CONSTRUCTION DOCUMENTS
for the
Replacement of Well 3

Palo Alto Park Mutual Water Co.
2190 Addison Ave.
East Palo Alto, CA. 94303-1434

December 2022

Prepared by:

Michael Freitas

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PART A - CONTRACT DOCUMENTS
PUBLIC NOTICE

Palo Alto Park Mutual Water Company invites Sealed Bids for the following contract: **Replacement Well 3 Contract.**

Bids for this project will be received at the office of the Company Clerk, Palo Alto Park Mutual Water Company Office until **2:00 PM on xxxxxxxxxxxxx** at which time they will be publicly opened and read aloud. The scope of work consists of all labor, material, equipment and services necessary to complete the work in compliance with the specifications, including but not limited to:

The work to be performed under this contract consists of furnishing of all labor, materials, transportation, tools, supplies, plant equipment, and appurtenances necessary for the complete and satisfactory construction of a new 300 foot deep domestic water well including drilling, conductor casing, blank casing, screened casing, gravel pack, concrete seal, gravel fill pipe, test pumping, e-log, well pump with column pipe, discharge head, motor, underground piping, demolition of existing well and building, new wood frame building, electrical system and appurtenances; all work to the satisfaction of the Company as shown on the drawings in complete working condition.

Bidders are highly encouraged to attend a **non-mandatory Pre-bid meeting** at Palo Alto Park Mutual Water Company Office. This meeting will be held as indicated in below schedule. The estimated cost for this project is approximately $550,000 to $600,000.

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Date/Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Mandatory Pre-Bid Meeting at Company Corporation Yard</td>
<td>xxxxx at 10:30 AM</td>
</tr>
<tr>
<td>Deadline for submitting questions</td>
<td>xxxxxxx at 3:00 PM</td>
</tr>
<tr>
<td>Bid Opening</td>
<td>xxxxxxx at 2:00 PM</td>
</tr>
<tr>
<td>Award Construction Contract at Company Board Meeting</td>
<td>xxxxxxxx</td>
</tr>
<tr>
<td>Execute Construction Contract</td>
<td>xxxxxxxx</td>
</tr>
<tr>
<td>Preconstruction Meeting / Notice to Proceed</td>
<td>xxxxxxxx</td>
</tr>
<tr>
<td>Contractor Mobilization</td>
<td>xxxxxxxx</td>
</tr>
</tbody>
</table>

Sealed envelopes containing a bid must be marked on the outside as “**BID FOR REPLACEMENT WELL 3 CONTRACT**” and indicate bidder name, address and Bidder’s DIR number. If forwarded by mail, the sealed envelope containing your bid must be enclosed in another envelope addressed as follows:

**Palo Alto Park Mutual Water Co.**
2190 Addison Ave.
East Palo Alto, CA. 94303-1434

Bid Documents can be obtained from the Palo Alto Park Mutual Water Company web site. As distribution of the Bid Documents is by email, outside plan rooms and other means, it’s the bidder’s responsibility to advise Palo Alto Park Mutual Water Company that you need to be included on the official bid holders list for the project in order to receive any addenda.

Inquiries or questions based on alleged patent ambiguity of the plans, specifications or estimate must be communicated
as a bidder inquiry prior to bid opening. Any such inquiries or questions, submitted after bid opening, will not be treated as a bid protest. Questions and requests for clarifications shall be submitted to Michael Freitas via e-mail at fr8tus@aol.com by the deadline in the above schedule.

It is expressly understood and agreed that a responsive bid shall have the following documents completed, all of which are incorporated into and made a part hereof:

1. Completely executed Proposal, signed and dated
2. Bidder's Statement of Subcontractors
3. Bidder's Bond
4. Signed Addendum, if any
6. Non-collusion Affidavit

All Bids must be made on the required forms. All blank spaces for bid prices must be filled in, in ink or typewritten and the bid from must be fully completed and executed when submitted. Only one copy of the completed bid form is required. By submitting a bid, it is assumed that the bidder inspected the site and the bidder is satisfied as to the existing conditions, said conditions being reflected in the bid.

Each bid shall be in accordance with the Construction Documents adopted therefore, submitted on the Proposal form furnished and accompanied by a certified or cashier's check or bidder's bond made payable to the Palo Alto Park Mutual Water Company, for an amount equal to at least ten percent (10%) of that amount of the bid, such guaranty to be forfeited should the bidder to whom the contract is awarded fail to enter into the Contract within fifteen (15) calendar days after notification of the Award of Contract.

At the time of award of contract, the successful bidder shall possess a Class "A" contractor's license or a combination of Specialty Class "C" licenses sufficient to cover all work to be performed. Only a contractor registered with the Department of Industrial Relations (DIR) shall be permitted to submit a bid.

By order of the Palo Alto Park Mutual Water Company Board of Directors, East Palo Alto, California.

Niambi Lincoln
Palo Alto Park Mutual Water Company

Date
PALO ALTO PARK MUTUAL WATER COMPANY

NAME OF BIDDER

BID

FOR

Replacement Well 3
PROPOSAL
TO PALO ALTO PARK MUTUAL WATER COMPANY
FOR
REPLACEMENT WELL 3 CONTRACT

NAME OF BIDDER______________________________________________________________________

CONTRACTOR LICENSE No. ____________________________________________________________

DIR REGISTRATION No. __________________________________________________________________

BUSINESS PO BOX ______________________________________________________________________

COMPANY, STATE, ZIP __________________________________________________________________

BUSINESS STREET ADDRESS __________________________________________________________________

(Please include even if P.O. Box used)

COMPANY, STATE, ZIP __________________________________________________________________

TELEPHONE No: ( ) ______________________________

The work for which this proposal is submitted is for construction in conformance with the special provisions, the project plans described below, including any addenda thereto, the contract annexed hereto, and also in conformance with Current California Department of Transportation Standard Plans, Standard Specifications, and the Labor Surcharge and Equipment Rental Rates in effect on the date the work is accomplished.

Bids are to be submitted for the entire work. The amount of the bid for comparison purposes will be the total of all items. The bidder shall set forth for each unit basis item of work a unit price and a total for the item, and for each lump sum item a total for the item, all in clearly legible figures in the respective spaces provided for that purpose. In the case of unit basis items, the amount set forth under the "Item Total" column shall be the product of the unit price bid and the estimated quantity for the item.

In case of discrepancy between the unit price and the total set forth for a unit basis item, the unit price shall prevail, except as provided in (a) or (b), as follows:

(a) If the amount set forth as a unit price is unreadable or otherwise unclear, or is omitted, or is the same as the amount of the entry in the item total column, then the amount set forth in the item total column for the item shall prevail and shall be divided by the estimated quantity for the item and the price thus obtained shall be the unit price;

(b) (Decimal Errors) If the product of the entered unit price and the estimated quantity is exactly off by a factor of ten, one hundred, etc., or one-tenth, or one-hundredth, etc. from the entered total, the discrepancy will be resolved by using the entered unit price or item total, whichever most closely approximates percentage-wise the unit price or item total in the PALO ALTO PARK MUTUAL WATER COMPANY’s Final Estimate of cost.

If both the unit price and the item total are unreadable or otherwise unclear, or are omitted, the bid may be deemed irregular. Likewise, if the item total for a lump sum item is unreadable or otherwise unclear, or is omitted, the bid may be deemed irregular unless the project being bid has only a single item and a clear, readable total bid is provided.
Symbols such as commas and dollar signs will be ignored and have no mathematical significance in establishing any unit price or item total or lump sums. Written unit prices, item totals and lump sums will be interpreted according to the number of digits and, if applicable, decimal placement. Cents symbols also have no significance in establishing any unit price or item total since all figures are assumed to be expressed in dollars and/or decimal fractions of a dollar. Bids on lump sum items shall be item totals only; if any unit price for a lump sum item is included in a bid and it differs from the item total, the item total shall prevail.

The foregoing provisions for the resolution of specific irregularities cannot be so comprehensive as to cover every omission, inconsistency, error or other irregularity which may occur in a bid. Any situation not specifically provided for will be determined in the discretion of the PALO ALTO PARK MUTUAL WATER COMPANY, and that discretion will be exercised in the manner deemed by the PALO ALTO PARK MUTUAL WATER COMPANY to best protect the public interest in the prompt and economical completion of the work. The decision of the PALO ALTO PARK MUTUAL WATER COMPANY respecting the amount of a bid, or the existence or treatment of an irregularity in a bid, shall be final.

If this proposal shall be accepted and the undersigned shall fail to enter into the contract and furnish the 2 bonds in the sums required, with surety satisfactory to the PALO ALTO PARK MUTUAL WATER COMPANY, within 8 days, not including Saturdays, Sundays and legal holidays, after the bidder has received notice from the PALO ALTO PARK MUTUAL WATER COMPANY that the contract has been awarded, the PALO ALTO PARK MUTUAL WATER COMPANY may, at its option, determine that the bidder has abandoned the contract, and thereupon this proposal and the acceptance thereof shall be null and void and the forfeiture of the security accompanying this proposal shall operate and the same shall be the property of the PALO ALTO PARK MUTUAL WATER COMPANY.

The undersigned, as bidder, declares that the only persons or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm, or corporation; that they have carefully examined the location of the proposed work, the annexed proposed form of contract, and the plans therein referred to; and they propose, and agree if this proposal is accepted, that they will contract with the PALO ALTO PARK MUTUAL WATER COMPANY, in the form of the copy of the contract annexed hereto, to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract, in the manner and time therein prescribed, and according to the requirements of the Engineer as therein set forth, and that they will take in full payment therefore the following prices, to wit:
NAME OF BIDDER

Bid Schedule

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Units</th>
<th>Unit Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization, Site Preparation and Demobilization</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2</td>
<td>Water and Waste Management Plan</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>3</td>
<td>Drill Pilot Hole</td>
<td>300</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>4</td>
<td>Conduct Geophysical Logging</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>5</td>
<td>Abandon Pilot Hole, if required</td>
<td>300</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6</td>
<td>Bucket auger or direct/reverse mud-rotary drilling of a 24&quot;-diameter</td>
<td>50</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7</td>
<td>Furnish and install 24&quot; conductor casing, complete</td>
<td>50</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8</td>
<td>Grout conductor casing seal</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>9</td>
<td>Drill 24&quot;-diameter production bore hole</td>
<td>300</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>10</td>
<td>Furnish and install 12&quot; blank steel well casing and dielectric coupling</td>
<td>250</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>11</td>
<td>Furnish and install 12&quot; stainless steel wire wrap well screen, complete in</td>
<td>50</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>12</td>
<td>Furnish and install filter pack/gravel envelope, complete in place</td>
<td>300</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>13</td>
<td>Furnish and install cement seal, complete in place</td>
<td>50</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>14</td>
<td>Well development by airlifting &amp; jetting, including water handling and</td>
<td>20</td>
<td>HR</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>15</td>
<td>Furnish, install, and remove test pump</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>16</td>
<td>Well development/sampling by test pumping, including water handling and</td>
<td>40</td>
<td>HR</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>17</td>
<td>Conduct three 2-hour step drawdown tests with 1/2 hour recovery between,</td>
<td>8</td>
<td>HR</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>18</td>
<td>Conduct 72-hour constant rate pumping test, with 2-hour recovery test,</td>
<td>74</td>
<td>HR</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Quantity</td>
<td>Unit</td>
<td>Rate</td>
<td>Amount</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------</td>
<td>----------</td>
<td>------</td>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td>19</td>
<td>Furnish and treat with chlorine for disinfection</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>20</td>
<td>Conduct plumbness and alignment test</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>21</td>
<td>Conduct video survey and cement bond log</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>22</td>
<td>Furnish and install casing cap and plate on above-grade casing, and secure wellhead, complete in place</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>23</td>
<td>Site Clean-Up</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>24</td>
<td>San Mateo County Health Department Permit Fees</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>25</td>
<td>Construct New Well Building</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>26</td>
<td>Install New Well Pump, Discharge Head and Column Piping and connect to existing pipeline</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>27</td>
<td>Extend Electrical System and Install Electrical Equipment</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>28</td>
<td>Destroy Existing Well 3 and Pump Building</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**TOTAL BID** = $

The Company further reserves the right to reject all bids and to reduce the scope of work of the lowest responsible bidder to within the Company's budget through mutual agreement between the Company and Bidder. The Company also reserves the right to withhold award of the bid for 60 days following the bid date without change to the bid. Should there be reasons why the contract cannot be awarded within the specified period; the time may be extended by mutual agreement between the COMPANY and the BIDDER.

Except as may otherwise be provided herein, all work to be done under this Contract shall conform to the applicable requirements of the “Design Standards And Standard Specifications” And “Standard Specifications For The Installation Of Water Facilities”, For The Palo Alto Park Mutual Water Company, herein referred to as the Standard Specifications, and any modifications/updates to the standard plans as included in the plan set details.

The undersigned understands that the quantities given are approximate only, being given as a basis for the comparison of bids, and the Palo Alto Park Mutual Water Company does not, expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Company Engineer without claim for damage or loss of anticipated profit and that payment will be made only on the basis of the actual quantities of work performed. BIDDERS must satisfy themselves as to the accuracy of the estimated quantities in the BID Schedule by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or the nature of the WORK to be done.

The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT.
obtained from an officer, agent, or employee of the COMPANY, or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve him from fulfilling any conditions of the contract.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the performance BOND and payment BOND within ten (10) calendar days from the date when the NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary Agreement and BOND forms. In case of failure of the BIDDER to execute the Agreement, the COMPANY may at their option consider the BIDDER in default, in which case the BID Bond accompanying the proposal shall become the property of the COMPANY.

The COMPANY within ten (10) calendar days of receipt of acceptable performance BOND, payment BOND, and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the COMPANY not execute the Agreement within such period, the BIDDER may by WRITTEN NOTICE withdraw their signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice of the COMPANY.

The Notice To Proceed shall be issued within ten (10) calendar days of the execution of the Agreement by the COMPANY. Should there be reasons why the Notice To Proceed cannot be issued within such period, the time may be extended by mutual agreement between the COMPANY and the CONTRACTOR. If the Notice To Proceed has not been issued within the thirty (30) day period, or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on either party.

The Contractor shall commence work and all work under this contract shall be complete on or before the expiration of One Hundred Twenty (120) working days after said Notice To Proceed. Liquidated damages of $500 per day will be assessed for each calendar day over contract time unless the Contractor can prove in writing, and shall be supplemented by the equipment manufacturer in writing, that equipment procurement lead time has delayed the project beyond the completion date and that the equipment was ordered in a timely manner.

The contractor shall perform work and be completed by the dates noted in the schedule in the PUBLIC NOTICE. Any deviation from this schedule will not be permitted unless approved in writing by the Company Engineer.

Within thirty (30) days after signing the Contract, but in any event prior to the first Application For Payment, Contractor shall submit a Cost Breakdown of the Contract Sum.

The Cost Breakdown shall itemize as separate line items the cost of each work activity and all other costs, including warranties, record documents, insurance, bonds, overhead expenses and the total allowance for profit, the total of which shall equal the Contract Sum. The Cost Breakdown, when approved by the Company, shall become the basis for determining the cost of Work performed for Contractor's Applications For Payment.

The undersigned further agrees that all work to be done under this Contract shall be done in accordance with the provisions of that certain form of Agreement attached hereto and hereby made a part of these Specifications. If the Contractor is delayed by the progress of work of any other Company project contractor and their subcontractors, Contractor shall be allowed extra working days in the amount equal to the delay caused and shall assign their work forces accordingly so no extra charge for delays is incurred by the Company.

The COMPANY may make such investigations as it deems necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish the COMPANY all such information and data for this purpose as the COMPANY may request. The COMPANY reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the Agreement and to complete the WORK contemplated therein.
A conditional or qualified BID will not be accepted. Award will be made to the lowest responsible BIDDER. All applicable rules and ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT Documents. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to their BID.

Enclosed herein is a BID BOND for not less than ten percent (10%) of the total amount of the BID and the undersigned agrees that, in case of his/her default in executing the Contract and the necessary BONDS after award and due notice thereof, the BOND and the money payable thereon shall become and remain the property of the Company as liquidated damages. As soon as BID prices have been compared, the COMPANY will return the BONDS of all except the three lowest responsible BIDDERS. When the Agreement is executed the bonds of the two remaining unsuccessful BIDDERS will be returned. The BID BOND of the successful BIDDER will be retained until the payment BOND and performance BOND have been executed and approved, after which it will be returned. A certified check may be used in lieu of a BID BOND.

A PERFORMANCE BOND and a PAYMENT BOND, each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the COMPANY, will be required for faithful performance of the contract. Attorney’s-in-fact who sign BID BONDS or payment BONDS and performance BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

Questions about the meaning or intent of the Construction Documents shall be submitted to the Company Engineer in writing to the attention of Michael Freitas via e-mail to Michael.Freitas@fr8tus@aol.com. Replies will be issued by Addenda to all plan holders on the list kept by the Company. Only the information presented in Addenda shall be binding. Oral and other interpretations or clarifications will be without legal effect.

Any and all Addenda to the Contract documents shall be signed and attached hereto this Proposal.

Addenda received and incorporated into this proposal:

Addenda number(s): none 1 2 3 4 5

(Circle all that apply) Signed Date signed

For any money earned by the Undersigned and withheld by the Company, to insure the performance of the Contract, the Undersigned may, at his/her request and expense, substitute securities equivalent to the amount withheld in the form and manner and subject to the conditions provided in Section 22300 of the Public Contracts Code of the State of California.

Licensed in accordance with an act providing for the registration of Contractors, License No. __________________. Expiration Date ______________. (If bidder is a joint venture, each member must specify license number, expiration date, and statement regarding representations made).

(If an individual, so state. If a firm or co-partnership, state the firm name and give the names of all individuals; co-
partners composing the firm. If a corporation, state legal names of corporation, also names of President, Secretary, Treasurer, and Manager thereof).

________________________________________

Business Address

Signature of Bidder _______________________________________

________________________________________

Print Name and Corporate Title

Dated: ________________________________, 2022

(Attach notary acknowledgement)
BIDDER'S STATEMENT OF FINANCIAL RESPONSIBILITY, TECHNICAL ABILITY AND EXPERIENCE

(This form must be completed and submitted with bid)

The Bidder is required to state what work of a similar character to that included in the proposed Contract he/she has successfully performed and give references which will enable the Company to judge his/her responsibility, experience, skill and business standing.

The undersigned submits herewith a statement of his/her financial responsibility.

The undersigned submits below a statement of the work of a similar character to that included in the proposed contract which he/she has successfully performed. (Include the type of work, name, and phone number of all references).

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<tr>
<th>TYPE</th>
<th>NAME</th>
<th>PHONE NO.</th>
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\{155572/000/00654248-1 \}
## SUBCONTRACTORS LIST

The Bidder shall list the name and address of each subcontractor to whom the Bidder proposes to subcontract portions of the work, as required by the provisions of the Standard Specifications and of the special provisions. After the opening of bids, no changes or substitutions will be allowed except as otherwise provided by law. The listing of more than one subcontractor for each item of work to be performed with the words “and/or” will not be permitted. Failure to comply with this requirement may render the Bid non-responsive and may cause its rejection.

If no list is submitted, it will be assumed that the Contractor will do all work as specified.

No Subcontractors, other than those listed hereon, will be allowed to perform work under this Contract. Substitutes of Subcontractors will be only with the approval of the Company Engineer. The Contractor and all Subcontractors shall have valid Contractor's licenses for the classification of work performed, prior to award of Contract.

<table>
<thead>
<tr>
<th>Subcontractor’s Name &amp; Address</th>
<th>Percent of Total Contract</th>
<th>License No. and Date of Expiration</th>
<th>Work to be Performed Including bid item number</th>
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<td>9</td>
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</tbody>
</table>

SIGNED________________________________________

Attach Notary Acknowledgment if signature is not the same as the Proposal signature(s).
NONCOLLUSION AFFIDAVIT

(Title 23 United States Code Section 112 and Public Contract Code Section 7106)

To the

PALO ALTO PARK MUTUAL WATER COMPANY

In conformance with Title 23 United States Code Section 112 and Public Contract Code 7106 the bidder declares that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Note: The above Non-collusion Affidavit is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Non-collusion Affidavit.

Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.
BIDDER'S BOND

We, ____________________________________________ as Principal, and

as Surety are bound unto the Palo Alto Park Mutual Water Company, State of California, hereafter referred to as "Obligee", in the penal sum of ten percent (10%) of the total amount of the bid of the Principal submitted to the Obligee for the work described below, for the payment of which sum we bind ourselves, jointly and severally,

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT:

WHEREAS, the Principal is submitted to the Obligee, for   ____________________________________________

(Copy here the exact description of work, including location as it appears on the proposal)

for which bids are to be opened at ______________________ on ______________________

(Insert place where bids will be opened)   (Insert date of bid opening)

NOW, THEREFORE, if the Principal is awarded the contract and, within the time and manner required under the specifications, after the prescribed forms are presented to him for signature, enters into a written contract, in the prescribed form, in conformance with the bid, and files two bonds with the Obligee, one to guarantee faithful performance of the contract and the other to guarantee payment for labor and materials as provided by law, then this obligation shall be null and void; otherwise, it shall remain in full force.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including a reasonable attorney's fee to be fixed by the court.

