2 - DEPOSIT: A deposit of twenty-five dollars ($25.00) in cash or certified check is required of each bidder who desires to secure one (1) set of drawings and specifications, which deposit is a guarantee that the drawings and specifications will be returned in good condition to the Manager, not more than seven (7) days after bids on the project have been opened, and is liable to forfeiture if the drawings and specifications are not so returned within said time. The drawings and specifications are the property of the Department of Water Supply of the County of Hawaii and are loaned to the bidder until bids are due. The deposit shall not be construed to be the purchase price of any part of these documents. Bidders are requested, should they decide not to submit a bid, to return the drawings and specifications as soon as possible after such decision is made.

3 - SECURITY TO BE FURNISHED BY EACH BIDDER: A certified check or bid bond as required by law made payable to the Department of Water Supply, for an amount as required by Section 103-23, Hawaii Revised Statutes, shall accompany each bid as evidence of good faith and as a guarantee that if awarded the contract, the bidder will execute the contract and give bond as required. The successful bidder's check or bid bond will be retained until he has entered into a satisfactory contract and furnished a fifty per cent (50%) performance bond. The Department of Water Supply of the County of Hawaii reserves the right to hold the certified checks or bid bonds of the three lowest bidders, until the successful bidder has entered into a contract and furnished a fifty per cent (50%) performance bond.

Bid bond shall be furnished by a bonding company, authorized to do business in the State of Hawaii. Should the successful bidder fail to enter into a contract and furnish a satisfactory performance bond within the time stated in his proposal, the certified check or bid bond shall be forfeited as liquidated damages.
4 - PROPOSALS:

a) Bids shall be made upon the form therefor obtained at the office of the Manager, properly and with all items filled out. Numbers shall be stated both in writing and in figures for total sum bid and the signatures of all persons signing shall be in longhand. The completed form should be without interlineations, alternations, or erasures.

b) Bids shall not contain any recapitulation of the work to be done; alternative proposals will not be considered unless called for. No oral, telegraphic or telephonic proposal or modifications will be considered.

c) Before submitting a bid, bidders shall carefully examine the drawings, read the specifications and the form of agreement, shall visit the site of work and shall fully inform themselves as to all existing conditions and limitations and shall include in the bid a sum to cover the cost of all items included in the contract.

d) Bids shall be enclosed in a sealed envelope marked for the particular project, which can be obtained at the office of the Manager.

e) Bids shall be delivered to the Manager, 25 Aupuni Street, Hilo, Hawaii.

5 - WITHDRAWAL OF BIDS: No bidder may withdraw his bid after the hour set for opening thereof, or before award of the contract.

6 - INTERPRETATION OF PROPOSED CONTRACT DOCUMENTS: If any person contemplating submitting a bid for the proposed contract is in doubt as to the true meaning of any part of the plans, specifications or other proposed contract documents, he may submit to the Manager a written request for any interpretation thereof. Any interpretation of the proposed documents will be made only by addendum, duly issued and a copy of such addendum will be mailed or delivered to each person receiving a set of such documents. The Department of Water Supply of the County of Hawaii will not be responsible for any other explanations or interpretations of the proposed documents.

7 - ADDENDA OR BULLETINS: Any addendum or bulletin issued during the time of bidding or forming a part of the documents loaned to the bidder for the preparation of his bid, shall be covered in the bid and shall be made a part of the contract.
3 - OPENING OF BIDS: Bids will be opened and read at the time set in the advertised "Invitation to Bidders" in the office of the Manager. Bidders or their representatives and other interested persons may be present at the opening of bids.

9 - AWARD OR REJECTION OF BIDS: The contract will be awarded to the lowest responsible bidder complying with these instructions and with the advertised "Invitation to Bidders" inviting bids, provided his bid is reasonable, and it is to the interest of the Department of Water Supply of the County of Hawaii to accept. The Department, however, reserves the right to reject any or all bids, and/or to waive any informalities to bids received.

10 - SUCCESSFUL BIDDER TO FILE PERFORMANCE BOND: The successful bidder will be required to file a performance bond in accordance with Section 103-34, Hawaii Revised Statutes, which bond shall be furnished by a security company acceptable to the Department of Water Supply of the County of Hawaii.

11 - COMPLIANCE WITH SPECIFICATIONS OF MATERIALS: Unless otherwise specifically provided for in the specifications, all workmanship and materials incorporated in the contract are to be of the best available grade of their respective kinds. Whenever in the specifications any material or process is indicated or specified by patent or proprietary name of manufacturers, such specifications shall be deemed to be used for the purpose of facilitating description of the material or process desired, and shall be deemed to be followed by the words "or equal", and the contractor may offer any materials or process which shall be substantially equal in every respect to that so specified. Where the bidder is contemplating submission of a bid based on a brand of manufactured article other than the brand specified, he shall submit for the approval of the Department, samples or supporting data for the proposed brand substitution not later than ten (10) calendar days prior to the date of opening of bids. The Department's approval shall be secured in writing prior to the submission of bid.