Dated: 20 ______________________

Principal  
Surety

By ______________________

Attorney-in-fact

CERTIFICATE OF ACKNOWLEDGEMENT

State of California

Company/County of ______________________ SS
On this _____ day of ___________________________ in the year 2022 before me
__________________________ , personally appeared ____________________________ ,

Attorney-in-fact

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is
subscribed to this instrument as the attorney-in-fact of, and acknowledged to me that he (she) subscribed the name of
the said company thereto as surety, and his (her) own name as attorney-in-fact.

(SEAL)

Notary Public
GENERAL INSTRUCTIONS TO LOW BIDDER
(To be submitted immediately after project award)

BIDDER'S SIGNATURES

(a) The Bidder shall sign two documents included in the Bid Documents:
   • Bid
   • Bidder's Security

(b) The name of the Bidder shall be typewritten or printed below the signature line. The type of legal entity shall be included in the name of the Bidder (Examples: individual, sole proprietorship, general partnership, limited partnership, corporation).

(c) The name and title of all individuals signing for the entity shall be typewritten or printed below the signature line. All signatures shall be notarized with a notary jurat.

(d) The Bidder shall provide evidence that the individual signing the document is authorized to bind the legal entity of the Bidder. The notarization does not constitute such proof unless the Bidder is signing as an individual.

(e) If the Bidder is a corporation, proof of authorization shall be established (pursuant to Corporations Code Section 313) if one of the corporate officers listed in column A below and one of the corporate officers listed in column B below both sign the documents.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chairman of the Board, or President, or Vice President</td>
<td>and</td>
</tr>
<tr>
<td>Secretary, or Assistant Secretary, or Chief Financial Officer, or Assistant Treasurer</td>
<td></td>
</tr>
</tbody>
</table>

For any other combination of signatures of corporate officers, a copy of the Board minutes, resolution, or articles of incorporation may be submitted to prove that the individuals have the authority to bind the corporation.

(f) If the Bidder is any legal entity other than an individual or corporation, documentation must be submitted which establishes that the individuals have the legal authority to bind the legal entity of the Bidder.

(g) If the legal entity is a Limited Partnership, a Certificate Limited Partnership (State form LP-1) is sufficient to establish the authority of a single General Partner to bind the Limited Partnership.

(h) If the Bidder is a General Partnership, a Certificate of General Partnership or General Partnership agreement is sufficient to establish the names of all general partners of a General Partnership. All general partners must sign the documents, unless proof is submitted which authorizes an individual partner to bind the other general partners.

(i) If the individual signing the document is signing as a sole proprietorship, either a Fictitious Business Name
Statement or a City of East Palo Alto Business License is sufficient to establish the authority of an individual to bind a sole proprietorship.

(j) If the individual or individuals signing the documents are signing on behalf of an entity other than the Bidder, and that other entity is authorized to bind the legal entity of the Bidder, then documentation must be submitted which establishes that the individuals have the authority to bind the other entity, and that the other entity has the authority to bind the legal entity of the Bidder.

**BIDDER'S/CONTRACTOR'S SECURITY**

All bidder's security (including bidder's bond, faithful performance bond, labor and materials bond, and any other required bond) shall be in one of the following forms:

a. Cash

b. Cashier's check made payable to the Company

c. A certified check made payable to the Company

d. A bond executed by an admitted surety insurer, made payable to the Company in the form of the bonds in the Contract documents. The Power of Attorney for the attorney-in-fact of the surety must be current, contain an authorization to bind for at least minimum dollar amount of the bond, and be attached to the bond.

    **The signature of the attorney-in-fact must be notarized.**
AGREEMENT

THIS AGREEMENT, made and entered into this _______ day of ____________, 2017, by and between PALO ALTO PARK MUTUAL WATER COMPANY of the State of California of the State of California, hereinafter called "Company", and

_________________________________________ of ____________________________

"Contractor",

W I T N E S S E T H

FIRST: Contractor hereby covenants and agrees to furnish and provide all labor, materials, tools, appliances, equipment, plant and transportation, and all other things required or necessary to be furnished, provided or done, and build, erect, construct and complete the work at the time and in the manner provided, and in strict accordance with, the Plans and Specifications therefore, for

REPLACEMENT WELL 3 CONTRACT

SECOND: It is expressly understood and agreed that this contract consists of the following documents, all of which are incorporated into this agreement and made a part hereof as fully and completely as if set forth herein verbatim, to wit:

1. Notice to Bidders
2. Information for Bidders
3. Bid Form
4. List of Subcontractors
5. Noncollusion Affidavit
6. Contractor’s Certificate as to Workers’ Compensation
7. Affidavit Concerning Employment of Undocumented Aliens to be Submitted with Bid
8. Bid Bond
9. Agreement
10. Performance Bond
11. Payment Bond
13. General Conditions
14. Special Conditions
15. Plans
16. Addendums
17. Remaining Work Items List and Contractor Breakdown

THIRD: That said Contractor agrees to receive and accept the following prices as full compensation for furnishing all materials and for doing all the work embraced and contemplated in this Agreement as set forth in the Proposal, a true copy thereof hereeto attached; also, for all loss or damage arising out of the nature of said work or from the action of the elements or from any unforeseen difficulties or obstructions which may arise or be encountered in the prosecution of the work until the acceptance thereof by the Palo Alto Park Mutual Water Company and for all risk connected with the work, and for well and faithfully completing the work, and the whole thereof, in the manner and according to the said Plans and Specifications and the provisions of this Agreement, and the requirements of the Company Engineer under
them, to wit: The prices as set forth in the Proposal of said Contractor for the work to be constructed under this Agreement, which prices should be considered as though repeated herein.

The Contractor and Company hereby agree that the Contractor shall perform the work, and be paid the amount as specified in the Proposal of the Contractor, for the total price of:

______________________________ ($__________). The undersigned Contractor further agrees to so plan the work and to prosecute it with such diligence that said work, and all of it, shall be completed on or before the expiration of the time specified in the Proposal after execution of the Contract on behalf of the Palo Alto Park Mutual Water Company and the receipt from the Palo Alto Park Mutual Water Company of a notice to proceed with the work.

FOURTH: Company hereby promises and agrees with said Contractor to employ, and does hereby employ, said Contractor to provide the materials and to do the work according to the terms and conditions herein contained and referred to, for the price aforesaid, and hereby contracts to pay the same at the same time, in the manner and upon the conditions set forth in the Specifications and the said parties, for themselves, their heirs, executors, administrators, successors, and assigns, do hereby agree to the full performance of the covenants herein contained.

FIFTH: No interest in this Agreement shall be transferred by the Contractor to any other party, and any such transfer shall cause the annulment of this Agreement, so far as the Palo Alto Park Mutual Water Company is concerned. All rights of action, however, for any breach of this Agreement are reserved to Company.

SIXTH: The Contractor shall hold harmless and indemnify the Palo Alto Park Mutual Water Company, its officers, agents, employees and volunteers, from all loss, damage, cost or expense that arises or is set up for infringement or patent rights of anyone for use by the Palo Alto Park Mutual Water Company, its officers, employees or agents, or articles supplied by the Contractor under this Agreement of which he/she is not entitled to use or sell. Contractor agrees to, at his/her own cost and expense, defend in court the Company, its officers, agents, employees, and volunteers, in any action which may be commenced or maintained against them, on account of any claimed infringement of patent rights, arising out of this Agreement.

Contractor shall take all responsibility for the work, shall bear all losses and damages directly or indirectly resulting to the Contractor, any subcontractors, the Company, its officers, officials, agents, employees, and volunteers, on account of the performance or character of the work, unforeseen difficulties, accidents, or occurrences of other causes predicated on active or passive negligence of the Contractor or of any subcontractor. The Contractor shall indemnify, defend and hold harmless the Company, its officials, officers, employees, agents and volunteers from and against any or all loss, liability, expense, claim costs (including costs of defense), suits, and damages of every kind, nature and description directly or indirectly arising from performance of the work. This provision shall not be construed to exempt the Company, or its officials, officers, and employees from their own willful misconduct or sole negligence. By execution of this Agreement the Contractor acknowledges and agrees that the Contractor has read and understands the requirements of this Agreement, including this indemnity provision, which is a material element of consideration. Approval of the Contractor’s certificates of insurance does not relieve the Contractor of liability under this provision.

1. Contractor will defend any action or actions filed in connection with any such claims, damages, penalties, obligations or liabilities and will pay all related costs and expenses, including attorney’s fees incurred;
2. Contractor will promptly pay any judgment rendered against the Company, its officials, officers, employees, agents and volunteers or Engineers for any such claims, damages, penalties, obligations or liabilities; and,

3. In the event the Company, its officials, officers, employees, agents, volunteers or Engineers is made a party to any action or proceeding filed or prosecuted against Contractor for such damages or other claims arising out of or in connection with the negligence or wrongful acts of Contractor in the performance of the work, Contractor agrees to pay the Company, its official, officers, employees, agents, volunteers and Engineers any and all costs and expenses incurred in such action or proceeding, including but not limited to, reasonable attorney’s fees.

Contractor shall reimburse the Company for all costs and expense (including but not limited to fees and charges of architects, engineers, attorneys and other professional and court costs) incurred by the Company in enforcing the provisions of this Section.

SEVENTH: The Contractor agrees to immediately repair and replace all defective material and workmanship discovered within one year after acceptance by the Company or final payment to Contractor and to indemnify the Company against all loss and damage occasioned by any such defect, discovered within said year, even though the damage or loss may not be ascertained until after the expiration thereof. Provided, however, that if such failure of the Contractor to perform should not, by reasonable diligence, be discoverable or discovered within said one year, then the obligation of the Contractor to repair and replace said defective material or workmanship shall continue until one year after the actual discovery thereof.

EIGHTH: The Contractor agrees at all times during the progress of the work to carry with insurance carriers approved by the Company full coverage worker’s compensation and commercial general liability insurance in the form and to the extent called for in Section 7-1.12 of the Design Standards and Standard Specifications, and the Standard Specifications for the Installation of Water Facilities Department of Public Works, Palo Alto Park Mutual Water Company, 1995 Edition. Coverage must be on a “claims occurrence” basis. If the policy is “claims made” Contractor will be required to obtain a bond which must remain in effect until 12 months following completion of work. Contractor shall also advise the insurance carrier to inform the Company of the unpaid limits of the policy. Such insurance policy shall contain an endorsement that the same shall not be canceled nor the amount of coverage be reduced until at least thirty days after receipt by the Palo Alto Park Mutual Water Company by certified or registered mail or a written notice of such cancellation or reduction in coverage.

NINTH: If the Contractor fails to fully perform the work contemplated under this agreement in accordance with the Contract Documents by the agreed upon time for completion, as such time may be amended by change order or other modification to this Agreement in accordance with its terms, and/or if the Contractor fails, by the time for completion, to fully perform all of the Contractor’s obligations under this Agreement that have accrued by the time for completion, the Contractor will become liable to the Company for all resulting loss and damage in accordance with the Contract Documents and applicable law. The Company’s remedies for the Contractor’s failure to perform include, but are not limited to, assessment of Liquidated Damages of $500 per day.

TENTH: The Contractor will be solely responsible for any and all losses, costs, or liabilities of any kind incurred by the Contractor, any subcontractor engaged in the performance of the contract work, any party supplying material or equipment for the work or site maintenance or any third party that are incurred pursuant to Contractor-proposed change orders prior to issuance of an approved change order.
Any changes in the work and/or the Contract Documents pursuant to change orders and any other amendments issued in accordance with the Contract Documents, will in all respects be subject to all provisions of the Contract Documents, except as modified by such change orders or amendments.

The Company has the right to add, delete or change any aspect or any amount of the Work by written directive. If the Company believes that it is entitled to a credit of money or time based on the written directive, Company must ask contractor for a credit proposal and then negotiate a change order; if no agreement is reached, Company may issue a unilateral change order and contractor may follow the contract's claim procedures if it wishes. If the contractor believes that the written directive will lead to additional cost or time for which contractor must be compensated, then contractor may submit a proposed change order. If the Contractor disputes a Company directed change order following a reasonable effort by the Company and the Contractor to resolve the dispute including, at a minimum, a meeting between appropriate representatives of the Contractor and the Company, the Contractor must commence performing the work consistent with the disputed change order within five (5) working days of the last meeting between representatives of the Contractor and the Company to resolve the dispute, or within the time specified in the disputed Company directed change order, whichever is later.

If the Company disputes a Contractor proposed change order, the Company and the Contractor will use reasonable efforts to resolve the dispute including, at a minimum, holding a meeting between appropriate representatives of the Contractor and the Company. Regardless of and throughout any such efforts to resolve the dispute the Contractor must continue performing the work, as directed by the Company, irrespective of and unmodified by the disputed change order. In continuing to perform the work, the Contractor will retain all of the Contractor’s rights under contract or law pertaining to resolution of disputes and protests between contracting parties. Disputes between the Company and the Contractor concerning any Contractor-proposed change order or other amendment do not excuse the Contractor’s obligation to perform the work in accordance with the Contract Documents excluding such Contractor-proposed change order or other amendment by the time for completion or waive any other Project milestone or other requirement of the Contract Documents.

ELEVENTH: <intentionally left blank>

TWELVETH: If this Project will involve trenching deeper than four (4) feet, the Contractor must notify the Company before disturbing any hazardous waste, subsurface conditions different from those indicated, or unusual conditions that may be encountered. Company will promptly investigate and provide for change orders if necessary. If the Project involves trenching deeper than five (5) feet, Contractor must submit a detailed design for shoring and other protection measures before trenching commences.

IN WITNESS WHEREOF, Company has caused this instrument to be executed and its corporate name and seal to be hereunto attached by its Company Manager, pursuant to resolution theretofore duly adopted by the Board of Directors of the Palo Alto Park Mutual Water Company, and Contractor has caused this instrument to be executed, the day and year first herein above written.

PALO ALTO PARK MUTUAL WATER COMPANY
By: ________________________________

Company Manager

CONTRACTOR

By: ________________________________

Approved as to form:

_______________________________

Company Attorney
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS THAT WHEREAS, the Palo Alto Park Mutual Water Company has awarded to the Principal

_________________________________________________________ as Contractor, a contract for the following project:

REPLACEMENT OF WELL 3

WHEREAS, Principal, as Contractor, is required to furnish a bond in connection with said contract, to secure the faithful performance of said contract.

NOW, THEREFORE, we as Principal, and ______________________________________________ as Surety, are held and firmly bound unto the Palo Alto Park Mutual Water Company (hereinafter called “Company”), and to the persons named in California Civil Code Section 3181 in the penal sum of

_________________________________________________________ Dollars ($__________________ ), for the payment of which sum in lawful money of the United States, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

If the Principal, as Contractor, or Principal’s heirs, executors, administrators, successors, or assigns, (1) shall in all things stand to and abide by and well and truly keep and perform the covenants, conditions, and agreements in said contract and any alteration thereof made as therein provided, on Principal’s part to be kept and performed, at the time and in the manner therein specified and in all respects according to their true intent and meaning, and (2) shall indemnify and save harmless the Company, and its Directors, officers, agents and employees as therein stipulated, then this obligation shall become null and void; otherwise, it shall be and remain in full force and virtue.

Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract on the call for bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said contract or the call for bids, or to the work, or to the specifications.

If suit is brought upon this bond by the Company and judgment is recovered, the Surety shall pay all litigation expenses incurred by the Company in such suit, including attorneys’ fees, court costs, expert witness fees and investigation expenses.

Should the Obligee (Company) file an action in a court of law to enforce this bond, the prevailing party shall be entitled to recover any and all costs and fees associated with the litigation, including but not limited to attorneys’ fees and experts’ fees.
IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals this ______________ day of ________________, 2022, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(Corporate Seal) ______________________________
Principal

By ______________________________

Title ______________________________

(Corporate Seal) ______________________________
Surety

By ______________________________

Title ______________________________

(Attach notary acknowledgment for all signatures and attorney-in-fact certificate for signature by surety’s representative)
PAYMENT BOND
(Civil Code Section 3249)

KNOW ALL MEN BY THESE PRESENTS THAT WHEREAS, the Palo Alto Park Mutual Water Company has awarded to Principal, _________________________________ as Contractor, a contract for the following project:

REPLACEMENT OF WELL 3

WHEREAS, Principal, as Contractor, is required to furnish a bond in connection with said contract, to secure the payment of claims of laborers, mechanics, material men, and other persons furnishing labor and materials on the project, as provided by law.

NOW, THEREFORE, we _________________________________ as Principal, and _________________________________ as Surety, are held and firmly bound unto the Palo Alto Park Mutual Water Company and to the persons named in California Civil Code Section 3181 in the penal sum of ________________ Dollars ($______), for the payment of which sum in lawful money of the United States, well and truly to be made, we find ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION IS SUCH THAT:

If the Principal, as Contractor, or Principal’s heirs, executors, administrators, successors, or assigns, (1) shall in all things stand to and abide by and well and truly keep and perform the covenants, conditions, and agreements in said contract and any alteration thereof made as therein provided, on Principal’s part to be kept and performed, at the time and in the manner therein specified and in all respects according to their true intent and meaning, and (2) shall indemnify and save harmless the Company and its Directors officers, agents and employees as therein stipulated, then this obligation shall become null and void; otherwise, it shall be and remain in full force and virtue.

Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract on the call for bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said contract or the call for bids, or to the work, or to the specifications.

If the Company brings suit upon this bond and judgment is recovered, the Surety shall pay all litigation expenses incurred by the Company in such suit, including attorney’s fees, court costs, expert witness fees and investigation expenses.

This bond inures to the benefit of any of the persons named in Civil Code Section 3181, and such persons or their assigns shall have a right of action in any suit brought upon this bond, subject to any limitations set forth in Civil Code Sections 3247 et seq.

IN WITNESS WHEREOF the above bounden parties have executed this instrument under their several seals this ________________ day of __________________________ , 2022, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.
Palo Alto Park Mutual Water Company
Replacement Well 3

(Corporate Seal) __________________________

Principal

By __________________________

Title __________________________

(Corporate Seal) __________________________

Surety

By __________________________

Title __________________________

(Attach notary acknowledgment for all signatures and attorney-in-fact certificate for signature by surety’s representative)

PALO ALTO PARK MUTUAL WATER COMPANY
CERTIFICATES OF INSURANCE

(This form is for informational purposes only. Contractor shall provide Company with the original Certificate of Insurance issued by their insurance company.)

This certifies to PALO ALTO PARK MUTUAL WATER COMPANY, Attention: General Manager that the following described policies have been issued to:

1. Insured: 
   Address: 

2. Location of operations insured: 

3. Description of work (show project name and/or number, if any): 

4. Worker's Compensation Employer's Liability: Statutory (Insurer)

5. Comprehensive $_______ $ Each Person Each Occurrence Claims occurrence
   or
   $_______ $ Each Occurrence Aggregate Claims (Insurer) made * basis
   $_______ Combined Single Limit

6. Comprehensive $_______ $ Each Person Each Occurrence Claims occurrence
   or
   $_______ Claims (Insurer) made *basis
   $_______ Combined Single Limit
7. Contractor shall, throughout the duration of this Agreement maintain comprehensive general liability and property damage insurance, or commercial general liability insurance, covering all operations of the Contractor, its agents and employees, performed in connection with this Agreement including but not limited to premises and automobile.

8. Contractor shall maintain the following minimum limits: General

<table>
<thead>
<tr>
<th>Liability</th>
<th>Minimum Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined Single Limit per Occurrence</td>
<td>$1,000,000.00</td>
</tr>
<tr>
<td>General Aggregate</td>
<td>$2,000,000.00</td>
</tr>
<tr>
<td>Automobile Liability</td>
<td>$1,000,000.00</td>
</tr>
</tbody>
</table>

9. All insurance companies affording coverage to the Contractor shall be required to add the Palo Alto Park Mutual Water Company, its elected and appointed officials, employees, agents and volunteers as "insured" under the insurance policy.

10. All insurance companies affording coverage to the Contractor shall be insurance organizations authorized by the Insurance Commissioner of the California State Department of Insurance to transact the business of insurance in the State of California.

11. All insurance companies affording coverage shall provide thirty (30) day written notice by certified or registered mail to the Palo Alto Park Mutual Water Company should the policy be canceled or reduced in coverage before the expiration date. For the purposes of this notice requirement, any material change prior to expiration shall be considered cancellation.

12. Contractor shall provide evidence of compliance with the insurance requirements listed above by providing a certificate of insurance, in a form satisfactory to the Company, concurrently with the submittal of this Agreement. A statement on the insurance certificate which states that the insurance company "will endeavor" to notify the certificate holder, "but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" does not satisfy the requirements of subsection (11) herein. The Contractor shall ensure that the above quoted language is stricken from the certificate by the authorized representative of the insurance company. The insurance certificate shall also state the unpaid limits of the policy.

13. Contractor shall provide a substitute certificate of insurance no later than thirty (30) days prior to the policy expiration date. Failure by the Contractor to provide such a substitution and extend the policy expiration date shall be considered a default by Contractor and may subject the Contractor to a Stop Work Notice until the Contractor has cured the default.

14. Maintenance of insurance by the Contractor as specified in the Agreement shall in no way be interpreted as relieving the Contractor of any responsibility whatever and the Contractor may carry, at its own expense, such additional insurance as it deems necessary.

15. All policies in effect, above and endorsements below, will not be canceled, limited, or allowed to expire without renewal until after thirty (30) days' written notice has been given to the PALO ALTO PARK MUTUAL WATER COMPANY.

The following coverages or conditions are to be in effect:
A. Products and Completed Operations
B. Palo Alto Park Mutual Water Company named as Additional Insured
C. Cross Liability Clause
D. Broad Form Property Damage
E. X, C, U Hazards Included
F. Personal Injury
G. Worker’s Compensation
H. Automobile Liability

16. Authorized signature may be the agents if agent has placed insurance through an agency with the insurer. If insurance is brokered, authorized signature must be that of official of insurer.

NOTE: This form is for informational purposes only.
PART B - SPECIAL PROVISIONS

SECTION 1. SPECIFICATIONS AND PLANS

All work performed under this Contract shall conform to the requirements of the Palo Alto Park Mutual Water Company “Design Standards and Standard Specifications”, and “Standard Specifications for the Installation of Water Facilities”, September 2015, herein referred to as the Standard Specifications, and any modifications and updates thereto contained within these Special Provisions and the project plans and details.


In the event of conflict between the Specifications and these Special Provisions the latter shall take precedence over and be used in lieu of such conflicting portions. The listing of certain salient sections from the Standard Specifications and these Special Provisions shall not in any way relieve the Contractor of complying with each and every section of the Standard Specifications.

Amendments to the Standard Specifications set forth in these special provisions shall be considered as part of the Standard Specifications for the purposes set forth in Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications and Special Provisions," of the Standard Specifications. Whenever either the term "Standard Specifications is amended" or the term "Standard Specifications are amended" is used in the special provisions, the indented text or table following the term shall be considered an amendment to the Standard Specifications. In case of conflict between such amendments and the Standard Specifications, the amendments shall take precedence over and be used in lieu of the conflicting portions.

Wherever in the Special Provisions, Notice to Contractors, Proposal, Contract or other Contract documents the following terms are used; the intent and meaning shall be interpreted as follows:

State – State of California
Company – Palo Alto Park Mutual Water Company, East Palo Alto California
Department of Transportation – California Department of Transportation (CALTRANS)
Director - Manager of PAPMWC or his/her designated representative.
Engineer – Company Engineer or his/her designated representative.
Company, Owner - Palo Alto Park Mutual Water Company, California.

SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS

The Bidder's attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions", of the Standard Specifications and these Special Provisions for the requirements and conditions which the bidder must observe in the preparations of the Proposal form and the submission of the bid. The Company reserves the right to award or withhold award of the project.

2-1.01 EXAMINATION OF PLANS, SPECIFICATIONS AND SITE OF WORK

The Bidder's Bond form mentioned in the last paragraph in Section 2-1.07, "Proposal Guaranty," of the Standard Specifications will be found following the signature page of the Proposal.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal. Signing the Proposal shall also constitute signature of the Noncollusion Affidavit. The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this
contract.

Failure of the bidder to fulfill the requirements of the Special Provisions for submittals required to be furnished after bid opening, including but not limited to escrowed bid documents, where applicable, may subject the bidder to a determination of the bidder's responsibility in the event it is the apparent low bidder on a future public works contracts.

The Bidder shall examine carefully the site of work contemplated, the Plans and Specifications, and the Proposal and Contract Forms therefore. The submission of a bid shall be conclusive evidence that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of work to be performed, the quantities of materials to be furnished, and as to the requirements of the Proposal, Plans, Specifications, and the Contract.

All questions about the meaning or intent of the Contract Documents shall be submitted in writing to the Company Engineer. Replies will be issued by Addenda mailed or delivered to all parties recorded by Company Engineer as having received the bidding documents. Questions received less than four (4) calendar days prior to the date and time of the opening of bids will not be answered. Only questions answered by formal written Addenda submitted by facsimile or e-mail will be binding. Oral and other interpretations or clarifications will be without legal effect.

Where the Company has made investigations of subsurface conditions in areas where work is to be performed under the Contract, or in other areas, some of which may constitute possible local material sources, bidders or Contractors may, upon written request, inspect the records of the Company as to such investigations subject to an upon the conditions hereinafter set forth. Such inspection of records may be made at the office of the Company Engineer, Palo Alto Park Mutual Water Company.

The records of such investigations are not a part of the Contract and are shown solely for the convenience of the bidder or Contractor. It is expressly understood and agreed that the Company assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the investigations thus made, the records thereof, or of the interpretations set forth therein or made by the Company in its use thereof and there is no warranty or guaranty, either expressed or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout such areas, or any part thereof, or that the investigations subject to an upon the conditions hereinafter set forth. Such inspection of records may be made at the office of the Company Engineer, Palo Alto Park Mutual Water Company.

The records of such investigations are not a part of the Contract and are shown solely for the convenience of the bidder or Contractor. It is expressly understood and agreed that the Company assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the investigations thus made, the records thereof, or of the interpretations set forth therein or made by the Company in its use thereof and there is no warranty or guaranty, either expressed or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout such areas, or any part thereof, or that the investigations subject to an upon the conditions hereinafter set forth. Such inspection of records may be made at the office of the Company Engineer, Palo Alto Park Mutual Water Company.

In some instances, the information from such subsurface investigations considered by the Company to be of possible interest to bidders or Contractors has been compiled as "Materials Information" is not a part of the Contract and is furnished solely for the convenience of bidders and Contractors. It is understood and agreed that the fact that the Company has compiled the information from such investigations as "Materials Information" and has exhibited or furnished to the bidders or Contractors such "Materials Information" shall not be construed as a warranty or guaranty, express or implied as to the completeness or accuracy of such compilations and the use of such "Materials Information" shall be subject to all of the conditions and limitations set forth in this Section 2-1.01 and Section 6-2 "Local Materials", of the Standard Specifications.

When contour maps were used in the design of the project, the bidders may inspect such maps, and if available may obtain copies for their use, at their expense.
The availability or use of information described in this Section 2-1.01 is not to be construed in any way as a waiver of the provisions of the first paragraph in this Section 2-1.01 and a bidder or Contractor is cautioned to make such independent investigation and examination as he/she deems necessary to satisfy himself/herself as to conditions to be encountered in the performance of the work and with respect to possible local material sources, the quality and quantity of material available from such property and the type and extent of processing that may be required in order to produce material conforming to the requirements of the Specifications.

No information derived from such inspection of records of investigation or compilation thereof made by the Company or from the Company Engineer, or his/her assistants, will in any way relieve the bidder or Contractor from any risk or from properly fulfilling the terms of the Contract.

2-1.02 DE-WATERING
Water pumped during any de-watering operations shall be discharged in accordance with the Clean Water Act (NPDES permit) in a manner such that there is no hazard to the public and a minimum of traffic interference.

Any de-watering methods used shall be the responsibility of the Contractor, but subject to approval of the Company Engineer.

Payment for de-watering, if any is required, shall be included in the items of work and no additional compensation will be made.

SECTION 3. AWARD AND EXECUTION OF CONTRACT

The Bidder's attention is directed to the provisions in Section 3, "Award and Execution of Contract" of the Standard Specifications and the "Proposal Requirements and Conditions" of these Special Provisions for the requirements and conditions concerning award and execution of the Contract.

Bid protests shall be delivered to the following address:

Palo Alto Park Mutual Water Co.
2190 Addison Ave.
East Palo Alto, CA. 94303-1434
Phone Number 650-322-6903

The award of the contract, if it is awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed.

The contract shall be executed by the successful bidder and shall be returned, together with the contract bonds, to the Company so that it is received within 10 days, not including Saturdays, Sundays and legal holidays, after the bidder has received the contract for execution. Failure to do so shall be just cause for forfeiture of the proposal guaranty. The executed contract documents shall be delivered to the following address: (Agency to provide detailed information if this paragraph is used) Certificates of Insurance shall be furnished by the Contractor and shall be returned with the signed Contract and Contract bonds. The Notice to Proceed with the work will not be issued by the Company until all such documents are submitted.

If awarded, this Contract will be awarded to the responsible bidder submitting the lowest bid who meets the financial and technical requirements.

SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION, LIQUIDATED DAMAGES AND TEMPORARY SUSPENSION OF WORK

The Contractor's attention is directed to the provisions of Section 8, "Prosecution and Progress", of the Standard Specifications and the following provisions:
The Contractor shall begin the work within **seven (7)** calendar days after the date of the official Notice to Proceed is issued by the Company and shall diligently prosecute the work to completion on or before the expiration of the contract working days. Contractor will provide the Company Engineer with a Gantt style chart of all construction phases at start of work and contractor shall update the schedule on a weekly basis on a weekday mutually arrived at by joint discussions between the successful bidder and the Company.

A working day shall be any other than a legal holiday, Saturday, or Sunday or designated non-work day on which the normal working forces of the Contractor may proceed with regular work for at least **six (6)** hours toward completion of the Contract. The Contractor shall pay to the Company the sum of **Five Hundred Dollars ($500.00)** per day for each and every calendar day delay in finishing the work in excess of the time of completion prescribed above.

Before the Notice to Proceed, a pre-construction conference will be held at the office of the Company or the Company Engineer for the purpose of discussing with the Contractor the scope of work, Contract drawings, Specifications, existing conditions, materials to be ordered, equipment to be used, and all essential matters pertaining to the prosecution of and the satisfactory completion of the project as required. The Contractor’s representative at this conference shall include all major superintendents for the work and may include major Subcontractors.

The first paragraph in said Section 8-1.03 of the Standard Specifications is amended by adding the following:

The Contractor shall notify the Company Engineer, in writing, of his/her intent to begin work at least **three (3) days** in advance before work is begun for this project. The notice shall be delivered to the office of the Company Engineer and shall specify the date the Contractor intends to start. If the project has more than one location of work, a separate notice shall be given for each location.

The first indented paragraph of the third paragraph in said Section 8-1.03 is amended to read:

1. **Notice in writing of the Contractor's intention to start work prior to approval, specifying the date on which he/she intends to start, shall be given to the Company Engineer at least three (3) days in advance. Refer to section 5-1.03 for coordinating schedules with the work of others.**

The Contractor shall immediately comply with written order of the Company Engineer to suspend work wholly or in part in accordance with Section 8-1.05 of the Standard Specifications and these Special Provisions.

**SECTION 5. GENERAL**

**SECTION 5-1 MISCELLANEOUS**

**5-1.01 SOUND CONTROL REQUIREMENTS**

The Contractor shall comply with all local sound control and noise level rules, regulations and ordinances which apply to any work performed pursuant to the Contract.

Each internal combustion engine, used for any purpose on the job or related to the job, shall be enclosed in a sound attenuated enclosure equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without this enclosure and muffler.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various Contract items of work involved and no additional compensation will be allowed therefore.

**5-1.02 WORK TO BE DONE BY OTHERS**
Miscellaneous items of work not included under the various Proposal items and as shown on the Plans, "N.I.C" and/or "By Others", will be done by others and are not a part of this Contract.

No additional compensation will be afforded for scheduling or rescheduling of work to allow for the work by others. However, time extension will be granted if Contractor's overall progress is impeded by the work of others.

Work to be done by others shall include, but is not limited to, the following:

1. Relocation and adjustments of utility company facilities shall be performed by various utility companies, if necessary and as required.

Contractor shall coordinate with the work of others and shall schedule their forces to allow for the work done by others and no additional compensation will be allowed for any delays.

5-1.03 DISCREPANCIES
Should the Contractor at any time discover any discrepancy or mistake in a drawing or Specification, any variation between dimension on drawings and measurements at site, or any lack of dimensions or other information, he/she shall report at once to the Company Engineer for correction and shall not proceed with work affected thereby until such correction has been made.

5-1.04 PERMITS AND LICENSES
Attention is directed to Section 1.02 Personnel and Equipment and Section 1.03 Permits, Certificates, Laws, and Ordinances, of the Technical Specifications, for further details.

The Contractor and its subcontractors shall obtain all necessary licenses and permits (including a Palo Alto Park Mutual Water Company encroachment permit, prior to construction.

The Contractor shall comply with all requirements of the Division of Industrial Safety, and the Department of Industrial Relations.

A "no fee" building permit may be issued. The Contractor shall obtain the permit from the Building Department. However, should the permit require "specialty testing", the Contractor shall, at his/her own expense, provide a certified laboratory that will submit written test results together with necessary reports to the Company Engineer for review and approval.

Payment for specialty testing including results and reports shall be included in the prices listed in the proposal and no additional compensation will be allowed therefore.

5-1.05 INCREASE OR DECREASE QUANTITY
Attention is directed to Section 1.05D Adjustment of Quantities for further details.

Delete Section 4-1.03B of the Standard Specifications in its entirety. The Company reserves the right to increase or decrease the quantity specified in the Proposal, as deemed necessary, by more than 25% and eliminate any item or work without the adjustment of Contract Unit Prices.

5-1.06 ITEMS NOT LISTED
Items of labor and materials which are not specifically listed in the Proposal and these Special Provisions as pay items, but which are shown and/or mentioned on the Plans or are required to be done to complete the overall project, shall be considered included in other pay items, and no additional compensation will be allowed therefore.

5-1.07 LEGAL RELATIONS AND RESPONSIBILITIES
The Contractor's attention is directed to Section 7 of the Standard Specifications.

For Traffic Maintenance, the Contractor's attention is directed to Section 7-1.08, "Public Convenience" and 7-1.09, "Public Safety", of the Standard Specifications and these Special Provisions. Nothing in these Special Provisions shall be construed as relieving the Contractor from his/her responsibility as provided in said Section 7-1.09. Contractor shall provide a traffic control plan acceptable to the Company 2 weeks prior to beginning the work.

A. Whenever immediate action is required to prevent impending injury, death, or property damage, and precautions which are the Contractor's responsibility have not been taken and are not expected to be taken, the Company may, after reasonable attempts to notify the Contractor, cause such precautions to be taken and shall charge the cost thereof against the Contractor, or may deduct such cost from any amount due or becoming due from the Company. Company action or inaction under such circumstances shall not be construed as relieving the Contractor of themselves or their surety from liability.

B. The Contractor shall notify the Police/Sheriff, Fire, Engineering Department of jurisdictional agencies involved, and affected property owners and businesses at least three working days in advance of any work that will delay traffic. The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make his/her own arrangements relative to keeping the working area clear of parked vehicles.

The Contractor shall also be responsible for compliance with additional public safety requirements which may arise during construction or which may be required by other jurisdictions. The Contractor shall exercise special caution against dangerous conditions and shall provide, install and maintain temporary barricades and fencing as may be necessary to protect the public. During any day between 9:00 a.m. and 3:30 p.m., the Contractor may limit traffic to one lane with approved traffic control measures, unless otherwise directed by the Company. During construction and within the area of work barricades, signs, lights, flashers and other safety devices shall be used by the Contractor to direct vehicular and pedestrian traffic. Unless otherwise directed by the Company, the Contractor shall maintain pedestrian and two-way vehicular traffic on the streets at all times.

C. Closing of any streets will not be allowed. Traffic safety devices shall be in good repair at all times. Traffic safety devices in need of repair or paint shall be removed immediately from the project on order of the Project Inspector. Upon completion of Work, the Contractor shall promptly remove all signs and warning devices.

D. Payment - The cost of furnishing all flagmen and police officers, and maintaining traffic as described herein and under the provisions in Section 7-1.08, "Public Convenience", 7-1.09, "Public Safety", and Section 12-2.02, "Flagging Costs", and for complying with the provisions of these Special Provisions shall be included in the item of work, traffic Control and no additional compensation will be made.

Personal vehicles of the Contractor’s employees shall not be parked on the traveled way or shoulders, including any section closed to public traffic.

Whenever vehicles or equipment are parked within six feet of a traffic lane, the shoulder area shall be closed with fluorescent traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the roadway at 25-foot intervals to a point not less than 25 feet past the last vehicles or piece of equipment. A minimum of 9 cones or portable delineators shall be used for the taper. A C23 (Road Work Ahead) or C24 (Shoulder Work Ahead) sign shall be mounted on a telescoping flag tree with flags. The flag tree shall be placed as directed by the Company Engineer.

All traffic cones used on the project shall conform to the requirements for fluorescent traffic cones in said Section 12-3.10. The top of fluorescent traffic cones used in the work during the hours of darkness as defined in Division 1, Section 280, of the California Vehicle Code, shall be covered by a 7-inch flexible vinyl reflective cone sleeve.
The provisions in Section 7-1.095, "Flagging Costs", of the Standard Specifications are amended to provide that the entire cost of furnishing all flagmen will be borne by the Contractor.

Where work is to be performed on private properties, (removal and construction of walks, driveway, etc.) the Company Engineer will obtain written permission for right-of-entry from the respective owner prior to performing the work. No work shall be commenced by the Contractor until such permission has been granted and until notified by the Company Engineer. The Contractor shall be responsible for any and all property damage and public liability resulting from his/her operation on said private properties.

Unless otherwise directed by the Company Engineer, the Contractor shall at all times maintain vehicular and pedestrian access to all properties fronting Company streets. The Company Engineer shall determine if temporary driveways will be necessary within the limits of work during construction. Traffic shall be maintained on one-half of the street at all times. The Contractor's special attention is directed to Section 10 of the Standard Specifications regarding dust control requirements. The Contractor shall abate dust nuisance by cleaning, sweeping (no blowers), and sprinkling with water, or other means as necessary during all phases of construction including weekends, holidays and any other times as necessary. Cleanup expenses to the Company at various job sites due to the Contractor's failure to comply with the provisions in the Standard Specifications and these Special Provisions will be charged to the Contractor. The use of water which may result in mud or public streets will not be permitted as substitute for sweeping or other materials. Payment for dust control shall be considered as included in the various pay items and no additional compensation will be made.

Whenever the presence of dust becomes a problem, the Contractor shall apply dust control materials as necessary to alleviate the problem. If, in the opinion of the Engineer, the presence of dust has become a problem, Engineer will specify a dust palliative according to these specifications, which the Contractor shall apply as necessary to alleviate the problem.

Contractor shall note the presence and condition of private property and improvements adjacent to the work site, including, but not limited to automobiles, buildings, landscaping and other property. The Contractor will be responsible for keeping dust controlled to the extent that private property is not damaged or dirtied. Contractor shall make arrangements with property owners to clean, or compensate property owners for cleaning of property, including building, existing structures, and automobiles that become dusty or damaged due to construction related dust.

The Contractor shall provide necessary safeguards and shall exercise caution against injury or defacement of any existing site improvements and plantings. The Contractor shall be responsible for any damage resulting from his/her operations and shall repair or replace such damage at his/her own expense. No trucks or vehicles of any kind shall be allowed to pass over area unless adequate protection is provided. Unless designated otherwise, all existing improvements shall be repaired or replaced, in kind, at the Contractors expense.

Temporary ramps, backfill, or covers for incomplete trenching/backfill operations shall also be furnished by the Contractor at the end of each day’s work for the protection of vehicular and pedestrian traffic.

The Contractor shall be responsible for any damage to the work which occurs before final acceptance. He/she is to securely cover all openings into the systems and protect all apparatus, equipment or appliance, both before and after being set in place, to prevent obstructions in the pipes and breakage, misuse or disfigurement of the apparatus, equipment or appliance. Contractor shall be responsible for damage to all existing utilities, whether or not they are indicated on the drawings.

Contractor shall provide delineators for traffic safety until such time as all cat tracking has been performed. Cat tracking shall be completed within 8 hours of completed paving/resurfacing at the respective location, and shall be maintained in a legible and traffic safety manner by the Contractor until final striping or pavement markings are in place.
Unless otherwise directed by the Company Engineer, the Contractor shall at all times maintain vehicular and pedestrian access to all properties fronting on Company streets. Two-way traffic shall be maintained at all times. The affected property owners shall be notified of any driveway closures by the Contractor one week minimum prior to closure. Temporary ramps and conforms shall be provided by the Contractor during operations which do not specifically require driveway closure at the end of each day’s work.

5-1.08 INSPECTIONS
The Contractor's attention is directed to Section 5 of the Standard Specifications.

In all cases where inspection of the work is required and/or where portions of the work are specified to be performed under the direction and/or inspection of the Company Engineer, the Contractor shall notify the Company Engineer at least two full working days in advance of the time such inspection and/or direction is required.

The Contractor shall notify the Company Engineer daily of his/her proposed work schedule. In addition, the Contractor’s representative shall submit for review to the Company Engineer a daily dairy of the previous day’s work including subcontractor’s equipment and personnel and labor. The Contractor’s attention is directed to Section 5-1.08 of the Standard Specifications. In addition to the requirements of said Section, the Contractor’s representative shall notify the Engineer daily of the following day’s proposed work schedule in order to plan for appropriate inspections. The Contractor’s Representative shall also submit a Daily Report of the day’s construction activity for review and approval. The daily report shall contain the name of all personnel and equipment, including all subcontractors, at work that day. The Contractor will also provide on a weekly basis an updated Gantt Chart, showing all completed & uncompleted work by percentage, included will be start & ending with milestones.

Payment for submitting the Contractor’s daily report and notification of the next day work schedule under this section shall be considered included in the contract lump sum price and no additional compensation will be made.

5-1.09 FINAL INSPECTION AND AREA CLEANUP
At the completion of the work, a final inspection will be made by the Company's Engineer. The Contractor will be responsible for final cleanup of the project area in accordance of the provisions of Section 4-1.02 of the Standard Specifications. Punch list items that result in additional work by contractor shall be subject to inspection by the Company Engineer.

5-1.10 COVERING OR CLOSING UN-INSPECTED WORK
Contractor shall not allow nor cause any work to be covered or enclosed until it has been inspected and approved by the Company. Should any of work be enclosed or covered before such inspection and approval he/she shall uncover the work at his/her own expense and after inspection make all repairs necessary to restore his/her work to its original condition.