The burden of proof as to the comparative quality and suitability of alternative equipment or articles or materials shall be upon the bidder and he shall furnish, at his own expense, all information, brochures and drawings (at least 5) necessary or related thereto as required by the Engineer. The Engineer shall be the sole judge as to the comparative quality and suitability of alternative equipment or articles or materials and his decisions shall be final.
12 - **CONTRACT:**

a) The contractor whose bid is accepted will be required to sign a contract within ten days after being notified that his bid has been accepted.

b) A copy of the contract with names and amounts omitted, may be seen at the office of the Manager, Hilo, Hawaii.

13 - **LIQUIDATED DAMAGES:** The contractor's attention is hereby directed to the provision on liquidated damages as contained in the General Requirements.

14 - **NOTICE OF INTENTION TO BID AND QUESTIONNAIRE:** A prospective bidder must file a written notice of his intention to bid in the office of the Manager at least six calendar days prior to the date designated for opening bids.

The Manager may require the prospective bidder to file a "Standard / and Financial Statement for Bidders", as required by said Section 103-25, at least seventy-two (72) hours, exclusive of Sundays and holidays prior to the time advertised for the opening of bids. If the answers and statements are satisfactory, the Bidder's proposal will be received.

The "Standard Questionnaire and Financial Statement for Bidders" shall be on the form provided by the Department of Water Supply, County of Hawaii.

In addition, no contract will be awarded to any person or firm suspended under the provisions of Chapter 104, Hawaii Revised Statutes, or to any firm, corporation, partnership or association in which such suspended person or firm has an interest, direct or indirect.

The undersigned understands and agrees that the quantities given herewith are approximate only and are subject to increase or decrease and hereby proposes to perform all quantities of work, as either increased or decreased, in accordance with the provisions of the specifications.

The undersigned also understands that the Department of Water Supply reserves the right to award the contract to the lowest responsible bidder after an analysis is made of all bids received and not necessarily to the bidder submitting the lowest bid.

The undersigned also agrees that he has carefully read and understands the proposal, specifications and general requirements, and he has carefully examined
and checked the plans for this contract; and the Department reserves the right to reject any and all bids submitted or to waive any irregularities.

Upon the acceptance of this proposal and the award of the contract by the Department, the undersigned hereby agrees to accept the award and will enter into and execute the contract in accordance with the provisions of Chapter 103, Hawaii Revised Statutes, and any other laws applicable thereto.
PROPOSAL

FOR

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAI'I
HILO, HAWAI'I

JOB NO. 71-167-A
PAPAIKOU-KAIEIE-KALAOA WATER SYSTEM IMPROVEMENT
PHASE I
DRILLING OF EXPLORATORY WELL

Papaikou, District of South Hilo
County of Hawaïi - State of Hawaïi

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII
HILO, HAWAI'I 96720

Gentlemen:

The undersigned hereby proposes and agrees to furnish and pay for all materials, labor, transportation, tools, machinery, and equipment necessary to drill, case and test complete in place JOB NO. 71-167-A, PAPAIKOU-KAIEIE-KALAOA WATER SYSTEM IMPROVEMENT PHASE I, DRILLING OF EXPLORATORY WELL, Papaikou, District of South Hilo, County of Hawaïi, State of Hawaïi, and all work incidental thereto, required and called for under this Proposal, Plans, Specifications and General Requirements on file in the office of the Manager of the Department of Water Supply, County of Hawaïi, for the total sum of ___________________________ DOLLARS ($_______)

and to complete same within 75 consecutive calendar days from the date of official award.

The following unit prices (to be filled in by the bidder) will be used in making monthly estimates and for determining the cost of omissions, deductions,
and/or additions due to authorized increase or decrease from the quantities herein
given or in adapting the bid to the appropriation.

(All extensions must be made by considering the quantities and unit prices as
factors and all extensions and the summation must be arithmetically correct and
the grand total must be equal to the lump sum bid; any error will be cause for
rejection.)
## PROPOSAL