5-1.11 COORDINATION AND COOPERATION
Attention is directed to Sections 7-1.14 “Cooperation” and 8-1.10 “Utility and Non-Highway Facilities” of the Standard Specifications.

The Contractor shall schedule operations to cooperate and work harmoniously with Company forces, Utility Companies, affected property owners and tenants, and other Contractors during the execution of this Contract; coordinating all activities to prevent unnecessary conflicts, delays, and disruptions to the progress of the project.

Prior to any work, the Contractor shall submit a schedule for the contract work reflecting coordination with other Contractors, if any, and utility companies. All work shall be coordinated to minimize delays to the overall progress of the work.
5-1.12 TESTING
If required due to questionable materials being furnished, the Contractor shall obtain and submit for approval a certified testing laboratory to complete necessary materials testing required by the specifications. Such testing laboratory shall be made available at the direction of the Company Engineer and shall submit necessary testing results and reports for review and approval. All tests and frequency of tests shall be in accordance with the Standard Specifications and the Caltrans Construction Manual. Your attention is directed to Section 7-1.04 "PERMITS AND LICENSE" concerning specialty testing. Concrete slump or break strength testing will not be required unless there are questions as to the strength of the concrete.

Payment for necessary materials and specialty testing including testing results and reports shall be included in the contract unit price; "Testing" and no additional compensation shall be allowed therefore. Should there not be an item, "Testing", then the cost for necessary materials and specialty testing including testing results and reports under this section shall be considered included in the various pay items and no additional compensation will be allowed therefore. Company shall provide and pay for the cost of compaction testing of sub-grade for site improvements and for trench backfill compaction.

5-1.13 CLAIMS
The Contractor’s attention is directed to Section 9-1.07B Final Payment and Claims of the Standard Specifications. Delete the fifth paragraph entirely and insert the following:

"The Palo Alto Park Mutual Water Company will make the final determination of any claims which remain in dispute after completion of claim review. The Company Engineer will review such claims and make a written recommendation thereon. The Contractor may meet with the PAPMWC to make a presentation in support of such claims."

5-1.14 PUBLIC SAFETY
The Contractor shall provide for the safety of traffic and the public in conformance with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications and these special provisions.

The Contractor shall install temporary railing (Type K) between a lane open to public traffic and an excavation, obstacle or storage area when the following conditions exist:

A. Excavations.—The near edge of the excavation is 11 feet or less from the edge of the lane, except:
   1. Excavations covered with sheet steel or concrete covers of adequate thickness to prevent accidental entry by traffic or the public.
   2. Excavations less than one foot deep.
   3. Trenches less than one foot wide for irrigation pipe or electrical conduit, or excavations less than one foot in diameter.
   4. Excavations parallel to the lane for the purpose of pavement widening or reconstruction.
   5. Excavations in side slopes, where the slope is steeper than 1:4 (vertical: horizontal).
   6. Excavations protected by existing barrier or railing.

B. Temporarily Unprotected Permanent Obstacles.—The work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and the Contractor elects to install the obstacle prior to installing the protective system; or the Contractor, for the Contractor's convenience and with permission of the Engineer, removes a portion of an existing protective railing at an obstacle and does not replace such railing complete in place during the same day.

C. Storage Areas.—Material or equipment is stored within 12 feet of the lane and the storage is not otherwise
prohibited by the provisions of the Standard Specifications and these Special Provisions.

The approach end of temporary railing (Type K), installed in conformance with the provisions in this section "Public Safety" and in Section 7-1.09, "Public Safety," of the Standard Specifications, shall be offset a minimum of 15 feet from the edge of the traffic lane open to public traffic. The temporary railing shall be installed on a skew toward the edge of the traffic lane of not more than 1 feet transversely to 10 feet longitudinally with respect to the edge of the traffic lane. If the 15 feet minimum offset cannot be achieved, the temporary railing shall be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules shall be installed at the approach end of the temporary railing.

Temporary railing (Type K) shall conform to the provisions in Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications.

Temporary crash cushion modules shall conform to the provisions in "Temporary Crash Cushion Module" of these Special Provisions.

Except for installing, maintaining and removing traffic control devices, whenever work is performed or equipment is operated in the following work areas, the Contractor shall close the adjacent traffic lane unless otherwise provided in the Standard Specifications and these Special Provisions:

<table>
<thead>
<tr>
<th>Approach Speed of Public Traffic (Posted Limit)</th>
<th>Work Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over 45 Miles Per Hour</td>
<td>Within 6 feet of a traffic lane but not on a lane</td>
</tr>
<tr>
<td>35 to 45 Miles Per Hour</td>
<td>Within 3 feet of a traffic lane but not on a lane</td>
</tr>
</tbody>
</table>

The lane closure provisions of this section shall not apply if the work area is protected by permanent or temporary railing or barrier.

When traffic cones or delineators are used to delineate a temporary edge of a traffic lane, the line of cones or delineators shall be considered to be the edge of the traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 11-feet without written approval from the Engineer.

When work is not in progress on a trench or other excavation that required closure of an adjacent lane, the traffic cones or portable delineators used for the lane closure shall be placed off of and adjacent to the edge of the traveled way. The spacing of the cones or delineators shall be not more than the spacing used for the lane closure.

Suspended loads or equipment shall not be moved nor positioned over public traffic or pedestrians.

Full compensation for conforming to the provisions in this section "Public Safety," including furnishing and installing temporary railing (Type K) and temporary crash cushion modules, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefore.

5.1.15 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES

When the presence of asbestos or hazardous substances are not shown on the plans or indicated in the specifications and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance
has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe. The Contractor shall immediately cease work in the affected area and report the condition to the Engineer in writing.

In conformance with Section 25914.1 of the Health and Safety Code, removal of asbestos or hazardous substances including exploratory work to identify and determine the extent of the asbestos or hazardous substance will be performed by separate contract.

If delay of work in the area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for the delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays,” of the Standard Specifications.

5-1.16 SUBCONTRACTOR AND DBE RECORDS
The Contractor shall maintain records showing the name and business address of each first-tier subcontractor. The records shall also show the name and business address of every DBE subcontractor, DBE vendor of materials and DBE trucking company, regardless of tier. The records shall show the date of payment and the total dollar figure paid to all of these firms. DBE prime contractors shall also show the date of work performed by their own forces along with the corresponding dollar value of the work.

5-1.17 PERFORMANCE OF SUBCONTRACTORS
The subcontractors listed by the Contractor in conformance with Section 2-1.054, “Required Listing of Proposed Subcontractors,” of the Standard Specifications, shall perform the work and supply the materials for which they are listed, unless the Contractor has received prior written authorization to perform the work with other forces or to obtain the materials from other sources. The Contractor should notify the Engineer in writing of any changes to its anticipated DBE participation. This notice should be provided prior to the commencement of that portion of the work.

5-1.18 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS
A prime contractor or subcontractor shall pay any subcontractor not later than 10 days of receipt of each progress payment in accordance with the provision in Section 7108.5 of the California Business and Professions Code concerning prompt payment to subcontractors. The 10 days is applicable unless a longer period is agreed to in writing. Any delay or postponement of payment over 30 days may take place only for good cause and with the agency’s prior written approval. Any violation of Section 7108.5 shall subject the violating contractor or subcontractor to the penalties, sanction and other remedies of that section. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract performance, or noncompliance by a subcontractor. This provision applies to both DBE and non-DBE subcontractors.

5-1.19 PROMPT PAYMENT OF FUNDS WITHHELD TO SUBCONTRACTORS
No retainage will be held by the Company from progress payments due to the prime contractor. Prime contractors and subcontractors are prohibited from holding retainage from subcontractors. Any delay or postponement of payment may take place only for good cause and with the agency’s prior written approval. Any violation of these provisions shall subject the violating contractor or subcontractor to the penalties, sanctions, and other remedies specified in Section 7108.5 of the California Business and Professions Code. This requirement shall not be construed to limit or impair any contractual, administrative or judicial remedies, otherwise available to the contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract performance, or noncompliance by a subcontractor. This provision applies to both DBE and non-DBE subcontractors.

SECTION 6. (Blank)
SECTION 8. MATERIALS

8-1.01 GENERAL
Attention is directed to Section 6, "Control of Materials" of the Standard Specifications and these Special Provisions.

All materials required to complete the work under this Contract shall be furnished by the Contractor except when otherwise specified herein.

8-1.02 RELATIVE COMPACTION
Wherever relative compaction is specified to be determined by Test Method No. Calif. 216 or Test Method No. Calif. 312, the relative compaction will be determined by Test Method No. 231 in accordance with Section 6-3 of the Standard Specifications.

8-1.03 SUBSTITUTIONS
Reference in these Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number is to be interpreted only as establishing a standard of quality, and not to be construed as limiting competition. In such cases, the Contractor may, at his/her option, use any article, device, product, material, fixture, form, or type of construction equal to that specified. The Company Engineer is the final judge of acceptability of proposed substitute and the Contractor proposing substitution shall furnish, at his/her expense, any data, samples, test, etc., as required by the Company Engineer to determine quality of the proposed substitutions.

In addition, all proposed substitutions must be:

1. Submitted within 5 calendar days following award of the Contract as approved by Company Engineer, all submissions for substitution will be presented as a proposed change order.
2. Proven to the Company Engineer to be equal or superior to the specified item in all respects.
3. Accompanied by shop drawings and/or complete descriptive information.

All dimensional or functional changes, or changes to other work which is required by, or are a result of, an acceptable substitution shall be the sole and complete responsibility of the Contractor and shall be made at no additional cost to the Company.

The Contractor shall make no substitutions of materials or equipment without written approval of Company Engineer.

SECTION 9. DESCRIPTION OF PROJECT
The general work to be performed in accordance with the plans and these special provisions consists of all labor, material, tools, equipment, incidentals and services necessary to complete the work shown on the plans and in the specifications, including but not limited to:

Except for authorized changes in the work, payment for said complete-in-place finished work or improvement will be made only on the basis of the contract item of work listed in the Proposal.

All other work, including the furnishing of labor, materials, tools, equipment and incidentals, provided for in these Specifications and Contract, or required for the proper completion of the work as a whole, for which no separate payment has been provided shall be a supplementary obligation for the Contractor and payment therefore shall be considered included in the price paid for the various items of work.

SECTION 10. CONSTRUCTION DETAILS
SECTION 10-1. GENERAL

10-1.01 ORDER OF WORK
Order of work shall conform to the provisions in Section 5-1.05 "Order of Work", of the Standard Specifications and these Special Provisions.

All operations shall be coordinated to eliminate any possibility of damage, or unnecessary removal, replacements and/or modifications to existing facilities or to facilities constructed for this project.

No cross connections between existing and new facilities shall be completed until such facilities are completed, tested, and accepted; and until permission has been granted by the Company.

The Contractor shall submit a Plan of proposed construction operation together with a diagram indicating their layout for traffic control. This Plan shall be subject to the approval of the Company and shall be submitted at least two weeks prior to the beginning of any work.

The Contractor shall have a representative on all working job sites at all times while work is actually in progress, whose sole duties shall be to supervise the work crews and coordinate activities pertaining to the contract operations, including traffic control and public notifications.

The Contractor may store materials on PAPMWC site. The site shall be approved by PAPMWC prior to storing materials. Work shall not begin until the Engineer has reviewed the staging plan and approval letter.

10-1.02 WORKMANSHIP
All work performed under this Contract shall be of the highest quality of the trade, and the Contractor shall employ only workmen who are skilled and thoroughly familiar with the type of improvements proposed.

10-1.03 PROGRESS SCHEDULE
A progress schedule shall be prepared by the Contractor for this Contract and shall conform to the provisions in Section 8-1.04 "Progress Schedule" of the Standard Specifications and shall be delivered to the Company Engineer at the pre-construction meeting. No work shall begin until the Progress Schedule has been reviewed and approved.

Such progress schedule (Gantt type) shall show coordination of major portions of the work including utility relocations/adjustments and other related work by others. Start up and completion dates of all phases, milestones, and all related construction activity.

The Contractor shall schedule operations in cooperation with other Contractors and the utility companies to avoid unnecessary conflicts, delays, and disruptions to the progress of this project.

No work may begin under contract until the progress schedule and Traffic Control Plan have been approved by the Engineer. Time required for review and approval of these items shall not constitute a basis for time extension.

10-1.04 OBSTRUCTIONS
Attention is directed to Section 10-1.10, Utility and Non-Highway Facilities, and Section 15, Existing Highway Facilities, of the Standard Specifications and these Special Provisions.

10-1.05 EXISTING UTILITIES
The Contractor shall coordinate with the utility companies to locate and mark all utility mains and service laterals within the project area. Contractor shall make full determination of all underground utilities in order to prevent damage or disruption to the existing services during construction. These markings shall be visible for the root
trimming crews. The Contractor shall contact the Underground Service Alert (USA) at least two full working days before starting any excavation. The toll free number to call is: 1-800-227-2600.

Unless specifically noted, removals, installations, and relocations of conflicting underground and above ground utilities will be executed by the respective utility companies at their expense.

Relocation of existing water meters, where noted on plans, shall be per Palo Alto Park Mutual Water Company standard plans and details.

The Plans show only approximate location of underground utilities. The Contractor shall be responsible for verifying the exact location and depth of existing utilities in the field. Where excavation is contemplated, the Contractor shall notify Underground Service Alert (USA) at (800) 642-2444 or 811 prior to excavation.

Where excavations are performed in the vicinity of underground utility services, the Contractor shall, as necessary, perform initial exploratory excavations to determine their exact depth and location. Extreme care shall be exercised to avoid damage as it will be the Contractor’s sole responsibility to have the repairs made to the existing facilities at his/her own expense.

The Contractor’s attention is directed to the existence of certain underground facilities that may require special precautions to be taken by the Contractor to protect the health, safety and welfare of workers and of the public. Facilities requiring special precautions include, but are not limited to: irrigation water lines; natural gas pipelines; underground telephone, cable TV, and electric supply system conductors or cables either directly buried or in duct or conduit. The Contractor shall notify the Company Engineer at least two full working days prior to performing any work in the vicinity of such facilities.

Repair of pipes due to accidental or convenience removals (including equipment conflicts) shall be at the expense of the Contractor and no additional compensation will be allowed.

Survey markers that will be impacted must be properly recorded and restored in compliance with all local, state and federal laws and regulations. The contractor is responsible for this work at his own expense.

10-1.06 UNDERGROUND OBSTRUCTIONS
Other than utility work, the removal and relocation of all underground obstructions, including but not limited to sprinkler systems, water mains, sewer mains or laterals or electrical conduits shall also be the responsibility of the Contractor and no additional compensation will be allowed therefor.

Repair of pipes, electrical conduits and other appurtenances due to accidental or convenience removals shall be at the expense of the Contractor.

10-1.07 EXAMINATION OF SITE
Before submitting a bid, each bidder shall carefully examine the drawings and Specifications relating hereto. He/she shall also visit the site of the proposed work and shall fully inform himself/herself as to all the existing conditions relating to the construction and related labor so that he/she may fully understand the facilities, difficulties, restrictions attendant on the execution of the work, limitations applying to the work, and he/she shall estimate and include in his/her bid a sum sufficient to cover the cost of all items which are required to attain the completed conditions contemplated in the project.

10-1.08 SUBMITTALS/DRAWING OF RECORD
The Contractor shall provide submittals for all materials, product data, working/shop drawings, diagrams, schedules, or other data prepared by the Contractor in accordance to the Contract requirements. The submittals shall not modify any Contract requirement.
The Contractor shall provide a certificate of compliance from its material suppliers, in advance of the work, that each conforms to the requirements of these specifications. The Contractor shall also furnish to the Company in triplicate, certified copies of all factory and mill test reports when required by the Engineer. The Certificate shall be signed by the manufacturer of the material. The Company reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance alone.

Contractor shall review the plans and specifications carefully and submit shop drawings and submittals as required. Submittals shall be shown on the schedule and shall not be critical path items of work. All submittals shall be reviewed by the Engineer and returned to the Contractor within 10 working days from the date of receipt by the Engineer. In addition, the Contractor shall allow the Company identical time periods for any rejected submittals that are re-submitted for approval.

The Engineer’s review of Contractor shop drawing submittals shall not relieve the Contractor of the entire responsibility for the correctness of details and dimension. The Contractor shall assume all responsibility and risk for any misfits due to any errors in Contractor submittals. The Contractor shall be responsible for the dimensions and the design of adequate connections and details. Acceptance by the Engineer of a substitute item proposed by the Contractor shall not relieve the Contractor of the responsibility for full compliance with the Contract Documents and for adequacy of the substitute item.

The Contractor shall provide and maintain an up-to-date complete "RECORD DRAWING" record on a separate set of construction Plans which shall show every change from the original drawings and Specifications. Prints for this purpose may be obtained from the Company Engineer. This set of drawings is to be kept on the site and to be used only as a record set.

These drawings shall also serve as work progress sheets, and the Contractor shall make neat and legible annotations thereon daily as the work proceeds, showing the work as actually installed. These drawings shall be available at all times for inspection and to be kept in a location designated by the Company Engineer.

On or before the date of final inspection, the Contractor shall deliver the corrected and completed "RECORD DRAWING" to the Company Engineer including a scanned copy of the approved record drawings in PDF format on CD (2 copies of CD to be provided). Contractor shall furnish in duplicate two binders of all manufacturers’ literature brochures, manuals, parts list, instructions, etc., for all electrical and mechanical equipment as required to be furnished and installed by the Contractor. Submissions of this literature in a haphazard method will not be acceptable. Failure to submit "RECORD DRAWING" shall be cause to withhold final payment and not accept the project.

At the project pre-construction meeting, the Company will furnish Three sets of the Construction Documents to the Contractor. If additional sets are requested, the Contractor will be charged for any sets requiring reproduction and binding.

10-1.09 CONSTRUCTION EASEMENTS
Any work to be done on private properties or requiring access through private properties shall not be done until the Company has acquired easements or right-of-entry from the property owner. Prior to starting such work, the Contractor shall verify with the Company Engineer that such authority has been granted.

The Contractor will confine his/her operations within the limitations of construction easements or limits as shown on the drawings. If the Contractor's operations result in damage to plantings or any other privately-owned facility outside the limitations of the construction easements or public right-of-way, the Contractor shall, at his/her expense, repair such damage or indemnify the owner of the damaged property.

If the Contractor negotiates with property owners for use of their land for construction operations outside the limits of the construction easements, he/she assumes all responsibility to private, public and Company property, the
Company will assume no liability for such use of private property. All agreements between the Contractor and private property owners shall be in writing. The Contractor shall commence no work outside the construction easements until copies of such agreements are furnished to the Company. Any delays that result from this are the responsibility of the contractors including all associated penalties.

10-1.10 PARTIAL PAYMENTS AND RETENTION

The Contractor’s attention is directed to Section 9-1.06 “Partial Payments” of the Standard Specifications. Delete the third paragraph entirely and insert the following:

"The Department shall retain five (5) percent of such estimated value of the work done and 10 percent of the value of materials so estimated to have been furnished and delivered and unused or furnished and stored as aforesaid as part security for the fulfillment of the contract by the Contractor. The retained security shall be paid to the Contractor thirty-five (35) days after the work has been formally accepted by the Company."

The Contractor shall submit subcontractor and/or suppliers’ waiver of liens as required under Civil Code Sections 8122 and 8124. The waiver shall be "conditional" before payment and "unconditional" after payment on forms set forth in the statute.

10-1.11 CONSTRUCTION AREA SIGNS

Construction area signs shall be furnished, installed, maintained, and removed when no longer required in accordance with the provisions in Section 12, "Construction Area Traffic Control Devices" of the Standard Specifications and these Special Provisions.

Base material of construction area signs shall not be plywood and shall be in accordance with Section 12-3.06 of the Standard Specifications and these Special Provisions, with Type III illumination.

Payment shall be as included in the price paid for traffic control listed in the Proposal and no additional compensation will be made.

10-1.12 PROTECTION OF SITE

The Contractor shall be responsible for the protection of public and private property at and adjacent to the Work and shall exercise due caution to avoid damage to such property. This work shall conform to the requirements of Section 7-1.11, “Preservation of Property”, of the Standard Specifications, these specifications and as directed by the Engineer.

The Contractor shall repair or replace all existing improvements which are not designated for removal (e.g., curbs, sidewalks, survey points, fences, walls, signs, utilities, pavements, structures, etc.) and are damaged or removed as a result of its operations. Repairs and replacements shall be at least equal to existing improvements and shall match them in finish and dimension.

Trees, lawns, and shrubbery that are not to be removed shall be protected from damage or injury. If damaged or removed because of the Contractor's operations, they shall be restored or replaced in as nearly the original conditions and location as is reasonably possible. Lawns shall be re-seeded and covered with suitable mulch.

A Certified Arborist shall be used by the Contractor prior to starting any work adjacent to tree roots, as approved by the engineer.

The Contractor shall give reasonable notice to occupants or owners of adjacent property to permit them to salvage or relocate plants, trees, fences, sprinklers, and other improvements within the right-of-way which are designated for removal or would be destroyed because of the Work.