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<th>No. of Units</th>
<th>Unit Description</th>
<th>Unit Price</th>
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<tr>
<td>1A</td>
<td>1</td>
<td>L.S. Mobilization (not to exceed $2,000)</td>
<td>$__________</td>
</tr>
<tr>
<td>1B</td>
<td>1</td>
<td>L.S. Demobilization (not to exceed $1,500)</td>
<td>$__________</td>
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<tr>
<td>2A</td>
<td>400</td>
<td>L.F. Drilling cased well from the ground surface to the bottom of the casing</td>
<td>$__________</td>
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<tr>
<td>2B</td>
<td>10</td>
<td>L.F. Drilling open hole from the bottom of the casing to the bottom of the well</td>
<td>$__________</td>
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<tr>
<td>3A</td>
<td>370</td>
<td>L.F. Furnishing and Installing 10.136-inch I.D. solid well casing</td>
<td>$__________</td>
</tr>
<tr>
<td>3B</td>
<td>30</td>
<td>L.F. Furnishing and Installing 10.136-inch I.D. perforated well casing (louver type)</td>
<td>$__________</td>
</tr>
<tr>
<td>4A</td>
<td>1</td>
<td>L.S. Furnishing, installing, and subsequent removal of dumping test equipment</td>
<td>$__________</td>
</tr>
<tr>
<td>4B</td>
<td>72</td>
<td>Hours Pumping test</td>
<td>$__________</td>
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<tr>
<td>5A</td>
<td>1</td>
<td>L.S. Constructing the concrete block</td>
<td>$__________</td>
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<tr>
<td>5C</td>
<td>360</td>
<td>L.F. Cement grouting the annular space</td>
<td>$__________</td>
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**TOTAL SUM BID**

$__________
It is understood and agreed that the Department of Water Supply reserves the right to reject any end/or all bids and waive any defects, when in the Department's opinion, such rejection or waiver will be for the best interest of the County of Hawaii.

It is also understood and agreed that the quantities given herewith are approximate only and are subject to increase, decrease, or deletion and that the undersigned will perform all quantities of work, as either increased or decreased, in accordance with the provisions of the specifications.

It is also understood and agreed that if the product of the UNIT PRICE bid and the number of units does not equal the total amount stated by the undersigned in the Proposal for any item, it will be assumed that the error was made in computing the total amount. For the purpose of determining the lowest Bidder, the stated UNIT PRICE alone will be considered as representing the Bidder's intention and the correct total amount bid on such item shall be considered to be the amount arrived at by multiplying the UNIT PRICE by the number of units.

It is also understood and agreed that bids will be compared on the basis of the actual or corrected TOTAL SUM BID for all items contained in the Proposal.

It is also understood and agreed that the estimated quantities shown for items for which a UNIT PRICE is asked in this Proposal are only for the purpose of comparing on a uniform basis bids offered for the work under this contract, and the undersigned agrees that he is satisfied with and will at no time dispute said estimated quantities as a means of comparing the bids. It is understood and agreed that he will make no claim for anticipated profit or loss of profit because of a difference between the quantities of the various classes of work done or the materials and equipment actually installed and the said estimated quantities. On UNIT PRICE bids, payment will be made only for the actual number of units incorporated into the finished project at the contract UNIT PRICE.

It is also understood and agreed that if this bid is accepted, the successful Bidder will contract with the Department of Water Supply and said Bidder will
furnish the required bonds to the Department within 10 days after the award or within such further time as the Manager may allow.

It is further understood and agreed that the successful Bidder will provide all the necessary labor, material, tools, equipment and other incidentals required to do all the work and furnish all the materials specified in the contract in the manner and time herein prescribed and according to the requirements of the Engineer as therein set forth.

It is also understood and agreed that the time of completion of the work shall be seventy-five (75) consecutive calendar days after receipt of notice to proceed and that liquidated damages in the amount of Fifty Dollars ($50) will be assessed for each and every calendar day in excess thereof prior to completion of the contract.

It is also understood and agreed that if this Proposal shall be accepted and the undersigned shall fail to or neglect to contract as aforesaid, the Department may determine that the Bidder has abandoned the contract, and thereupon, forfeiture of the security accompanying his Proposal shall operate and the same shall become the property of the Department.

Enclosed herewith find legal tender, certificate of deposit, certified check or surety bond made payable at sight to the Department of Water Supply, County of Hawaii, for the sum of ________________________________________________________ DOLLARS ($___________) as required by Section 103-28, Hawaii Revised Statues.

Respectfully submitted,

PROPER NAME OF BIDDER

By __________________________________________

ADDRESS __________________________________________

PHONE NO. ________________________________________
LISTING OF SUBCONTRACTORS

In compliance with the provisions of Act 185, S.L.H. 1963, the bidder shall include in his bid the names of each person or firm to be engaged by the bidder as a joint contractor or subcontractor in the performance of the public work construction contract. The bid shall also indicate the nature and scope of the work to be performed by such joint contractor or subcontractor. All bids which do not comply with this requirement shall be rejected.

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<th>Nature and Scope of Work</th>
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### SPECIAL PROVISIONS

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SPECIAL PROVISIONS

These Special Provisions modify and supplement the Standard Specifications for Public Water Systems dated March 1965, as amended, of the Department of Water Supply, County of Hawaii, to render them applicable to this specific project. There are no deletions to the Standard Specifications except for those sub-sections which are specifically deleted by these Special Provisions or those which obviously cannot apply to this project. Where there is a discrepancy between the Special Provisions and the Standard Specifications, the provisions set forth in these Special Provisions shall govern.