10-1.13 NOT USED
10-1.14 NOT USED

10-1.15 CHANGED CONDITIONS
Before submitting a bid, each bidder shall carefully examine the drawings and Specifications relating hereto. He/she shall also visit the site of the proposed work and shall fully inform himself/herself as to all the existing conditions relating to the construction and related labor so that he/she may fully understand the facilities, difficulties, restrictions attendant on the execution of the work, limitations applying to the work, and he/she shall estimate and include in his/her bid a sum sufficient to cover the cost of all items which are required to attain the completed conditions contemplated in the project.

Differing Site Conditions

1. During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before the site is disturbed and before the affected work is performed.
2. Upon written notification, the engineer will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding anticipated profits, will be made and the contract modified in writing accordingly. The engineer will notify the contractor of the determination whether or not an adjustment of the contract is warranted.
3. No contract adjustment which results in a benefit to the contractor will be allowed unless the contractor has provided the required written notice.

Suspension of Work Ordered by the Engineer

1. If the performance of all or any portion of the work is suspended or delayed by the engineer in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the contractor shall submit to the engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment.
2. Upon receipt, the engineer will evaluate the contractor's request. If the engineer agrees that the cost and/or time required for the performance of the contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the engineer will make an adjustment (excluding profit) and modify the contract in writing accordingly. The contractor will be notified of the engineer's determination whether or not an adjustment of the contract is warranted.
3. No contract adjustment will be allowed unless the contractor has submitted the request for adjustment within the time prescribed.
4. No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided or excluded under any other term or condition of this contract.

Significant Changes in the Character of Work

1. The engineer reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily complete the project. Such changes in quantities and alterations shall not invalidate the contract nor release the surety, and the
contractor agrees to perform the work as altered.

2. If the alterations or changes in quantities significantly change the character of the work under the contract, whether such alterations or changes are in themselves significant changes to the character of the work or by affecting other work cause such other work to become significantly different in character, an adjustment, excluding anticipated profit, will be made to the contract. The basis for the adjustment shall be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, then an adjustment will be made either for or against the contractor in such amount as the engineer may determine to be fair and equitable.

3. If the alterations or changes in quantities do not significantly change the character of the work to be performed under the contract, the altered work will be paid for as provided elsewhere in the contract.

4. The term “significant change” shall be construed to apply only to the following circumstances:
   - When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction; or
   - When a major item of work, as defined elsewhere in the contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity. Any allowance for an increase in quantity shall apply only to that portion in excess of 125 percent of original contract item quantity, or in case of a decrease below 75 percent, to the actual amount of work performed.

SECTION 10-2 ITEMS OF WORK

10-2.01 GENERAL

All materials, appliances, equipment, labor, tools, and incidentals necessary for the construction of the improvements shall be in accordance with the applicable provisions of the Standard Specifications, Plans and these Special Provisions.

All work and materials shall be subject to inspection at all times by representatives of the Company Engineer.

Work shall not be closed in or covered before inspection and approval by the Company Engineer or his/her representative. Cost of uncovering and making repairs where un-inspected work has been closed in shall be borne by the Contractor.

If Company Engineer's inspector finds that materials and/or equipment do not conform with these Specifications, the Contractor shall, within 3 days after being notified by the Company Engineer, remove said material from premises; if said material has been installed, entire expense of removing and replacing same, including any cutting and patching that may be necessary, shall be borne by the Contractor.

10-2.02 MOBILIZATION

Mobilization shall conform to the provisions in Section 11, “Mobilization,” of the Standard Specifications, and as provided herein. The Contractor will provide labor, materials and equipment to prepare the site for the timely start and efficient completion of all work.

Mobilization shall include preparatory work including but not limited to movement of personnel, equipment, supplies and incidentals to the project site. Payment for this item will be on a lump sum basis at 100 percent of the lump sum bid for this item contingent upon the Contractor furnishing and Company acceptance of:

1. All required bonds, insurance, and permits
2. The Contract has been signed by the Company and the Contractor.
3. Initial Construction Schedule
4. Schedule of Values
5. All submittals (reviewed and approved)
6. Obtain all necessary permits. Company permits will be at no cost.
This work includes mobilizing all labor, materials and equipment to do the work to the staging area.

10-2.03 CONSTRUCTION STAKING AND MARKING
The Contractor shall furnish and pay for all construction staking, surveying and markings. Construction staking must be done by a surveyor, licensed by the State of California and paid for by the Contractor. The name, license number and expiration date of the surveyor in charge of the survey work shall be submitted prior to construction. Provide the Engineer with a copy of cut sheets at least five (5) working days prior to excavation.

The Contractor shall be responsible for preserving all required benchmarks, reference points and construction stakes in the area and he will be responsible for any cost incurred in replacing any such benchmarks, reference points or construction stakes which are destroyed as a result of his activities. The Contractor will be responsible for maintaining the legibility and refreshing of paint marks as long as needed, including maintenance during idle time and/or inclement weather. The Contractor shall provide staking sufficient to perform the work.

The horizontal controls for this project are the control points and base lines as shown on the plan. The vertical controls for this project are the control points as shown on the plan or they will be provided to the Contractor. Where horizontal control points are not shown, construction staking for the proposed improvements can be laid out by distances given or by scaling to existing surface features shown on the plans.

The Contractor’s surveyor shall be responsible for establishing the horizontal location and elevation of utilities uncovered in potholing.

10-2.04 NOT USED

10-2.05 WATER POLLUTION CONTROL PLAN
All Contractors and Subcontractors working on Palo Alto Park Mutual Water Company projects are required to comply with the pollution control measures described in these Special Provisions. Additionally, the Contractors shall follow any local, State or Federal regulations and ordinances on construction pollution control.

Attention is directed to Section 7-1.01G, “Water Pollution”, of the State Standard Specifications, and these Special Provisions. A Water Pollution Control Plan must be submitted and approved by the Engineer prior to start of work. The plan shall contain measures necessary to keep all substances used in or resulting from the Contractor’s work out of the gutters, storm drains and creeks, including but not limited to: employee and subcontractor training and instruction, dry cleanup of spills, wet-vacuum of saw cutting slurry, proper disposal of cement and paint, proper handling of hazardous materials and hazardous waste, blocking of storm drains, shoveling dirt and debris from gutters, covering materials stored outside, sweeping pavements and approach streets, and erosion controls (straw bales, silt fences, detention basins, etc.) at grading sites. It shall be the Contractor’s responsibility to monitor and maintain all such measures on a daily or more frequent basis, including on non-work days and during storms. In addition, all catch basins at the project site, and which are determined by the Company Engineer to have been affected by the construction, shall be cleaned out by the Contractor at the end of the project.

10-2.06 REMOVAL AND DISPOSAL/SALVAGE OF EXISTING FACILITIES
The Contractor shall remove all appurtenances as shown on Plans. All removed material shall become the property of the Contractor and shall be disposed of as provided in Section 7-1.13, "Disposal of Materials Outside the Highway Right-of-Way”, of the Standard Specifications except for the materials the Company deems are acceptable for deposit at the a dump which will be deposited in a manner acceptable to the Company and at locations designated by the Company at the Contractor’s expense.

Removal and disposal/salvage of existing facilities shall be considered as merged into the unit prices paid for other items of work for which no separate payment shall be made and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing and disposal
of various items of materials.

All removals, installations, and relocations of underground and aboveground utilities in direct conflict, if any, with the proposed improvements under this Contract will be executed by the respective utility companies at their expense.

All accidental or convenience removals of existing facilities shall be at the expense of the Contractor, and no additional compensation will be made.

10-2.07 EXCAVATION
Excavation shall conform to the provisions of Section 19, "Earthwork" of the State Standard Specification and these Special Provisions. Earthwork shall be done to the lines and grades shown on the plans.

The excavation limits shall be as shown on the plans or as directed in these special provisions.

All excavations within 6 inches of existing utilities shall be done by hand equipment. The Contractor's attention is directed to Section entitled, "Protection of Site," elsewhere in these Special Provisions with special emphasis on locating all existing utility facilities before starting excavation.

Excavation shall commence after the site has been cleared of all vegetation, debris, and miscellaneous obstructions. The site shall be stripped of all organic material within cut, fill and pavement areas. Existing stockpiles shall be removed from the areas to be graded. All areas to receive engineered fill shall be stripped down to firm soil.

The road or existing concrete surface to remain in place shall not be damaged in any way. Care shall be exercised to avoid damage to manholes and other covers (whether shown or not shown on the plans) and adjacent gutters.

Utilities and underground pipelines, which are to remain in place shall be worked around and protected from damage or interruption of service. All improvements damaged by construction shall be replaced at the Contractor’s expense. It shall be the contractor’s responsibility to ascertain the location of all utilities, including manholes and monuments.

Footings which may be affected by any excavation shall be underpinned or otherwise protected against settlement and shall be protected against lateral movement. Fills or other surcharge loads shall not be placed adjacent to any building or structure unless such building or structure is capable of withstanding the additional loads caused by such fill or surcharge.

The Contractor shall provide no less than 48 hours’ notice to the Engineer, in writing of the need for compaction testing of the subgrade.

Surplus excavated material not used in embankments shall become the property of the Contractor and shall be disposed of outside the project site in accordance with Section 7-1.23 of the standard specifications and these special provisions.

Where a portion of existing surfacing is to be removed, the outline of the area to be removed shall be sawcut on a neat line with a power-driven saw to a minimum depth of 0.17 feet before removing the surfacing.

10-2.08 SUBGRADE PREPARATION
This work shall consist of the scarification and re-compaction of native soil underneath the asphalt paving or concrete sidewalks and ramps where shown on the Plans.

If excavation reaches to subgrade depth in locations to receive hot mix asphalt or concrete, the soil shall be scarified to a minimum depth of 6 inches, moisture conditioned to within 2 to 5 percentage points above optimum moisture content, and compacted to a minimum relative compaction of 90 percent relative compaction to the maximum dry
density as determined in the laboratory according to ASTM D1557.

The Contractor shall protect from damage all existing improvements, drainage facilities, sanitary sewage facilities, water facilities, traffic signal facilities, landscaped areas, trees and shrubbery that are not required to be removed during construction. Any existing improvements, drainage facilities, sanitary sewage facilities, water facilities, traffic signal facilities, landscaped areas, etc., damaged as a result of the Contractor’s construction activities shall be replaced by the Contractor at no cost to the Company.

Shallow utilities may be located within the scarification area. The Contractor shall identify these utilities and protect during scarification.

It is the Contractor’s responsibility to plan the preparation of the subgrade with respect to weather conditions. If poor weather creates excessive moisture in the subgrade or the inability to meet minimum compaction standards, the Contractor shall implement alternative methods as approved by the Engineer to continue subgrade preparation in accordance with these Special Provisions.

SECTION 10-3 MEASUREMENT AND PAYMENT
Payment for all labor, materials, tools, equipment and other appurtenances required for the proper, substantial and complete-in-place performance of the work as shown on the Plan and/or outlined in these Special Provisions shall be considered as included in the unit prices bid for each item of work.

Except for authorized changes in the work, payment for said complete-in-place finished work or improvement will be made only on the basis of the Contract item of work listed in the Proposal. The Contract unit prices paid for the work required, complete-in-place for the Project shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, for doing all the work involved in removing and disposal of various items of materials, provided for in these Specifications and Contract, or required for the proper completion of the work as a whole, for which no separate payment has been provided shall be a supplementary obligation for the Contractor and payment therefore shall be considered included in the price paid for the Contract item of work listed in the Proposal.

SECTION 11. INTERIM CLEAN-UP & FINISHING PROJECT

11-1.01 GENERAL Clean-up and finishing project shall conform to Section 22 “Finishing Roadway” of the State Standard Specifications, the plans, and as provided herein. This section is a supplement to the above mentioned Standard Specifications and in case of conflict, this provision shall govern insofar as it is applicable.

11-1.02 INTERIM CLEAN-UP
See Section 3.10E Cleanup of Technical Specifications for further details.

This work shall consist of clean-up at end of daily operations and whenever directed by the Engineer. Traveled lanes opened for public traffic shall be swept clean of all dirt and foreign material at all times. If ordered by the Engineer, the Contractor shall provide a street sweeper on stand-by basis at his own expense. The procedures for interim clean-up on various streets shall adhere to the following requirements:

The existing pavement shall be swept clean of all dirt and foreign material at the end of daily construction activities. The entire working area shall be left in a neat and presentable condition. All equipment shall be removed from the roadway shoulder.

Should the Contractor appear to be neglectful or negligent in furnishing clean-up as provided herein, the Company may call upon others to provide clean-up and charge the Contractor by deducting the cost thereof from the progress payments due to Contractor as such costs are incurred by the Company.
Attention is directed to maintaining traffic and public safety as provided in Section 5-1.17 of these special provisions.

11-1.03 FINISHING PROJECT
The finished surfaces in all cases shall conform to the lines, grades, and dimensions as shown on the plans. Upon completion and before making application for acceptance of the work, the Contractor shall clean all areas occupied by him in connection with the work and remove all debris, excess materials, waste materials, Contractor’s temporary structures and equipment, and the entire project shall be left in a neat, clean, and presentable condition.

11-1.04 SCHEDULE OF VALUES
The contractor shall submit to the Company a Schedule of Values for each contract lump sum item of work. Quantities and values shall be included in the Schedule of Values for Company approval.
PART D – SPECIAL PROVISIONS

SECTION 12  SPECIAL PROVISIONS

SECTION 12.01  PROJECT DESCRIPTION
The work to be performed under this contract consists of furnishing of all labor, materials, transportation, tools, supplies, plant equipment, and appurtenances necessary for the complete and satisfactory construction of a new 300 foot deep domestic water well including drilling, conductor casing, blank casing, screened casing, gravel pack, concrete seal, gravel fill pipe, test pumping, e-log, well pump with column pipe, discharge head, motor, underground piping, demolition of existing well and building, new wood frame building, electrical system and appurtenances; all work to the satisfaction of the Company as shown on the drawings in complete working condition.

SECTION 12.02  REQUIRED PERMITS
The Contractor shall obtain and pay for all required permits.

SECTION 12.03  SURVEYING
The Palo Alto Park Mutual Water Company will furnish one set of stakes for all facilities in accordance with the General Conditions. All subsequent construction surveying shall be paid for by the Contractor.

SECTION 12.04  PERSONNEL AND EQUIPMENT
The Contractor shall have a valid Contractor's license from the State of California. The Contractor shall perform this work in a safe manner and shall comply with Health Department regulations and the requirements of the Industrial Safety Orders of the State of California.

The Contractor shall furnish all labor, material, tools, supplies, power, equipment, permits, licenses, and services required.

SECTION 12.05  CONTRACTOR'S UTILITIES
Electrical Power: The Company will provide electrical power from its existing system. The Contractor shall make all arrangements for power takeoff points, voltage and phasing requirements, transformers, and metering from the existing system. It shall be the Contractor's responsibility to provide all special connections required for this work.

Water: The Company will provide the potable and construction water needed for the work. The Company will provide water for testing. Testing water not incorporated into the final work shall be disposed of by the Contractor.

Sanitary Facilities: The Contractor shall make arrangements for use of adequate toilet facilities at or near the work site. The Contractor shall maintain the sanitary facilities in acceptable condition from the beginning of the work until completion. At completion, the Contractor shall remove the facilities and disinfect the premises. All portions of the work area shall be left in a clean and sanitary condition.

SECTION 12.06  REQUIRED SHOP DRAWINGS AND SUBMITTALS
For all equipment items, the Contractor shall submit for written approval to the Company one pdf file of manufacturers scaled, dimensioned shop drawings complete with all information required to describe the item and demonstrate compliance with the contract drawings and these specifications. Neither fabrication nor on site preparation shall be started before receipt of written review of the Company.

Each shop drawing submitted shall be sequentially numbered and labeled with the following required information:
SECTION 12.07 LIST OF DRAWINGS
The following Drawings are included as part of the Specifications:

Sheet 1 – Cover Sheet
Sheet 2 – Site Plan and Details

SECTION 12.08 EXISTING UTILITIES
The locations of existing major utilities as provided by the serving agencies are shown on the drawings. Minor lines, such as water, gas, and sewer services, may not be shown. It shall be the sole responsibility of the Contractor to determine the exact location and depth of all major utilities shown on the drawings, and all minor lines, whether shown or not.

If necessary the Contractor shall call Underground Service Alert (USA), Phone number 1-800-642-2444 at least 2 full working days prior to construction to mark underground utilities in the work areas.

If existing major utilities are not shown on the drawings or not found to be within reasonable proximity as shown on the drawings, the Contractor shall take all precautionary measures to protect existing facilities and notify the Company of these findings.

The Contractor shall bear full responsibility for all damages and costs of repairs to existing utilities. Should any such utility be damaged during construction, all expenses of whatever nature arising from the restoration of the utility to its original service shall be born by the Contractor, and no additional compensation will be allowed.

Unless otherwise shown on the drawings or specified herein, the Contractor shall maintain all water, gas, and sewer lines; lighting, power, and telephone conduits; structures; house connection lines and other surface or subsurface structures of any nature that may be affected by the work. If the Contractor fails to maintain and protect such facilities, the Company reserves the right, if requested by the Company, to permit the Company to move or maintain the utility at the Contractor's expense.

Should it become necessary in the performance of the work to disconnect or reroute any underground utility due to a direct conflict with the new work, disconnection or rerouting will be paid for as extra work unless otherwise specified on the drawings or specifications.
SECTION 12.09 ‘ DUST CONTROL AND FENCING
Whenever there is the presence of dust, the Contractor shall supply dust control materials as necessary to alleviate the problem. If, in the opinion of the Engineer, the presence of dust becomes excessive, the Engineer will specify a dust palliative according to these specifications, which the Contractor shall apply as necessary to alleviate the problem. No separate payment shall be made for the application of materials for dust control and full compensation for furnishing all labor, materials, tools, equipment, and incidentals.

SECTION 12.10 ‘ TRAFFIC CONTROL
All traffic control by Contractor shall conform to Section 12 of the State of California Standard Specifications, and all costs of traffic control and posting of No Parking signs shall be considered included in the various items of work, and no additional compensation will be allowed. At no time shall signs be nailed or stapled to trees.

Contractor shall post temporary “No Parking” signs 48 hours in advance of the start of construction. The Company will provide the contractor with “No Parking” signs. Contractor shall provide barricades and/or other means, approved by the Engineer, to post the signs. These signs shall be removed when the street is reopened for traffic.

The Contractor shall refer to Caltrans Standard Plans and the “Uniform Sign Chart,” for all signing and traffic control requirements.

Unless otherwise approved by the Engineer, one lane of traffic shall be maintained at all times when work is being performed on the project. Emergency vehicles shall be permitted to pass through the work area without delay at all times.

At the end of the day’s work and when construction operations are suspended, all equipment and other obstructions shall be removed from the roadway and opened for two-way traffic.

The contractor may, upon advance approval of the Engineer, close streets to through traffic upon which contract work is being performed if the following conditions are met, all conditions subject to the approval of the Engineer:

- An adequate alternative route is available.
- Adequate detour route signing is provided by the contractor.
- Traffic control and detour plan is submitted and is subject to approval of Company Engineer, Police Department, and Fire Department.
- Local access is provided to residents on the affected blocks. Delays shall not exceed 10 minutes.
- Driveways shall be kept open, non-access to any driveway as a result of construction shall not exceed one hour.

SECTION 12.11 PROJECT RECORD DOCUMENTS
Project record documents are the Engineer’s construction documents for the Project, which have been modified by the Engineer, from input received from the Contractor to show the actual conditions of in-place construction installed by the Contractor as accurately as possible. They include:

A. Drawings marked where required to show changes in dimensions or configuration between the original design and final construction
B. Specifications, marked to indicate changes of materials, products or methods of installation
C. Modifications to Drawings or Specifications issued during the course of construction (including addenda, change orders, or clarifications issued by the Engineer or his Engineers)
D. Approved shop drawings and product data
E. Field test records and reports

The Contractor shall maintain a set of project specifications and a full-size set of plans marked “Record Documents” upon which shall be legibly marked information detailing the actual materials used, location of
newly constructed facilities, and the location and arrangement of existing facilities as actually encountered in the field. Prepare record documents as the Work progresses. Do not conceal in-place construction until field verifications are made for record purposes.

Locate internal utilities and items concealed in the construction, referenced to visible and accessible surface features. Note field changes of dimension and detail; and changes made by change order. Sketch details not on the original Drawings. For Specifications and Addenda, legibly mark each Section to record the manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed. Note changes made by Change Order.

Submit one set of reproducible project record documents to the Company at the end of the Work, before final payment is made.

SECTION 12.12 SITE SAFETY AND REGULATORY REQUIREMENTS

A. DESCRIPTION

1. Contractor shall provide plans, procedures, and controls to be used when encountering hazardous conditions and hazardous substances during performance of the work.

2. Engineer will review submittals under this Section for general conformance to the requirements of the Contract Documents and to the specified laws and regulations. The Engineer's acceptance of such plans, procedures, and controls will not relieve Contractor of responsibility for complying with all applicable laws and regulations, and will not relieve Contractor of responsibility for the safety of all persons and property on the jobsite or that may be affected by work under this contract.

B. DEFINITIONS

1. Hazardous substance: Defined as any substance included in the list (Director's List) of hazardous substances prepared by the Director, California Department of Industrial Relations, pursuant to Labor Code Section 6382. Includes hazardous waste as defined herein.

2. Hazardous waste: A waste or combination of wastes as defined in 40 CFR 261.3, or regulated as hazardous waste in California pursuant to Chapter 11, Division 4.5, Title 22, California Code of Regulations, and Chapter 6.5, Division 20, California Health and Safety Code, or those substances defined as hazardous wastes in 49 CFR 171.8.

3. Confined spaces: Shall mean the interior of storm drains, sewers, vaults, utility pipelines, manholes, reservoirs, and any other such structure which is similarly surrounded by confining surfaces so as to permit an oxygen deficient atmosphere or the accumulation of dangerous gases or vapors. For permit required confined spaces, see Section 5157, General Industry Safety Orders, Title 8, California Code of Regulations. For other confined space operations see Section 5158, General Industry Safety Orders, Title 8, California Code of Regulations.

4. Competent Person: As defined in Section 1504 of the Construction Safety Orders, Title 8, California Code of Regulations, one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them. As defined in 29 CFR 1926.62, one who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them.

C. SUBMITTALS

A. Allow 10 working days minimum for the Engineer's review plus transit time to and from the Engineer's offices.
B. Contractor shall make available to the Engineer upon request the Site Safety and Health Plan, the Materials Disposal Plan, and the Spill Prevention and Response Plan separately.

C. Work under plans requiring the Engineer's acceptance shall not begin until the submitted plan has been returned as "Accepted" or "Accepted as Noted".

D. Site Safety and Health Plan:
   1. Plan shall comply with all applicable requirements of: the Federal Resource Conservation and Recovery Act; Title 8, Title 22, and Title 26 of the California Code of Regulations; and all applicable regulations of all local, state, and federal agencies having jurisdiction over the safety and health hazards of all phases of the work to be performed.
   2. Contractor shall designate a Competent Person for the lead remediation portion of the work.
   3. Plan shall include a description of the jobsite security, including name, license number, and phone number of the agency providing the security service, if any.

E. Materials Disposal Plan:
   1. Prepare a materials disposal plan and submit a copy of the plan for the Engineer's acceptance prior to disposing of any material (except for water wastes which shall be addressed in the Water Control and Disposal Plan). The plan shall identify how the Contractor will remove, handle, temporarily store on-site, transport, and dispose of all material required to be removed under this contract in a safe, appropriate, and lawful manner in compliance with all applicable regulations of local, state, and federal agencies having jurisdiction over the disposal of removed materials.
   2. In the event that any hazardous wastes are generated:
      (a) Contractor shall prepare and submit to the Engineer for review all hazardous waste manifests for acceptability prior to use.
      (b) Submit the yellow “Generator” and blue "Department of Toxic Substances Control" (DTSC) copies of hazardous waste manifests, land disposal restriction forms, or other documentation required by applicable regulations governing transport and disposal of hazardous wastes for disposal of hazardous substances within 5 days of offhaul. Submit the name, address, EPA Identification Number and Hauler License Number of the transport company and the EPA Identification Number of the disposal site.
      (c) Submit proof that the transporter and disposal site are regulated by the State to handle and dispose of hazardous wastes.
   3. Submit name of disposal site where hazardous waste will be disposed of for Engineer's approval. The Engineer reserves the right to approve the disposal of hazardous waste only at facilities approved of by the Company.

F. Material Safety Data Sheet (MSDS):
   1. Submit an MSDS for each hazardous material proposed to be used prior to delivery of the material to the jobsite.

G. Sampling and Analysis, Laboratory Designation, and Test Results:
   1. Contractor shall submit laboratory analysis results of samples taken per sampling plan. Specify any deviations from original sampling plan. Submittal shall include the Environmental Laboratory Accreditation Program Certificate. Sampling and analysis of solid wastes shall be conducted according to methods listed in Environmental Protection Agency Document SW 846.

H. Water Control and Disposal Plan:
   1. Contractor shall make available to the Engineer upon request a detailed discharged water control and disposal.
   2. Contractor shall comply with the National Pollution Discharge Elimination System (NPDES) for discharges of toxic substances to public waterways.

I. Competent Person Designation:
1. Designate one or more individuals as Competent Persons. Written designation shall certify that each designated Competent Person has the training and knowledge required of a competent person under Article 6 of the Construction Safety Orders, Title 8, California Code of Regulations.

2. Submit written designation of principal and alternate Competent Persons to the Engineer for information prior to start of the work.

J. Dust Control and Monitoring Plan:
1. Contractor shall make available to the Engineer upon request a plan detailing the means and methods for controlling dust generated by work on the site at or below ambient dust levels for the Engineer’s acceptance. The plan shall also make provision for the control of paint overspray generated during the painting of the tanks and support structures. The plan shall detail the equipment and methods used to monitor compliance with the plan.

2. Full site containment of tank coating overspray and abrasive blasting media shall be utilized. The intent of full containment is to eliminate all escape of fugitive dust emissions into the environment and neighboring properties.

3. Submit copy of lead work pre-job notification provided to the California Division of Occupational Safety and Health.

D. QUALITY ASSURANCE

A. Spill Prevention and Response Plan
1. Contractor shall have a spill response plan. Plan shall describe proposed approach to prevent, contain, and remediate any potential release of abrasive blast media, paint dust, fuel, oils or coatings. At a minimum, Plan shall describe:
   a. Immediate steps to prevent the spread of any abrasive blast media or paint dust that is released due to a spill or a failure of the containment system.
   b. Sampling methodology to determine extent of spill, and to determine background lead levels in the vicinity of the spill.
   c. Method of cleanup.
   d. Sampling methodology to verify that all soil with lead levels above background has been removed from the site.

B. Fire Prevention Program
1. The Contractor shall have a fire prevention program prior to beginning work on the jobsite.
2. Contractor shall comply with the applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241).
3. No burning is allowed.

C. Confined Space Operating Procedures:
Contractor shall submit to the Engineer upon request confined space operating and rescue procedures. Procedures shall conform to the applicable provisions of Section 5158, Title 8, California Code of Regulations.

   Fall Protection
   a. Contractor shall have fall protection procedures for any work at heights at the jobsite.
   b. The fall protection plan shall address control of fall hazards for any work occurring at heights greater than 7½ feet.
   c. Procedures shall conform to applicable provisions of Sections 1669 through 1671.2, Title 8, California Code of Regulations.

D. Contractor shall provide the Engineer upon request copies of personnel air monitoring results taken of representative tasks for exposure to lead, zinc, and/or other hazardous substances during the course
of onsite work. Tasks may include: sandblasting, inspection, clean-up, disposal, etc. Results should identity the task, duration of sample, amount of exposure, and time weighted averages (TWA).

E. NOT USED

F. TRAINING REQUIREMENTS

All personnel who, as the result of work on this contract, will likely be exposed to hazardous conditions or hazardous substances, shall have received the appropriate training for the hazards they may encounter.

G. INJURY NOTIFICATION

A. Contractor shall report any serious injury to the Engineer, and furnish further information to the Company if requested. Examples of reportable injuries: broken limbs, amputation, chemical asphyxia, etc.

B. The Contractor shall notify the Engineer if representatives for Cal/OSHA or any other regulatory agency arrives on site for any purpose, including inspections, consultations, or investigations.

H. SITE SAFETY AND HEALTH PLAN

General:

1. A copy of the Contractor's Site Safety and Health Plan shall be made available at each construction site requiring such a plan while work is being performed.

2. Contractor's Site Safety and Health Plan shall apply to all personnel working at, or visiting the site including, but not limited to, Contractor's employees, suppliers, truckers, and Company personnel. The Contractor's site safety and health supervisor, having the responsibility for site control, shall have authority to verify that all persons within a controlled access area are in compliance with applicable safety and health requirements.

3. Provide the Engineer a minimum of 48 hours advance notice of time and location of any pre-entry briefings so that Company personnel, who are required to enter the site, may attend. A record of attendance shall be provided to the Engineer within 24 hours after the briefing.

I. DISCHARGE OF WATER

A. Discharged water includes but is not limited to rainwater, groundwater, water pumped or otherwise removed from excavations, whether introduced to the excavation or naturally occurring groundwater, wash water, and water used by the Contractor for any purpose. Contractor shall comply with the Water Control and Disposal Plan.

B. All water discharged from or flowing from the jobsite shall be of such purity and cleanliness as not to introduce any contaminants into any watercourse, stream, lake, reservoir, or storm drain system.

C. Wash water, construction water, or other liquid that has been in contact with the exterior of the aqueducts, support structures, or abrasive blast media, will not be discharged into any storm drain system or water course.

D. The Contractor shall be responsible for caring for the drainage on the entire work area and the disposal of such drainage from commencement of work until contract completion. Silt, eroded materials, construction debris, concrete or washings thereof, petroleum or paint products or other hazardous substances, shall not be introduced, or placed where they may be washed by rainfall or runoff, into any water course, stream, lake, reservoir, or storm drain system.
E. Water shall cause no erosion of earth, whether disturbed or not disturbed, or of excavated or dredged earth stored on site, or of material imported for fill or other purposes.

F. No soil or other material shall be discharged in a quantity that will have an adverse effect on the receiving waters. Discharge shall not cause or contribute to a violation of any water quality standard.

G. In addition to other requirements, Contractor is responsible for verifying that discharged water has a:
   1. Non-detectable total chloramine residual.
   2. pH greater than 6.5 and less than 8.5.

H. In addition to conforming to all other requirements for water discharged from the site, wash water, construction water, or other liquid shall not be discharged onto the ground or permitted to enter any sanitary sewer system, or removed for disposal until approved by the Company.

I. Contractor shall be responsible for all costs of sampling, testing, and disposal of liquids discharged from the jobsite.

J. **HAZARDOUS CONDITIONS**

   **Confined Spaces:**

   1. Attention is directed to the provisions of Article 108 of the General Industry Safety Orders, Title 8, California Code of Regulations, and Article 4 on Dusts, Fumes, Mists, Vapors, and Gases of Subchapter 4, the Construction Safety Orders, Title 8, California Code of Regulations.

   2. Tests for the presence of combustible or dangerous gases and/or oxygen deficiency in confined spaces shall be made with an approved device immediately prior to a worker entering the confined space and at intervals frequent enough to ensure a safe atmosphere during the time a worker is in such a structure. A record of such tests shall be kept at the jobsite.

   3. No employee shall be permitted to enter a confined space, where tests indicate the presence of a hazardous atmosphere, unless the employee is wearing suitable and approved respiratory equipment, or until such time that continuous forced air ventilation has removed the hazardous atmosphere from the confined space.

   4. Confined spaces that contain or that have last been used as containers of toxic gases, light oils, hydrogen sulfide, corrosives, or poisonous substances, shall, in every case, be tested by means of approved devices or chemical analysis before being entered without wearing approved respiratory equipment.

   5. Sources of ignition shall be prohibited in any confined space until after the atmosphere within the confined space has been tested and found safe.

   6. Reservoirs, vessels, or other confined spaces having openings or manholes in the side as well as in the top shall be entered from the side openings or manholes when practicable.

   **Fall Protection:**

   1. Section 1670 of the Construction Safety Orders, Title 8, California Code of Regulations, requires protective measures to be implemented whenever a worker is exposed to falls greater than 7½ feet.

   2. On site activities shall conform to the requirements set forth in Sections 1669 through 1671.2, Title 8, California Code of Regulations.

   3. A walkway or bridge, with standard guardrails, shall be provided where employees are required to cross excavations and trenches 6 feet or greater in depth per Section 1541 of the Construction Safety Orders, Title 8, California Code of Regulations.
SECTION 12.13 - STANDARD DRAWINGS

The Standard Details of the Palo Alto Park Mutual Water Company are included with these specifications. The Drawings show the water main installation details, roadway details, storm drainage details and other items. The details are shown in the three ring binder available from the Company.

Section 12.14 All Materials

All new materials incorporated into the project that are in contact with drinking water shall be NSF 61 approved.

SECTION 12.15 - BID ITEMS

The Contractor shall furnish bids for the following items:

The various items to be included in each bid item shall be as set forth in these Specifications.

Irrespective of whether a specific item of work shown on the drawings or specified or is mentioned in the bid items, all work required shall be included in the Total Bid Price of the Contract.

Bid Item No. 1 – Mobilization, Site Preparation and Traffic Control

Mobilization, Site Preparation and Traffic Control shall include all work for mobilization as defined in Section 2, "Proposal Requirements and Conditions" of the Caltrans State Standard Specification. Payment shall be lump sum complete.

Bid Item No. 2 – Water and Waste Management Plan

Water and Waste Management Plan shall include all work to provide the water and waste management plan during construction as required. Payment shall be lump sum complete.

Bid Item No. 3 – Drill Pilot Hole

Drill Pilot Hole shall include all work for drilling the well pilot hole. Payment shall be per lineal foot complete in place.

Bid Item No. 4 – Conduct Geophysical Logging

Conduct Geophysical Logging shall consist of conducting the pilot hole geophysical logging as stated in the contract documents. Payment shall be lump sum complete in place.

Bid Item No. 5 – Abandon Pilot Hole if required

Abandon pilot hole shall include abandonment of the pilot hole as stated in these documents, complete in place as shown on the drawings. Payment shall be per lineal foot complete in place.

Bid Item No. 6 – Bucket Auger Or Direct/Reverse Mud-Rotary Drilling Of A 24" Diameter Conductor Bore Hole

Bucket auger or direct/reverse mud-rotary drilling of a 24" diameter conductor bore hole shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lineal foot complete in place.

Bid Item No. 7 – Furnish And Install 24" Conductor Casing, Complete

Furnish And Install 24" Conductor Casing be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lineal foot complete in place.

Bid Item No. 8 – Grout Conductor Casing Seal

Grout Conductor Casing Seal shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

Bid Item No. 9 – Drill 24” Diameter Production Bore Hole

Drill 24” Diameter Production Bore Hole Drill 24” Diameter shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lineal foot complete in place.
Bid Item No. 10 – Furnish and Install 12” Blank Steel Casing
Furnish and Install 12” Blank Steel Casing shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lineal foot complete in place.

Bid Item No. 11 – Furnish And Install 12” Stainless Steel Wire Wrap Well Screen.
Furnish And Install 12” Stainless Steel Wire Wrap Well Screen shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lineal foot complete in place.

Bid Item No. 12 – Furnish and Install Filter Pack/Gravel Envelope
Furnish and Install Filter Pack/Gravel Envelope shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lineal foot complete in place.

Bid Item No. 13 – Furnish and Install Cement Seal
Furnish and Install Cement Seal shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lineal foot complete in place.

Bid Item No. 14 – Well Development By Airlifting, Jetting, Water Handling and Disposal.
Well Development By Airlifting, jetting, water handling and disposal shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per hour complete in place.

Bid Item No. 15 – Furnish, Install and Remove Well Test Pump
Furnish, Install and Remove Well Test Pump shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

Bid Item No. 16 – Well Development/Sampling by Test Pumping
Well Development/Sampling by Test Pumping be as stated in these documents, complete in place as shown on the drawings. Payment shall be per hour complete in place.

Bid Item No. 17 – Conduct Three 2 hour Step Drawdown with ½ hour recovery between.
Conduct three 2 hour step Drawdown with ½ hour recovery between shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per hour complete in place.

Bid Item No. 18 – Conduct 72 hour Constant Rate Pumping Test
Conduct 72 hour Constant Rate Pumping Test shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per hour complete in place.

Bid Item No. 19 – Furnish and Treat with Chlorine for Well Disinfection
Furnish and Treat with Chlorine for Well Disinfection shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

Bid Item No. 20 – Conduct Plumbness and Alignment Test
Conduct Plumbness and Alignment Test shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

Bid Item No. 21 – Conduct Video Survey and Cement Bond Log
Conduct Video Survey and Cement Bond Log shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

Bid Item No. 22 – Furnish and Install casing Cap on Above Ground Casing and Secure in Place.
Furnish and Install casing Cap on Above Ground Casing and Secure in Place Conduct shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

Bid Item No. 23 – Site Clean Up
Site Clean up shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.
Bid Item No. 24 – San Mateo County Health Department Permit Fee  San Mateo County Health Department Permit Fee shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

Bid Item No. 25 – Construct New Well Building  Construct New Well Building shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

Bid Item No. 26 – Install New Well Pump, Discharge Head, Pump to Waste System and Column Pipe and Connect to Existing Pipeline  Install New Well Pump, Discharge Head, Pump to Waste System and Column Pipe and connect to existing pipeline shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

Bid Item No. 27 – Extend Electrical System and Install Electrical Equipment.  Extend Electrical System and Install Electrical Equipment shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

Bid Item No. 28 – Destroy Existing Well 3 and Well Building in Accordance with California Division of Drinking Water Standards  Destroy Existing Well 3 in Accordance with California Division of Drinking Water Standards shall be as stated in these documents, complete in place as shown on the drawings. Payment shall be per lump sum complete in place.

SECTION 12.15  COST BREAKDOWN
Within thirty (30) days after signing the Contract, but in any event prior to the first Application For Payment, Contractor shall submit a Cost Breakdown for all Contract Lump Sum items.

The Cost Breakdown shall itemize as separate line items the cost of each work activity and all other costs, including warranties, record documents, insurance, bonds, overhead expenses and the total allowance for profit, the total of which shall equal the Contract Sum. The Cost Breakdown, when approved by the Company, shall become the basis for determining the cost of Work performed for Contractor's Applications For Payment.
Palo Alto Park Mutual Water Company
Replacement Well 3

Part E - TECHNICAL SPECIFICATIONS
FOR REPLACEMENT WELL 3 CONTRACT
PALO ALTO PARK MUTUAL WATER COMPANY

SECTION 13 - GENERAL CONDITIONS

13.01 SCOPE
This document specifies construction of a 12-inch diameter gravel-envelope production well at Palo Alto Park Mutual Water Company’s site located at 2160 Addison Street in East Palo Alto California in accordance with these Specifications. The location of the well is shown on the enclosed drawing. Work shall conform to the applicable requirements outlined in the State Department of Water Resources Bulletin No. 74-90,.Water Well Standards, State of California...

The work to be performed under this contract includes the furnishing of all labor, material, transportation, tools, supplies, plant equipment, and appurtenances necessary for the complete and satisfactory construction of a pilot hole, followed by a filter-pack/gravel-envelope water production well, as herein specified.

Through the completion of well construction and development work will be restricted to 12- hours per day due to the proximity of nearby residences, unless longer hours are absolutely necessary to the successful construction of the well, noise attenuation shall be required due the proximity of nearby residences. During test pumping, work will be allowed on a 24-hour per day basis, but efforts will be required to minimize noise and disturbance to nearby residences. Test pumping of the well shall be on a continuous basis unless directed otherwise by the Company.

The Company's authorized technical representative shall observe the work. The Engineer shall confirm final depth, screen location, slot size, and filter pack gradation to be used in the well based upon interpretation of the conditions encountered in the pilot hole and the results of geophysical logging.

13.02 PERSONNEL AND EQUIPMENT
The production well shall be drilled to an approximate anticipated depth of 300 feet below the ground surface using either direct mud-rotary or reverse circulation drilling methods, as further defined in these technical specifications. Drilling equipment shall be of good condition and be of sufficient equipment capacity to perform the work required by these Specifications. All drilling equipment, including mast and draw works, air compressors, drilling fluid pumps, drill pipe, etc. must be of the size, capacity, and condition to drill and set casing to required depths. Contractor shall furnish documentation regarding capacity of various components of the drilling equipment. Rigs shall be equipped with a weight indicator. Drill rigs shall have the ability to lift and land anticipated casing and screen loads without the use of float plugs or similar devices. Delays during the drilling operation caused by the inadequacy of the drilling equipment shall be the responsibility of the Contractor and replacement of such inadequate equipment will be required by the Company.

Equipment to be used for developing and testing the completed well shall be capable of uninterrupted service for a period of at least 48 hours. All equipment to be used for the performance of this Contract shall comply with all State and local safety, noise and environmental regulations and shall be subject to the inspection and approval of the Company or its representative.

The Contractor shall employ only competent workers for the execution of this work. The Contractor shall designate one person, who shall have full decision-making authority, to be its representative on the jobsite on a daily basis. This person shall serve as Drilling Superintendent and his phone number shall be given to Company Staff for emergency notification, and all such work shall be performed under the direct supervision of an experienced well driller satisfactory to the Company.

13.03 PERMITS, CERTIFICATES, LAWS, AND ORDINANCES
The Contractor shall procure, at his own expense, San Mateo County Environmental Health Bureau certificates, and licenses required of him by law for the execution of this work. The Contractor shall comply with all Federal, State, and local laws and ordinances or rules and regulations relating to the performance of the work, and shall...
file all reports as required by the State and local agencies in connection with the well drilling. Copies of all reports shall be sent to the Company. The Company has applied to the County Environmental Health Bureau for the Permit for Well 3. The Contractor will be required to comply with all the conditions of the permit, including the notification and reporting requirements.

13.04 SUBMITTALS
The Contractor shall submit information to substantiate compliance with this specification. The following specific information shall be required.

- Conductor casing, well casing and well screen: materials, dimensions, details, appurtenances and mill certificates
- Filter pack (Supply descriptive literature, source, 3-pound sample, and sieve analysis of sample)
- Sealing material
- Drilling fluid additives
- Geophysical logging results
- Test results for plumbness and alignment, and video survey
- Procedures and equipment for well development
- Water, cuttings, and drilling fluid handling and disposal plan, including development water and pumping test water
- Water pumping test information
- Complete drillers log report, DWR Form 188, which is to include Depth to "first" water below surface (feet below ground surface), and "Static" water level depth after well has been developed/test pumping is completed (feet below ground surface)

13.05 MISCELLANEOUS DEFINITIONS AND ITEMS OF CONSIDERATION
13.05A Standard Specifications
Wherever standard specifications are referred to, they shall be the latest revised edition of the Standard Specifications insofar as they apply. Standard Specifications from the following sources are referred to herein:

- American Society for Testing Materials (ASTM)
- American Water Works Association (AWWA)
- California Groundwater Association- Standard Practice Series

13.05B Construction Water
The Company will cooperate with the Contractor in furnishing water from it’s system.