SECTION I - MOBILIZATION AND DEMOBILIZATION (Item Nos. 1A and 1B)

1.1 - DESCRIPTION: Mobilization shall consist of the transporting, assembling, constructing, installing and making ready for use at the well site all equipment, machinery, structures, utilities and incidentals necessary to do the work covered by this contract. Demobilization shall consist of the dismantling and removal from the project site all of the above mentioned equipment, machinery, structures, utilities and incidentals not incorporated in or a necessary part for the completed well.

The Contractor will clear and grade the site as required to move and setup the drilling rig at the site.

The Contractor shall be completely mobilized at the well site and shall begin his drilling operations within 20 calendar days after he has been notified in writing, to proceed under this contract. Any provisions in the Standard Specifications to the contrary are hereby deleted.

If the Contractor utilizes private lands other than the well site and access road for mobilization purposes, the provisions of this section shall still apply, and the mobilization and demobilization work on said private lands shall also be in accordance with the agreement between the Contractor and the land owners.
When the project is completed the Contractor shall clean up the well site and shall be responsible for all grading work required to leave the site in a neat and orderly condition to the satisfaction of the Engineer. Payment for clean-up work will not be paid for separately but shall be included in the contract unit price for Item No. 1B, "Demobilization," subject, however, to all provisions specified hereinabove.

The maximum total amount that will be paid for Item No. 1A, "Mobilization," shall be $2,000. The maximum total amount that will be paid for Item No. 1B, "Demobilization," shall be $1,500. All additional mobilization or demobilization costs in excess of the maximum amounts specified above shall be included in the appropriate unit prices bid in the Proposal. The Contractor shall not be entitled to receive any compensation for mobilization or for demobilization in addition to those specified herein and in the Proposal.

1.2 - MEASUREMENT: Measurement for payment of the work under this section of the specification will be made as follows:

(1) the contract unit price for Item No. 1A, Mobilization, will be paid when 50 feet of the well has been acceptably drilled and in the Engineer's opinion the Contractor has fully mobilized,

(2) the contract unit price for Item 1B, Demobilization, will be paid after the well has been completed and accepted by the Department and the project site cleaned to the satisfaction of the Engineer.

Should the Department terminate the contract before 50 feet of the well has been acceptably drilled for reasons other than those specified in the Standard Specifications and in the Engineer's opinion the Contractor has fully mobilized at the well site, the full amount of the contract unit price for Item No. 1A shall become due and payable subject, however, to all the provisions specified hereinabove. The full amount of the contract unit price for Item No. 1B shall also become due and payable after the above-mentioned termination of the contract, subject, however, to all the provisions specified hereinabove.
1.3 - PAYMENT: Mobilization and demobilization will be paid for at the applicable contract unit prices for:

Item No. 1A, "Mobilization (not to exceed $2,000)"

Item No. 1B, "Demobilization (not to exceed $1,500)",
as the case may be, which prices shall be full compensation for all the work specified in Section 1.1 above.

SECTION 2 - DRILLING THE WELL
(Item Nos. 2A and 2B)

2.1 - GENERAL: The well shall be drilled at the location shown on the plan and to a depth of 410 feet or as otherwise ordered by the Engineer. The exact location of the well shall be designated by the Engineer.

The well shall be drilled plumb and straight as specified herein and shall be large enough to install the well casing specified in Section 3 of the Specifications and to provide an annular space of at least 2" all around the casing to permit the rock-filling and cement grouting of the specifications.

The exact depth of the hole to be drilled and cased shall depend on the nature of the material penetrated by drilling and on hydrologic conditions and shall be determined by the Engineer during the course of the drilling. Casing shall not be installed until ordered by the Engineer. At his option the Engineer may order the drilling of an open hole below the installed casing. This open hole shall have a minimum diameter equal to one inch less than the inside diameter of the installed casing. The depth of the open hole shall be as ordered by the Engineer.

The Contractor may conduct drilling operations in excess of 8 hours a day only with the written consent of the Engineer. Not less than 72 hours prior to the commencement of any such overtime work, the Contractor shall submit to the Engineer a written notice of his intention and schedule.

2.2 - MEASUREMENTS, DRILLER'S LOGS, AND SAMPLES: The well to be drilled under this contract is of the exploratory type and the Department wishes to gather as much geological and hydrological data as possible. Every opportunity shall be
accorded the Department to obtain additional samples, make observations, and to study the apparent conditions.

The Contractor shall keep a continuous log of the well with entries for at least every 10-foot interval of depth, recording the general character, thickness, type, and drilling characteristic of materials encountered including the depth and drilling time, the color and hardness of the formations, and all other data which may be helpful in the interpretation of the geology, hydrology, and drilling conditions in the area. The log shall indicate the depths where water is encountered and the pertinent facts connected with its occurrence. All other information such as the location of lava tubes and cave-ins shall also be noted in the log. All work done including but not limited to reaming, backfilling, and concreting shall be accurately recorded. An accurate and carefully recorded log shall be kept current and available at the well site for inspection by the Engineer at any time during the work. The first carbon copy of the daily drilling log shall be submitted to the Engineer at the end of each day.