13.05C Disposal of Waste Water
The Contractor will work with the Company in providing a means to dispose of wastewater, including development and test pumping water. The Contractor must provide a written Water and Waste Handling Plan, describing the handling and proper disposal of all cutting, drilling fluids, development water, pumping test water, and sanitizing solution/water, prior to mobilizing to the site.

13.05D Adjustment of Quantities
One filter-packed/gravel-envelope well herein specified shall be drilled to an anticipated depth of approximately 300 feet. The Company reserves the right to terminate the well at lesser or greater depths than those estimated. The Company also reserves the right to make changes to the design and construction of the well, and in materials utilized. Compensation will be based upon unit prices and lump sum prices provided by the Contractor. There shall be no allowance of any claim for loss of anticipated profit due to change in specified depth.

SECTION 14 - MATERIALS
14.01 GENERAL
Materials shall be furnished by an established, experienced manufacturer or supplier. Materials shall be new, of first-class ingredients, and guaranteed to perform required service. Use of rejected, substandard, or previously used materials will not be permitted.
14.02 SOLIDS CONTROL SYSTEM
Excavated mud pits will not be allowed. Portable mud tanks, with a minimum capacity of 4,000 gallons, are required which allow the drill cuttings to settle. The solids control system shall also be equipped with a shaker and desilter system. Desilters must clean down to 15 microns. The sand content of return fluids shall contain less than 1% sand at the mud pump suction.

100% of all drilling fluids re-entering the mud pump suction must have passed through the solids control equipment. The desilter cones and pump must be capable of cleaning 1.5 times the capacity of the mud pump. The mud pump must have a minimum capacity of 525 gallons per minute.

Only Baroid drilling fluids and products, or approved equals, shall be used in the make-up of drilling fluid. If unapproved products are used during construction of the well, the Contractor may be required to drill a new well at his expense at a site approved by the Company.

Drilling fluid characteristics, including viscosity, weight, sand content, water loss, and wall thickness, shall be determined not less than every four hours. A record shall be maintained and submitted to the Engineer showing any variation in the addition and amount of approved chemical products or water require during drilling. The depths at which such changes were required shall be shown in the daily reports. Organic drilling additives will not be allowed.

14.03 CASING MATERIALS
14.03A Conductor Casing
Conductor (surface) casing shall be 30 inches in diameter, with a minimum wall thickness of 0.250 inch, fabricated with steel plate with welded collars, or approved equal. Steel plate shall meet requirements of ASTM Designation A 53 Grade B. Casing materials shall be new.

14.03B Steel Well Casing
Well casing shall be 12-inch outside diameter steel tubing with 0.375-inch wall thickness. Casing metal shall conform to A 53 Grade B. Welding shall be by automatic submerged-arc process using at least one pass on both the inside and outside.

If field assembled by welding, ends of casing sections shall be furnished with collars. Collars shall have the same thickness, physical and chemical properties as the casings. Collars shall be 2 to 4-inches minimum in width, rolled to fit the casing outside diameter, and welded to the casing sections. Inside edges of the collars shall be ground or sufficiently scarfed to remove sharp edges, burrs, and welds. Male ends of the casing sections shall be ground to remove excess welding bead within 4 inches of the ends to permit the casing section to enter collars without binding. Three alignment holes shall be provided in each collar to insure proper matching of the casing sections.

End piece of casing assembly shall be secured by a steel plate or welding cone having a minimum thickness of 0.375 inch.

Welding rod material: 7018 or 6011 to be used with mild steel; 309 L welding rod to be used for joining stainless steel to mild steel, and 308 welding rod is to be used for joining stainless steel to stainless steel. All welders shall be prequalified under the AWS Standard Qualification Procedure for the type of work being performed.

Casings stored at the jobsite shall be elevated and not in contact with the ground surface.

14.03C Stainless Steel Well Casing/Dielectric Coupling
The segment of steel casing to be installed above the screen section shall be composed of Type 304 stainless steel, having a wall thickness of 0.375-inch. There shall be adequate means provided to protect the joint between the stainless-steel casing and the steel casing from galvanic action between the two dissimilar metals. Such protection shall be provided in the form of a "dielectric" coupling.

14.03D Stainless Steel Wire Wrapped Well Screen
Wire wrapped well screen and attached end fittings shall be nominally 12-inch outside diameter (minimum of
12-inch inside diameter) and shall be fabricated from Type 304 stainless steel. The well screen shall be of the continuous slot wire-wound design to provide maximum inlet area consistent with strength requirements. It shall be fabricated by circumferentially wrapping a triangularly shaped wire around a circular array of internal rods. The wire configuration must produce inlet slots with sharp outer edges, widening inwardly to minimize clogging. For maximum collapse strength, each juncture between the horizontal wire and the vertical rods must be fusion welded under the screen body. The well screen shall be as manufactured by Johnson Screens, a division of the Aqseptence Group, St. Paul, Minnesota, or the Roscoe Moss Company, Los Angeles, California. The screen slot size is anticipated to be 0.040 inches, to be confirmed by the Engineer. To provide adequate column and tensile strength, the screen shall be extra strong.

Screens stored at the jobsite shall be elevated and not in contact with the ground surface.

14.03E Casing Alignment
Casing section ends shall be machined flat and perpendicular to the casing axis. Longitudinal welds shall be ground flush. Inside collar and outside sections shall be de-burred and fitted prior to assembly. Joints shall be not greater than 0.06 inch out of round and section ends shall not vary more than 0.015 inch from perpendicular to the casing.

14.04 SEALING MATERIAL
Sealing material for the conductor casing shall conform to API Class A neat cement. The Contractor may use quick-setting cement, retardants to setting, and other additives including hydrated lime (up to 10% of the volume of the cement) to make the mix more fluid. Bentonite, at an amount not to exceed 5% of the cement volume may be used to make the mix more fluid and reduce shrinkage.

Sealing material for the production well casing shall conform to API Class A cement and shall be neat, mixed with pozzolan ("pozmix") at a 50/50 ratio, with a fluid surface density of 14.2 pounds per gallon. Bentonite at an amount not more than 5% of the cement volume may be added to make the mix more fluid and reduce shrinkage.

The Well Permit requires the San Mateo County Environmental Health Bureau be notified at least 24-hours prior to placing any sealing material.

14.05 SAND/GRAVEL FOR FILTER PACK
Gravel or coarse-grained sand for the filter pack shall be hard, water worn, and washed clean of silt, fine sand, dirt, and foreign matter. It shall be well-rounded and graded. Crushed gravel will not be accepted. The filter pack material shall meet the requirements of AWWA A100 (latest edition) and B100 (latest edition).

The Engineer may adjust the sand/gravel gradation after examination of data obtained in drilling the production well pilot hole. It is anticipated that an 8 x 16 filter pack will be used. The 8 x 16 filter pack material shall meet the following requirements:

<table>
<thead>
<tr>
<th>Allowable Gradation</th>
<th>% Retained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sieve Size No.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>13</td>
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<td>12</td>
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<td>14</td>
<td>90</td>
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<tr>
<td>16</td>
<td>95</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
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Samples of filter pack materials to be used and their sieve analyses shall be submitted to the Engineer for
approval prior to placement. The Engineer may elect to have a certified testing laboratory perform sieve analysis to verify conformance with approved sample gradation. Failure to meet gradation shall be grounds for rejection. Filter pack shall be kept free of all foreign matter. Filter pack shall be as produced by Cemex, Silica Resources or other acceptable sources, and delivered in bulk to the jobsite by transfer truck. Filter pack to be stored at the site in such a manner as to keep it clean and free of all foreign matter.

SECTION 15 - EXECUTION

15.01 LOCATION

The Contractor shall examine the well site and satisfy itself regarding all local conditions affecting its' work. The Company will provide water to the Contractor from the municipal supply available at the site. Contractor shall determine that the water, by testing or current laboratory analysis, shall be compatible for use in drilling fluid and cement, and amendments shall be added as needed to comply with this requirement.

It is the intent to have the production well drilled by direct mud-rotary or reverse-circulation drilling methods. No mud sumps for drilling will be permitted. All drilling fluids must be contained in a portable mud system of adequate capacity, containing vibrating screens and desanding cones for solids control.

The Well Permit requires the San Mateo County Environmental Health Bureau be notified at least 24-hours prior to moving drilling equipment onto the site.

15.02 SITE DEVELOPMENT

Site development will be restricted to the minimum extent required to develop a work and storage area for materials and supplies. The Contractor shall during the progress of the work protect all facilities at the site to the maximum extent possible, and shall be responsible for and bear the cost of all damage and repairs to facilities. Maintenance of the drill site, clean-up and site restoration following drilling operations, and completion of the work will be the responsibility of the Contractor.

The Contractor shall satisfy the Company regarding the security and safety of the drilling site.

15.03 PRODUCTION WELL CONSTRUCTION

Contractor shall construct and develop a gravel packed filter packed water well, in accordance with the schematic diagram accompanying these specifications. A pilot borehole has been completed to an approximate depth of 300 feet below the ground surface, followed by the setting and cementing of the conductor casing. Once the details for the production casing, screen, and seal depths have been established from the pilot borehole data, construction of the production well can be completed.

15.03A Samples

Contractor shall be responsible for collecting and preserving all formation samples, and for recording all sample information.

The first sample shall be taken 10 feet below the existing ground surface. At each change in formation, and at 10-foot intervals between changes in formation, the Contractor shall take a one quart, representative sample of the formation material and shall label and preserve each sample in a sealable plastic bag. Bags shall be furnished by the Contractor. Samples shall be made available to the Engineer upon request. Sieve analyses shall be performed on selected samples by the Engineer.

The Contractor shall store samples of all strata penetrated in bags. The depth of strata shall be clearly marked on the bags. All samples shall be stored by the Contractor for a minimum of 30 days after completion of the project.

15.03B Drilling Log

A log shall be kept by the Contractor to record the course of actual drilling; the general character, type, and depths of materials penetrated; the aquifer intervals; any pertinent observations on the depths of water-bearing horizons; or other data such as caving, that may assist in the interpretation of the subsurface geology and may be useful in the final well design. As part of the formation log, the Contractor shall accurately determine the depth from which cuttings are being taken for analysis. All depth measurements shall be referenced to ground surface.
15.03C Water Record
A water record shall be maintained showing any variation in the amount of bentonite or water required to be added during drilling. The depths at which such changes are required shall be shown in the daily reports.

15.03D Geophysical Logs
Upon completion of the pilot borehole to the total proposed depth, geophysical logs consisting of an electrical log with spontaneous potential (SP) and 16 and 64-inch resistivity curves plus a natural gamma log shall be completed. Once the borehole is reamed to final diameter, and prior to the installation of the production casing, a caliper log to assist in calculating the volume of filter pack and cement seal needed in the annulus of the well shall be completed (see Section 3.03H).

The Company shall be given at least 24 hours' notice of the date and time geophysical logging will commence, so that the Engineer can be onsite to observe the logging.

The Contractor is responsible for the integrity of the borehole to assure that the geophysical logging can be successfully accomplished. The Contractor shall maintain circulation in the borehole with tools on the bottom of the hole until the logging equipment is on location and prepared to conduct the survey. The logging service company shall obtain a ditch sample of the circulating fluid for calibration of the logs prior to the securing of the mud-circulating pump. Tools shall then be pulled by the Contractor and logging services immediately commenced. If the logging probe fails to descend to the desired depth, the Contractor, at its own expense, shall rerun the drilling tools to recondition the hole.

The Contractor shall submit six (6) copies of each geophysical log. The logging shall be completed by Newman Well Surveys, Pacific Surveys, or approved equal. Engineer will use geophysical logs and drilling log to finalize well design with Contractor and San Mateo County Environmental Health Bureau.

15.03E Construction Details
Engineer will finalize well design based on drilling and geophysical logs. The anticipated general dimensions and characteristics are shown on the attached drawing.

15.03F Drilling and Installation of Conductor Casing
The borehole for the conductor casing shall be advanced by direct or reverse circulation mud-rotary drilling or by bucket-auger methods. Borehole for the conductor casing shall have a minimum diameter of 36 inches, to 80 feet deep as shown on the schematic diagram. Borehole may be advanced using one or more drilling passes; however, if a reaming operation is employed, a pilot bit shall be provided ahead of the reaming bit to assure hole straightness.

The conductor casing shall be securely welded in accordance with American Welding Society standards. All peepholes or alignment holes shall be filled by welding.

Cement grout (sealing material) shall be injected between the conductor casing and borehole wall by means of a tremie pipe. Grout shall extend throughout the bore. Cement grout material shall be placed by a positive displacement method using pumping equipment.

The Well Permit requires the San Mateo County Environmental Health Bureau be notified at least 24-hours prior to placing any sealing material. The Contractor is responsible for providing this notification. The Engineer can help coordinate this notification.

Grout pipe may be slowly raised as grout is placed, but the discharge end must be submerged in the grout until grouting is completed. Grout pipe shall be maintained full until completion of the grouting. No work shall be performed in the well for a minimum of 24 hours after completion of the grouting.

15.03G Drilling Production Borehole
The production well borehole shall be reamed to a final 28-inch diameter borehole to the final selected depth prior to setting casing, filter pack, and cement seal. Reaming may take place using one or more drilling passes; however, a pilot bit shall be provided ahead of the reaming bit to assure hole straightness. Drilling fluid additives other than those
defined and approved in accordance with Section 2.02 will not be permitted in construction of the production well.

Contractor shall be responsible for maintaining the borehole full of fluid at all times in order to maintain bore integrity. Maintaining an adequate supply of water from the available water source to the drilling sump is the Contractor’s responsibility.

15.03H Installing the Casing
After completion of drilling the production well borehole to the final design depth, the Contractor shall insure that all cuttings have been removed from the borehole/well in preparation for production well casing installation. Once the borehole is reamed to final diameter, and prior to installing the production casing, a caliper log to assist in calculating the volume of filter pack and cement seal needed in the annulus of the well shall be completed, see Section 3.030.

To allow for successful filter packing operations, a tremie pipe, having a minimum inside diameter of 2 7/8 inch, shall be run into the borehole to the proposed casing installation depth.

With the tremie pipe remaining in the borehole, casing installation shall proceed in accordance with the final casing design.

During installation, all field joints shall be lap-welded in accordance with American Welding Society Standards, with one pass per circumference. Welding rods shall be the suitable grade for the material being welded, as noted in Section 2.038. All peepholes or alignment holes shall be filled by welding.

Centralizers, three per set, placed at 120-degree intervals, shall be attached directly to the casing by welding at not more than 50-foot spacing, extending from approximately 50-feet above the bottom of the inner casing / screen section into the bottom of the conductor casing at depth of 50 feet below the ground surface. Centralizers shall center and hold casing in proper position until the filter pack and cement seal are in place. Centralizers shall be of the same material used for the casing and screen to which they are attached. If Contractor wishes to use a different spacing, provide justification to the Company and Engineer.

Inner 12-inch diameter blank well casing shall extend a minimum of five feet above the ground surface at the completion of work.

Casing shall be suspended from the surface by means of an appropriate hanger or clamp. Float plugs to land and set casing will not be permitted. Casing shall terminate above the bottom of the reamed hole without any contact with the bottom of the hole. This requirement will be confirmed by observation of the weight indicator showing weight suspended from the drill rig.

If the casing cannot be landed in the correct position or at a depth acceptable to the Company and Engineer, the Contractor shall remove the casing from the well and re-ream the well. Contractor shall not attempt to drive or spud the casing and screen assembly. If problems arise which prevent the Contractor from completing the well, it will be considered rejected.

15.031 Filter Packing
After the well casing has been installed in place in the well bore, the filter pack/sand-gravel envelope shall then be placed in the annulus around the well casing using procedures to minimize segregation and bridging of the sand/gravel, all as herein specified.

The annular space between the well casing and the side wall of the borehole shall be filled to the final specified depth with clean, washed, selected grade filter pack, designed to give sand free water from the well as herein specified. The final specified depth and filter pack length shall be determined from pilot borehole data—the current anticipated depth is shown on the drawings.

The filter pack shall be pumped in place using a suitable positive displacement pump and tremie pipe.

The tremie pipe used to place the filter pack shall be removed in 40-foot sections as the filter pack reaches the
bottom of the tremie pipe.

The filter pack shall be placed from bottom to the top with suitable precautions to avoid the possibility of the pack bridging or clogging at any point. The packing of the well shall be properly coordinated with the surging and cleaning of the well. Filter I gravel packing and well surging shall continue uninterrupted until the filter pack material is brought to the final specified level.

The screen section shall be gently swabbed to facilitate the settlement of the filter pack material, and additional filter pack material shall be added as needed to bring the filter pack to the final specified level.

15.03J Cement Seal
A cement grout seal shall be placed as shown on the schematic well construction diagram (EX-3), with the final depth to be determined based on pilot borehole data and final construction details/well design. The cement seal shall be composed of neat cement grout having the composition as previously specified in Section 2.04, API Class A neat cement mixed with pozzolan ("pozmix") at a 50/50 ratio, with a fluid surface density of 14.2 pounds per gallon.

Cement grout shall be injected through a tremie pipe in the annular space at the final specified interval by a positive displacement method using pumping equipment with all necessary precautions taken to minimize the possibility of bridging.

Grout pipe may be slowly raised as grout is placed, but the discharge end must be submerged in the grout until grouting is completed. Grout pipe shall be maintained full until completion of the grouting.

The Well Permit requires the San Mateo County Environmental Health Bureau (EHB) be notified at least 2 working days prior to placing any sealing material. The Contractor is responsible for providing this notification. The Engineer can help coordinate this notification. If EHB staff cannot witness placement of the seal, a written description of the seal shall be submitted to EHB within 10 days by the Contractor as required by Item 9 of the Well Permit.

The quantities of gravel and cement placed in the annulus of the well shall not be less than the computed volume of the annulus as determined by the Engineer. No work shall be performed in the well for a minimum of 24 hours after grouting is complete.

SECTION 16 - WELL DEVELOPMENT
16.01 General
Development shall consist of swabbing the well following filter packing; bailing of materials introduced into the casing during development; installation of an engine driven deep well turbine test pump; pumping and surging of the well until fully developed and meeting minimum production requirements.

The Contractor shall continue development of the well until the discharged water is clear of sand, silt, and mud and the following conditions have been met:

- There shall be no further settlement of the gravel envelope.
- Sand production shall not be more than the value specified in the section entitled Well Performance Parameters., Section 2.3.01.
- Turbidity shall be less than the value specified in the section entitled Well Performance Parameters., Section 2.3.01.
- Specific capacity shall have reached a constant value and there shall be no significant increase in specific capacity during at least 12 continuous hours of pumping and surging.

16.02 Pumping and Surging
Upon completion of 20-hours of jetting and air lift pumping operations, Contractor shall install a properly sanitized engine-driven deep well turbine pump, diesel engine, appropriate drive shaft, and appurtenant equipment. Foot valves installed on the pump or drivers with non-reverse ratchets installed will not be allowed. Diesel engine
shall be completely enclosed in a sound attenuated enclosure which shall meet all the sound requirements for the City of East Palo Alto. Contractor shall furnish and install necessary discharge piping to transport and handle pumped water in accordance with the approved Water Handling Plan.

Contractor shall furnish necessary valves to regulate flow, flow meters, sand testing sand production, and time of pumping. Installation of flow meters shall be as recommended by the manufacturer for this installation and shall provide reliable test information.

Water level measurements shall be made with an electric sounder, as approved by the Engineer.

Turbine pump used for development and testing shall consist of 150 feet of column assembly and a bowl unit capable of producing 1,500 gallons per minute from a pump setting at 200 feet below ground surface. Engine shall have a minimum continuous horsepower rating required for continuous pumping at the maximum desired flowrate and pumping level.

Development pumping shall commence at a low flowrate. Well shall be frequently surged for development purposes. Flow rates will be increased until the well achieves a minimum of 125% of the design flowrate or as directed by the Engineer. It is estimated that development pumping will continue for 40 hours.

At the discretion of the Engineer, it may be necessary to add a solution of Engineer approved polymer dispersants to the well to aid in the cleaning and elimination of fines during the development process. Following the addition of the solution, no further work should be performed on the well for a period of at least 24 hours, or an appropriate length of time as determined by the Engineer.

16.03 Records
Development records shall contain readings at half-hour maximum intervals showing production rate pumping level, drawdown, sand production, and all other pertinent information concerning well development. Development shall continue for a minimum of 8 hours and until the conditions in Section 3.11, Well Performance Parameters have been met.

16.04 Bailing
Contractor shall bail the well as needed to prevent accumulation of material above the lowest portion of the screen. The well shall be completely free of material prior to pumping and surging, and after completion of test pumping.

SECTION 17 - COMPLETED WELL PUMPING TEST
The completed production well shall be tested to determine efficiency and aquifer characteristics. Testing shall consist of a minimum of three 2-hour constant rate pumping tests (with 30-minute recovery intervals), followed by a 72-hour constant rate pumping test and a 2-hour recovery test, at capacities herein specified. The test pump shall be capable of pumping at a rate of 1,500 gallons per minute. Pumping rates for the step drawdown tests and the constant rate test will be determined by the Engineer.