The Contractor shall comply with all provisions of Chapter 178, "Wells Generally," which relates to the reporting of wells to the State Department of Land and Natural Resources.

Samples of drill cuttings shall be taken at successive intervals of 10 feet of depth. Samples of drill cuttings shall be obtained by bailling the hole, by screening the circulating "drilling muds" or by any other method acceptable to the Engineer. Samples of drill cuttings shall be washed free of any "drilling muds" such as local clays, bentonite, or other commercial additives used in the drilling of the well. These samples shall be collected in sample bags provided by the Engineer and shall be properly labeled and delivered to the Engineer at the end of each working day.

Immediately after water has been encountered in the well, the Contractor shall assist the Engineer in determining the elevation of the water level in the drilled hole with reference to the datum which will be established by the Engineer shall be used to make all water level measurements. The water level data shall include the date and time at which the measurements are taken and the depth of the well at the time of measurement. The Department shall be entitled to make additional water
level measurements with its own equipment. When ordered and in the manner directed by the Engineer, the Contractor shall obtain water samples.

2.3 - DRILLING OR CIRCULATING MEDIUM: Bentonite or other commercial drilling fluid additives shall not be used in the drilling or circulating medium in drilling the well below elevation fifty (50) feet, mean sea level. Below elevation fifty (50) feet, cable tool, rotary, or reverse rotary circulation with clear water or air will be permitted in the drilling or circulating medium.

2.4 - PROTECTION: During the progress of the work the Contractor shall provide an adequate cover over the top of the hole to prevent debris or other objects from entering the well when the crew is not at the well site. The Contractor shall preserve the well in good condition until the Engineer has completed all the sampling, testing and measurement; has examined the records; and has accepted the work.

2.5 - ABANDONED WELL: A well will be considered abandoned if the Contractor does not complete the well to the depth ordered by the Engineer or if the Contractor should abandon the well due to loss of tools or for any other cause or if the Department does not accept the well due to faulty plumbness and alignment. Such an abandoned well shall be sealed by the Contractor, at no cost to the Department, by filling the hole with approved material as directed by the Engineer. If casing has been installed, the Contractor, at his own expense, may remove the casing prior to backfilling the abandoned well.

No payment will be made for any work done on an abandoned well. All partial payments received by the Contractor for work done on a well that has been abandoned shall be refunded to the Department and the Contractor shall drill another well in the vicinity of the abandoned well as directed by the Engineer. The cost of moving from the location of the abandoned well to the above-mentioned new well site will be at the Contractor's expense and will not be paid for by the Department.

Upon completion of the work the Contractor shall leave the site of the abandoned well in a neat and presentable condition free of all debris and in a state comparable to its original condition.
2.6 - PLUMBNESS AND ALIGNMENT: The hole shall be constructed and the casing set round, plumb and true to line as specified herein. To demonstrate the compliance of his work with these requirements the Contractor shall furnish all labor, tools and equipment and in the presence of the Engineer shall make the tests described herein in the manner prescribed by, and to the satisfaction of, the Engineer. Tests for plumbness and alignment must be made both after the hole is drilled and after the casing is installed. Additional tests, however, may be made by the Contractor during the performance of the work. No specific payments shall be made by the Department for making these tests and the Contractor shall include the costs of such tests in the applicable contract items.

The requirement for plumbness and alignment shall be made in accordance with the requirements of the AWWA Specification A100-66, Standard Specifications for "Deep Wells," and as otherwise specified herein.

Plumbness and alignment shall be tested in the presence of the Engineer by lowering into the well to a depth specified by the Engineer a section of rigid pipe 40 feet long or a dummy of the same length. The outer diameter of the plumb shall not be more than 1/2-Inch smaller than the diameter of that part of the casing or hole being tested. If a dummy is used, it shall consist of a rigid 8-Inch minimum diameter spindle with three rings, each ring being 12 inches wide. The rings shall be truly cylindrical and shall be spaced one at each end of the dummy and one ring in the center thereof.

A log of the drift at 20-foot intervals shall be made in the presence of the Engineer, and shall be accurately recorded and submitted to the Engineer. The method used for recording the drift shall be as shown in the Layne Field Manual.

Should the dummy fail to move freely throughout the length of the casing or hole to the depth specified by the Engineer or should the well vary from the vertical in excess of two-thirds the smallest inside diameter of that part of the well being tested per 100 feet of depth, or beyond limitations of this test, the plumbness and alignment of the well shall be corrected by the Contractor at his
own expense and, should he fail to correct such faulty alignment, plumbness, or insufficient well diameter, the Department may refuse to accept the well and consider the well abandoned.

2.7 - MEASUREMENT: The depth of the cased well to be paid for shall be the actual depth in lineal feet measured vertically from the surface of the original ground to the bottom of the casing acceptably installed in the well.

The depth of open hole to be paid for shall be the actual depth in lineal feet measured vertically from the bottom of the casing acceptably installed in the well to the bottom of the hole as ordered and accepted by the Engineer.

The Contractor shall not receive specific compensation for making the plumbness and alignment tests and the cost of all testing and corrections for plumbness, alignment, and well diameter shall be included in the contract price for Item 2A.

2.8 - PAYMENT: The depth of well acceptably drilled, measured as provided above, will be paid for at the applicable contract unit price per lineal foot for:

Item No. 2A, "Drilling cased well from the ground surface to the bottom of the casing,"

Item No. 2B, "Drilling open hole from the bottom of the casing to the bottom of the well,"
as the case may be, which price shall be full compensation for drilling; preparing the driller's logs; measuring and recording water levels, obtaining samples of water; protecting and maintaining the well; measuring the depth of well as required; making all tests including the plumbness and alignment tests and necessary corrections of defects; all fishing operations, all costs of delays in work due to inclement weather, to lack of equipment and to equipment breakdowns; and for all equipment, tools, labor and incidentals necessary to complete the work.

No payment will be made for abandoned wells.

SECTION 3 - FURNISHING AND INSTALLING THE WELL CASING (Item Nos. 3A and 3B)

3.1 - GENERAL: Both the solid and perforated steel casing to be installed in the well under this contract will be furnished at the well site by the Contractor.

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The casing shall be installed in the well only when ordered in writing by the Engineer and as specified herein. The Engineer will specify the total lengths of the perforated and solid casing to be installed. Installation shall be made only during normal daylight working hours.

3.2 - CASING: The casing to be furnished and installed in the well shall be new seamless black steel pipe conforming to ASTM designation A-53, Grade B, or electric-resistance-welded pipe conforming to ASTM designation A-135, Grade B, or electric-fusion-welded pipe conforming to ASTM designation A-139, Grade B. The physical properties of the steel used in the fusion-welded pipe shall conform to ASTM designation A-283, Grade B. The casing shall have a minimum inside diameter of 10.136 inches and a minimum wall thickness of .307 inch and shall be clean, straight, and free from kinks. The individual lengths of casing shall be provided with beveled ends suitable for butt welding.

Perforated casing shall be louver type slot. The area of opening shall be approximately 65 square inches per foot of casing.

3.3 - INSTALLATION: The casing shall be installed in the presence of and as directed by the Engineer. The casing shall be properly aligned and welded by qualified welders and shall also be continuous for its entire length. Every precaution shall be taken to prevent the casing from dropping into the hole. Heavy driving of the casing which is likely to damage the pipe or cause a change in the circular cross section of the pipe will not be permitted.

The completely installed casing shall be tested for plumbness and alignment and after being accepted by the Engineer, the Contractor shall, to the satisfaction of the Engineer, clean and surge the water-bearing aquifer with a surge plunger or surge block or other equipment approved by the Engineer.

3.4 - MEASUREMENT: The length of casing to be paid for shall be the number of lineal feet of casing measured to the nearest foot acceptably installed in the well.

3.5 - PAYMENT: The total footage, measured as provided above, of casing furnished and installed by the Contractor will be paid for at the contract unit price per lineal foot for:

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Item No. 3A, "Furnishing and installing 10.136-inch I.D. solid well casing," or

Item No. 3B, "Furnishing and installing 10.136-inch I.D. perforated well casing,"
as the case may be, which price shall be full compensation for furnishing and
hauling the casing to the well site; for perforating the casing; for cleaning and
surging the well; for unloading, handling, cutting, aligning, welding, and setting
the casing; for furnishing the rock, cement and sand; for mixing and placing the
concrete at the bottom of the cased hole; and for all labor, equipment, tools,
materials and incidentals necessary to complete the work.

The Contractor may furnish and install casing with a larger inside diameter
and/or thickness than specified in the above specifications; however, he shall not
be entitled to additional compensation over and above the contract unit price bid
for the items listed above.

SECTION 4 - TESTING THE WELL
(Item Nos. 4A and 4B)

4.1 - DESCRIPTION: Testing of the well shall consist of bailing tests and
pumping tests to determine yield, drawdown, recovery, and quality of water at
various rates of pumping. The equipment and methods shall be as specified below
and as directed by the Engineer.

4.2 - BAILING TEST: When water is encountered in the well, the Engineer may
from time to time at his discretion direct the Contractor to bail water from the
well for the purpose of determining the general yield characteristics of the well
and the trend of the quality of the well water. When so directed, the Contractor
shall immediately begin cleaning the well by bailing. When the well is cleaned
to the satisfaction of the Engineer the bailing test shall begin.

The bailing test shall be performed with approved equipment, including a
minimum 20-gallon capacity bailer, in the presence of the Engineer and at the rate
set by the Engineer. During the bailing test the Contractor shall keep an accurate
record of the time of beginning and ending of the bailing test, interruptions of
bailing operation and reasons therefor, and the quantity of water bailed per hour. The Engineer may from time to time interrupt the bailing operations and the Contractor shall assist the Engineer in making water level measurements. The bailing test shall continue until ordered to be stopped by the Engineer.

4.3 - PUMPING TEST EQUIPMENT AND MATERIALS: The Contractor shall furnish and install a test pump assembly capable of discharging at least 1000 gallons of water per minute at the ground surface. The Contractor shall also furnish and install all other equipment and material, except as specified herein, and shall supply the power required to perform the pumping test of the well as directed by the Engineer. All Contractor-furnished equipment and appurtenances shall be in good operating condition. Before proceeding with the delivery to the project site of the test pump and motor required by this section, the Contractor must submit in writing to the Engineer the description, pump characteristics, curves, and specifications of the test pump and motor.

The rate of discharge from the well shall be measured with a water meter or an approved orifice plate furnished by the Contractor. The Contractor shall furnish all equipment and materials that may be required to measure the rate of discharge and it shall be the Contractor's responsibility to determine and provide the necessary and proper fittings to connect the water meter or orifice plate. The Contractor shall also provide the necessary facilities and make arrangements for the proper disposal of the well water as directed by the Engineer. Outlet shall be at least 300 feet makai of well or shall be discharged into the existing reservoir when approved by the Engineer.

Water level measurements during the pumping test shall be determined by the air line method. The Contractor shall furnish an air pressure gage for measuring the air pressure of the Contractor-furnished air line assembly. The Contractor shall furnish a 1/4-inch diameter air line assembly complete with all fittings and appurtenances necessary to connect the pressure gage furnished by the Department and to measure water levels in a manner acceptable to the Engineer.

4.4 - PUMPING TEST: When a pumping test is ordered in writing by the Engineer, the Contractor shall clean and surge the well to the satisfaction of the Engineer.
prior to the installation of the test pump. The Contractor shall satisfy himself that the well is adequately prepared for the proper installation and operation of the test pump assembly. After the pumping test equipment is acceptably installed and tested for proper operation in the presence of the Engineer, the Contractor shall notify the Engineer of his readiness to begin the test. The Engineer will provide the necessary personnel for directing the pumping test. The Contractor shall not begin the pumping test until the Engineer is present at the site and the Engineer orders the test to begin.

The pumping test procedure shall be prescribed by the Engineer during the course of the testing. The pumping shall be started, regulated, and stopped as directed by the Engineer. The testing shall include measuring the rate of discharge and drawdown at various pumping rates and the rate of recovery. If deemed necessary, the Engineer may order a long-term continuous pumping test under his direction. Testing may be conducted during the night, Saturdays, Sundays, and National and State holidays as required by the Engineer. Records will be kept throughout all tests showing the pumping rates, corresponding water levels in the well, and the quality of water being discharged.

During the entire testing period, the Contractor shall have at least one man available at the well site to operate and maintain the test pump and appurtenant equipment and to assist the Engineer in performing other incidental work required for the pumping test. The Contractor shall also provide a field office with a desk and light for the use of the Department of Water Supply personnel during the pump test. The Contractor shall be responsible for efficient continuous operation and maintenance of the pumping unit and measuring devices during all tests. The Department will not pay for any damages to the pumping test equipment for any cause.

4.5 - MEASUREMENT: No payment will be made for bailing and surging the well and it shall be considered incidental to the pump test.

The installation and removal of pumping test equipment and material to be paid for shall be considered complete when the complete unit has been satisfactorily
tested and accepted by the Engineer and when the removal has been completed to the satisfaction of the Engineer.

The pumping test time to be paid for will be the actual number of hours that the pump is operated under the direction and to the satisfaction of the Engineer measured to the nearest half-hour. The measurement of time will begin after the Engineer orders the pumping test begun and shall end when the Engineer orders the pumping test to be terminated. Time lost due to any failure, inability to meet specification requirements, or inefficient operation of the pumping equipment or measuring devices will not be measured for payment.

4.6 - PAYMENT: Installing and removing equipment for testing the well will be paid for at the contract lump sum price for:

Item No. 4A, "Furnishing, installing, and subsequent removal of pumping test equipment,"

which price shall be full compensation for furnishing, hauling, and installing test pump, power unit, power supply, discharge column, air line assembly, measuring devices, pipeline and materials necessary for the proper disposal of the water, and all other equipment necessary to conduct the test; for all delays necessitated by the nature of the work or as specified above; for the subsequent removal and hauling of the units listed above; and for all labor, equipment, tools, materials, and incidentals necessary to test the well.

The hours, measured as provided above for the pumping test, will be paid for at the contract unit price per hour for:

Item No. 4B, "Pumping tests,"

which price shall be full compensation for labor required for testing the well; for furnishing the fuel and power; for keeping the records; for taking samples; for maintaining and operating all pumping equipment and measuring devices required for the test; and for providing all labor, tools, equipment, materials, and incidentals necessary to complete the testing of the well as directed by the Engineer.

Any failure, inability to meet specification requirements, or inefficient operation of the pumping equipment, instruments, or measuring devices provided by
the Contractor for either the balling or pumping test may necessitate repetition of part of the test or of the entire test as determined by the Engineer; such repetition will be performed by the Contractor at no cost to the Department.

SECTION 5 - CONCRETE BLOCK AND FILLING THE ANNULAR SPACE
(Items Nos. 5A, 5B and 5C)

5.1 - DESCRIPTION: This section covers the rock-packing and cement grouting of the annular space between the wall of the drilled hole and the casing; and the placing of the concrete block at the top of the well. All work required in this section shall be done during normal daylight working hours. The Contractor shall notify the Engineer not less than 48 hours prior to rock-packing, cement-grouting, and placing the concrete block.

5.2 - ROCK-PACKING THE ANNULAR SPACE: When ordered in writing and as directed by the Engineer, the Contractor shall rock-pack the annular space between the wall of the drilled hole and the casing as shown on the plans. Rock-packing shall consist of 1/2 to 3/4 inch coarse graded gravel and must be approved by the Engineer before being used.

5.3 - CEMENT-GROUTING THE ANNULAR SPACE: The annular space between the outside of the casing and the wall of the drilled hole from the top of the rock-packing to the bottom of the concrete block shall be cement grouted in the presence of the Engineer.

Cement grout shall consist of one part Portland cement, one part rock sand and sufficient water to form a consistency such that the grout may be placed. The amount of water to be added shall be subject to the Engineer's approval.

The grout shall be placed in the annular space by pumping it through a one-inch minimum diameter grout pipe as directed by the Engineer. It is essential that the entire annular space around the grouted section of the casing specified above be completely filled with grout. Grout shall be placed in a manner that will avoid segregation of materials, inclusion of foreign material, bridging of grout materials, and contaminating the rock-packed section of the annular space.
5.4 - CONCRETE BLOCK: The concrete block at the top of the well, when ordered by the Engineer, shall be constructed as shown on the Plans. The concrete shall have a minimum cement content of five sacks per cubic yard of concrete, a maximum water-cement ratio of 7 gallons per sack of cement and shall be designed for an estimated compressive strength of 2,500 psi at 28 days.

5.5 - MEASUREMENT AND PAYMENT: Acceptable filling of the annular space which includes rock-packing and cement grouting and acceptable placing of the concrete block at the top of the well will be measured and paid for separately at the respective contract unit price for:

- Item No. 5A, "Constructing the Concrete Block,"
- Item No. 5B, "Rock-packing the annular space," or
- Item No. 5C, "Cement grouting the annular space," as the case may be, which respective price shall include full compensation for furnishing, mixing, placing and curing the cement grout and concrete; for furnishing, bending, and placing the reinforcing steel for excavation and backfill; for capping the top of the casing; for furnishing and placing the crushed rock in the annular space; and for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the work as specified herein and as shown on the Plans.

SECTION 6 - WAGE RATE SCHEDULE

6.1 - WAGE RATE SCHEDULE: The latest minimum wage rates as promulgated by the Department of Labor and Industrial Relations five (5) days prior to the date set for the opening of bids shall be paid to the various classes of labors and mechanics engaged in the performance of this contract on the job site.
PLANS FOR THE CONSTRUCTION OF
PAPAIKOU-KAIEIE-KALAOA WATER SYSTEM IMP.

PHASE I

DRILLING OF EXPLORATORY WELL

JOB NO. 71-167-A

DISTRICT OF SOUTH HILO

DEPT. OF WATER SUPPLY

COUNTY OF HAWAII — STATE OF HAWAII

DATE: 5/5/1972
APPROVED: Robert K. Cruck
MANAGER - ENGINEER
DIV. OF WATER & LAND DEVELOPMENT
STATE OF HAWAII

DATE: 4/4/1972
APPROVED: Lew Yuen
CHAIRMAN
WATER COMMISSION
COUNTY OF HAWAII

DATE: 3/17/1972
APPROVED: Wayne J. Fyfe
MANAGER
DEPT. OF WATER SUPPLY
COUNTY OF HAWAII

DATE: 4/9/1972
APPROVED: Executive Officer
DIV. OF ENVIRONMENTAL HEALTH
STATE OF HAWAII
SECTION THRU WELL
NOT TO SCALE