During pumping tests, depth to water level and flow rates shall be measured and recorded at intervals directed by the Engineer.

During recovery tests, depth to water level shall be measured and recorded at designated intervals.

In case of pump failure for a period greater than 1% of elapsed pumping time from t=0, test shall be suspended until static water level has been attained. Should test be aborted because of a deficiency on the part of Contractor’s equipment or personnel, time waiting for water level recovery and for rerunning pump test to the point where it was aborted shall be at no cost to the Company.

Prior to completion of pumping tests, the Contractor shall allow a water sample to be collected. The sample will be used for water quality testing as described in Section 3.1OB, Water Analyses. The Contractor shall give the Company and Engineer at least twenty-four (24) hours prior written notice to prepare for collecting the water
SECTION 18 - ENVIRONMENTAL CONTROL

18.01 Disposal of Drilling Fluids and Cuttings and Development and Testing Water
Contractor shall submit a Water and Waste Handling Plan for the Company and Engineer’s approval prior to mobilizing to the site. Water, including mud, sand, and debris pumped from the well during construction, development, and testing shall be properly and legally disposed of in accordance with the approved plan and in such a manner as not to damage or interfere with work or property of others.

Prior to discharge into drainage facilities, a temporary (portable) settling basin consisting of one or more "Baker" tanks of sufficient capacity shall be provided that eliminates discharge of mud and/or sediment.

Provisions for energy dissipation of the pumped water shall be employed at the entrance to the basins to assure quiescent settling conditions in the basins. Baffles or multiple cells in portable sumps may accomplish this function. Removal of settling basins and sediment shall be accomplished after well development by the Contractor.

18.02 Drilling Fluid Containment
Drilling fluids shall be completely contained in watertight portable basins with a volume not less than 30,000 gallons. Cuttings shall be removed regularly to assure that the fluid volume is sufficient for settling cuttings out of solution.

18.03 Cuttings and Drilling Fluid Disposal
All fluids and cuttings shall be removed from the site and properly and legally disposed of at the Contractor’s expense, and with the Engineer's approval.

18.04 Spillage During Hauling
Spillage resulting from Contractor's hauling operations along or across any public traveled way (pedestrian or vehicular) shall be removed in a timely manner.

SECTION 19 - DISINFECTION OF COMPLETED WELL
Well disinfection shall be in accordance with AWWA Standards for Water Wells, A100 (latest edition). In the event of conflict between this section and the AWWA Standards, the requirements of this section shall prevail.

Contractor shall disinfect the well as soon as possible after test-pumping procedures have been completed. Contractor shall clean well immediately preceding disinfection where evidence indicates that construction and development work has not adequately cleaned the well. All oil, grease, soil, and other materials, which could harbor and protect bacteria from disinfectants, shall be removed from the well. Unless prior approval is obtained for employing chemicals or other cleaning method, cleaning shall be by pumping and jetting. Where test-pumping equipment is to be utilized, such equipment shall be decontaminated prior to installation using a chlorine solution as described below.

Chlorine solution used for disinfecting well shall be NSF Certified, and of such volume, strength and application that a concentration of at least 100 parts per million of chlorine is obtained in all parts of the well water; however, not less than 15 pounds of 70% HTH, or its equivalent, shall be used. Disinfecting solution shall be added while the test pump is still in place and the well shall be surged to help distribute the chlorine solution into the well and surrounding strata.

SECTION 20 - TEST FOR PLUMBNESS AND ALIGNMENT
The completed well shall be constructed round, plumb, and true to line as defined in Article 400 of the California Groundwater Association Standard Practice Series. The Contractor shall give a minimum of twenty-four (24) hours prior written notice to the Company and Engineer prior to plumbness and alignment testing.

Alignment shall be tested by lowering a 40-foot long section of pipe or dummy into the well to a depth of at
least the lowest anticipated pump setting. Pipe outer diameter shall be not more than 1 inch smaller than the well inside diameter. Dummy shall consist of a 4-inch minimum diameter extra-heavy pipe with three rings fixed to the pipe so that they cannot move longitudinally along the pipe. Rings shall be cylindrical, at least 12 inches in length, and constructed from material which will not harm the interior of casings. Rings shall be placed at each end of the dummy and at the middle. Clearance between the outer diameter of the ring and inner diameter of the well casing shall not exceed 1 inch.

Should the pipe or dummy fail to move freely throughout the casing to the lowest anticipated pump setting, the Company has the option of having the alignment corrected by the Contractor or negotiating an adjustment of payment to the Contractor.

Cost of alignment and plumbness tests shall be included in the Contractor's bid. These tests are not considered part of developing and testing time.

SECTION 21 - VIDEO AND CEMENT BOND LOG

21.01 General
After final cleanup of the well, and before welding a plate on the top of the casing, the Contractor shall conduct a video inspection of the entire casing and screen assembly and complete a cement bond log of the completed well.

21.02 Video Log
The video log record of survey shall be recorded on DVD or other acceptable media and shall be delivered to the Engineer for review and storage.

A footage counter accurate to within two (2) feet in 1000 feet shall be used to indicate on the monitor and video log the distance traveled by the camera. Also displayed on the monitor, shall be date of inspection and a continuous forward and reverse readout of camera distance from the top of casing.

During inspection, the monitoring technician shall, in addition to the audio and video record of conditions, log in writing the location of all indications of leaks, cracks, defective joints, collapsed sections, deposits and other conditions or data pertinent to the physical condition of the well. Conditions and defects shall be located by footage counter and video clock reference.

21.03 Cement Bond Log
A cement bond log shall be performed within the production casing by Pacific Surveys, or approved equal. The results and record of the cement bond log shall be delivered to the Engineer.

SECTION 22 - SAMPLING AND CLEANUP

22.01 Logs and Samples
Contractor shall furnish daily records or logs, which will give depth, thickness and nature of the strata penetrated, water level, and other information that maybe requested by the State. Driller’s report form shall be in the format required by the State of California.

Contractor shall store samples of all strata penetrated in containers with the depth of strata and thickness noted on the containers as previously described. Samples shall be stored for a minimum of thirty (30) calendar days after submittal of the driller’s log report to the Engineer for review. Following the minimum thirty (30) calendar day's storage period and after acceptance of the well, at the written direction of the Company, the samples shall either be delivered to the Company or disposed of by the Contractor.

22.02 Water Analyses
Contractor shall take precautionary measures at all times to prevent contamination of the well.

Upon twenty-four (24) hours advance written notification from the Contractor, the Company and Engineer will collect the water samples and transport them to a State of California-certified laboratory for analyses for the following:
• EPA Method 502.2 Regulated and unregulated organic chemicals
• Title 22 - General Mineral
• Title 22 - General Physical
• Title 22 - Inorganics
• Title 22 - Radioactivity
• Title 22 - Total and Fecal Coliform
• Gross Alpha/Radioactivity
• Perchlorate
• Chromium VI

The Company will be responsible for ordering and paying for the water quality tests, and transmitting copies of the resulting reports to the San Mateo County Environmental Health Bureau, the San Mateo County Water Resources Agency, and the State Water Resources Control Board Division of Drinking Water. The Contractor will be responsible for pumping the water to the surface for sampling and providing a sample tap to collect the sample(s).

22.03 Capping Well
Except when drilling is in progress, the well shall be kept covered or capped in such a manner as to prevent either tampering with the well or entrance of foreign matter.

Temporary capping shall be provided whenever the well casing is otherwise exposed prior to completion of the work. Capping shall meet requirements of the State of California, Department of Industrial Safety, and the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor, and as directed by the Engineer.

Upon completion of all work in connection with development and test pumping, the well shall be capped with a 1/4-inch steel plate welded full circumference over the well casing. The inner 12-inch diameter well casing shall extend a minimum of five feet above the ground surface at the completion of work. The ground around the completed well shall be sloped away from the well head.

22.04 Abandonment of Hole
If the Contractor abandons a hole because of loss of tools or other causes which are the Contractor's responsibility, and that prevent completion of a well as specified, at the Contractor's expense the hole shall be completely filled with cement and the casing removed to a depth of at least 8 feet below ground surface. Destruction of wells shall be treated in accordance with State Water Well Standards (Bulletin 74-90) and local ordinances. Sealing of hole shall comply with all regulations or requirements of agencies with jurisdiction in this matter.

22.05 Cleanup
Following completion of work, Contractor shall remove from jobsite all excess materials, tools, and equipment, and shall legally dispose of all debris resulting from the work.
SECTION 23 - WELL PERFORMANCE PARAMETERS

23.01 Sand Content
A Rossum Centrifugal Sand Sampler (see Journal of the American Water Works Association, Volume 46, No. 2, February 1954) shall be used for sand testing. Test shall be witnessed by the Engineer upon notification by the Contractor, after completion of well development by pumping.

Sand content testing shall be conducted during a short constant rate discharge at the well design capacity. Sand content shall be determined by averaging results of samples collected at 12, 13, 14, and 15 minutes after start of the pumping test. Average sand production shall be 5 parts per million or less. Pumping rate during sand content testing shall be design rate of the well or at a lower rate selected by the Engineer.

If the average sand content exceeds 5 parts per million, additional redevelopment work may be specified by the Engineer, with repumping of the well until sand content is 5 parts per million, or as satisfactory to the Engineer and the Company. Such additional work shall be charged for at the hourly rate noted on the Bid Proposal.

23.02 Turbidity
Turbidity shall be five (5) NTU units or less after 15 minutes of pumping. If the turbidity exceeds the specified value, additional redevelopment work may be specified by the Engineer, with repumping of the well by the Contractor until the turbidity is 5 NTU units, or as satisfactory to the Engineer and the Company. Such additional work shall be charged for at the hourly rate noted on the Bid Proposal.

SECTION 24 - EARTHWORK

24.01 SCOPE OF WORK
Furnish all labor, materials, equipment, facilities, transportation and services to complete all excavation, backfill, grading and related work as shown on the Plans and/or specified herein.

Work Included: The general extent of all excavation, fill and grading is shown on the Plans and includes, but is not necessarily limited to, the following:

- Removal of excess and unsuitable material from the site.
- Excavation of material to allow for the placement of underground piping and structures, including any necessary shoring and bracing.
- Backfilling of underground piping and structures.
- Preparation of subgrade for concrete slab work and pavement.
- Finish grading.

24.02 DEFINITIONS
A. Excavation: Work shall consist of excavation, storage and any necessary removal of native soil material for structures, cut slopes, foundations, and pavement. Excavation may include the removal and disposal of existing pavement or concrete slab materials.
B. Fill: Soil or soil-rock material placed to raise the existing grade of the site or to backfill excavations.
C. On-Site Material: Material obtained from the project site.
D. Import Material: Material required for earthwork construction in excess of the quantity of suitable material available from required grading, cuts and excavations. Import material may be necessary even though not shown on Plans.
E. Select Material: Material meeting the requirements specified herein.
F. Degree of Compaction: The ratio of the in-place density of constructed fill to the maximum dry density determined by California Test No. 216.
G. In-Place Density: The dry density of constructed fill determined in accordance with the moisture-density gage method, ASTM D2922.
24.03 GENERAL BACKFILL

A. General Fill Requirements: Material for general site filling shall be free from sod, large lumps, boulders, rocks, roots, brush or other objectionable material; and should be obtained from on-site material insofar as practical. Should on-site material be unsuitable for general fill in quantity and/or quality, the Contractor shall furnish and place suitable import material.

B. Imported Materials: Imported materials shall be approved by the Engineer prior to use. The Contractor shall submit for review information on all backfill materials to be used on the project giving a description of the source of the material, past uses of the property at the source location, quantity of material and the purpose for which it is intended.

24.04 PIPE BEDDING AND INITIAL BACKFILL

Bedding material and initial backfill to a minimum depth of two inches above the top of pipe shall be Class II aggregate base.

24.05 FOUNDATION MATERIAL

Soil surfaces exposed by excavation for the building pad shall be compacted to 95 percent relative compaction per ASTM D1557, and have at least six (6) inches of Class II aggregate base.

24.06 JOB CONDITIONS

Existing Conditions: The Contractor shall, prior to submitting his bid, visit the site and become familiar with actual site and soil conditions. No allowance will be made by the Company for any unfavorable conditions or events which could have been foreseen from a thorough examination of the Contract Documents, the site and working conditions.

Protection: If existing live utilities are encountered, they are to be protected from damage and the proper authorities notified. Service shall not be interrupted except as directed or accepted; allow sufficient time for utility companies to arrange for continuation of services. Record unmarked utility locations on Record Drawings. Open excavations, trenches, and the like are to be protected with fences, barricades, covers and railings as required. Every precaution shall be taken to prevent spillage when hauling on or adjacent to any public street or highway. Any spillage shall be promptly removed.

24.07 SAFETY

A. The Contractor is solely responsible for excavation safety, including support to all adjacent improvements.

B. Excavation shall be in accordance with applicable provisions of the State of California Construction Safety Orders. The Contractor shall, in accordance with the California Labor Code Section 6705, submit a detailed drawing to the Engineer before excavation begins, showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground during any excavation of five (5) or more feet in depth.

C. Review by the Engineer of the calculations and Drawings or inspection performed by the Engineer will in no way relieve the Contractor for full responsibility for the shoring systems. Prior to applying any loading on the shoring, the Contractor's Engineer shall inspect the installation and certify in writing that the shoring system conforms to the Drawings and that the material and workmanship are satisfactory. This certification shall be provided to the Company and be available on the project site in accordance with Article 1717 of the Construction Safety Orders, Title 8, California Administrative Code.

D. If the Contractor presents a drawing which varies from shoring system standards established by the Construction Safety Orders, the drawing shall be prepared and signed by a registered civil or structural engineer licensed by the State of California. Any Engineer's review of said drawings will in no way relieve the Contractor from responsibility and liability for the adequacy of shoring systems and trench excavations.

E. Trench excavation shall not begin until trench support drawings have been returned by the Engineer.

F. The Contractor shall pay for and comply with all provisions of the permit required by Section 6500 of the California Occupational Safety and Health Act.
24.08 **SHORING**

A. All vertical trenches deeper than five (5) feet shall be shored in accordance with this section.

B. The design of shoring support systems is solely the Contractor's responsibility. Dewatering systems shall be considered in conjunction with the shoring system used.

C. Shoring systems should be designed to resist the larger of either the earth pressure distribution prescribed by the safety regulations or the lateral pressures indicated in the Geotechnical Report. Traffic loads and surcharge weights, such as stockpiled materials, must also be considered in the shoring design.

D. Full compensation for doing all work required to brace excavations and for complying with these requirements shall be included in the items of work which require the shoring.

24.09 **CONTROL OF WATER**

A. Groundwater may be encountered below ground surface.

B. Prior to the placement of pipe bedding, all utility pipe trenches shall be thoroughly dewatered by the use of sump pumps and dewatering equipment as necessary to safely convey water away from trench excavations to positive draining outlets.

C. The Contractor shall prevent surface water (e.g. rainwater) and subsurface or groundwater from flowing into excavations and from flooding the project site and surrounding areas.

D. The Contractor shall remove all water which accumulates in all excavations during the progress of work so that all work can be done in the dry. Excavated areas shall be kept free from water while pipe or structures are constructed, while concrete is setting and until backfill has been placed to a sufficient height to anchor the work against possible floatation.

24.10 **PREPARATION OF SUBGRADE**

Strip surface vegetation, weeds, and at least the top six (6) inches from areas underlying surface structures and areas to be paved. Excavate soft, wet, or otherwise unsuitable base grade to firm, unyielding soil.

24.11 **EXCAVATION**

A. Contractor shall notify the Engineer of any site condition not reflected on the Plans or in these Specifications, such as conflict in grade, bad soil, or unexpected utility lines. The Engineer will inspect the excavation bottom prior to placing material, and may recommend further excavation and soil replacement if required compaction with existing soil cannot be achieved.

B. Excavate to the lines, grades and dimensions shown on the Plans. Excavations shall be made to such width outside the lines of the structure to be constructed as may be required for proper working methods, the erection of forms, and the protection of work. Any resulting over-excavation extending beyond the lines, grades, and dimensions shown on the Plans shall be backfilled with material complying with these Specifications at no additional cost to the Company.

C. Care shall be taken to preserve foundation surfaces in an undisturbed condition, and excavation at or near property lines shall be performed in a manner that minimizes disturbances to adjacent property. Any foundation surfaces disturbed without the Engineer's authorization shall be replaced at the Contractor's expense with compacted gravel fill or other material approved by the Engineer so that by test, the bearing capacity of the replacement material is equal to or better than the undisturbed foundation material.

D. Existing structures and completed work shall be adequately braced and cared for so that no damage will result.

E. As directed by the Engineer, soft, spongy, or unsuitable bearing material of any kind shall be removed down to solid bearings and replaced with materials specified herein. Such over-excavations not specifically
specified or shown on the Plans will be paid for as extra work. Unauthorized excavations shall be corrected at no cost to the Company.

F. If previous trenches are encountered, any loose materials shall be excavated, backfilled and re-compacted in accordance with these Specifications.

G. Excavated material unsuitable for backfill or in excess of the amount required for backfill shall be disposed of by the Contractor off the site at his expense.

24.12 FILLING

A. Prior to the placement of fill, the Engineer shall be notified of the source of materials and their suitability for the particular fill application. Work shall not be backfilled without Engineer’s approval. Any work so covered prior to approval shall be uncovered at the Contractor’s expense.

B. All debris, form work, etc. shall be removed from the excavation prior to backfilling.

C. Pipe shall be supported during the placement and compaction of bedding and backfill.

D. Fill materials shall be spread in level layers of appropriate thickness for the compaction equipment to be used and moisture content of the material. Each layer shall be compacted as required.

E. Granular backfill shall be tamped mechanically or manually along the sides of pipes and structures to minimize voids in the material between the pipe or structure and excavation walls. No flooding or jetting shall be used to compact bedding or backfill materials.

F. **Moisture Content:** Fill materials shall have the uniform moisture content necessary for compaction to the specified dry density.

G. Fill shall not be placed during conditions that will alter the moisture content of the fill material sufficiently to make adequate compaction impossible. After placing operations have been stopped due to adverse conditions, no additional fill material shall be placed until the last layer compacted has been checked and found to be compacted to the specified densities.

H. **Tests:** Tests are to be made on each layer of fill to assure adequate compaction throughout the entire area. If the dry densities are not satisfactory, the Contractor will be required to re-compact each layer and/or work area as necessary to achieve the specified densities. Compaction testing will be performed in accordance with ASTM D1557.

24.13 COMPACTION

Fill materials shall be compacted so that the relative compaction is as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Relative Compaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Bedding</td>
<td>95%</td>
</tr>
<tr>
<td>Trench Backfill under Paved Areas</td>
<td>95%</td>
</tr>
<tr>
<td>Trench Backfill under Non-Paved Areas</td>
<td>90%</td>
</tr>
<tr>
<td>All Other Backfill</td>
<td>90%</td>
</tr>
</tbody>
</table>

24.14 GRADING

A. Contractor shall grade the site to establish finish grades of constructed elements. The remainder of site may be graded as required to match improvements to existing contours with a minimal amount of change.

B. All ground surfaces shall be finished to uniform grades and slopes as indicated on the Plans so that the ground drains properly and is free from depressions which may cause areas of standing water. Drainage shall be away from foundations and slabs. Clods are to be broken up and the surface of the ground shall be uniformly pulverized and graded to a relatively smooth surface.
C. Finish grades should be at least one (1) inch below the surface of adjacent walks, curbs, paved areas, etc. without abrupt change in gradient either in the surface of the soil or where the soil meets such features.

D. At the completion of grading work, the site shall be left in a clean and finished condition.

SECTION 25 - EROSION CONTROL

25.01 SCOPE
Furnish all labor, equipment and materials necessary for site preparation, seeding, hydromulch operations, maintenance and other erosion control operations as shown and specified. To protect against winter rains and potential erosion, seed and mulch by October 1 all disturbed areas as shown on Drawings. Alternative schedules must be approved by the Engineer prior to the commencement of grading operations. The Contractor is responsible for protecting the site and adjacent areas from any erosion caused by construction activities.

25.02 INTENT It is the intent of the drawings and specifications to provide seeding and/or hydromulching of designated areas with plants in vigorous growth ready for Owner's use. Any items not specifically shown in the drawings or called for in the specifications, but normally required to conform with such intent, are to be considered part of the work.


25.04 PROTECTION Contractor shall provide necessary safeguards and shall exercise caution against injury or defacement of any existing site improvement and plantings. Contractor shall be responsible for any damage resulting from his operations and shall repair or replace such damage at his own expense. No trucks or vehicles of any kind shall be allowed to pass over sidewalks, curbs, etc. unless adequate protection is provided.

25.05 GRADING AND PREPARATION OF AREA The Contractor shall be responsible for maintaining finish grades in all work areas and for executing any fine grading as may be necessary or incidental to seeding or hydromulching or repair of work areas. The following operations shall be carried out prior to seeding or hydromulching:

1. Make sure all construction requiring access over work areas is completed before any final planting preparation is started.

2. Clear area of weeds and debris over 2 inches in size.

3. The area to be seeded shall have a firm seedbed that has previously been roughened by scarifying, disk ing, harrowing, chiseling or track-walking, or otherwise worked to a depth of 2 to 4 inches unless a roughened condition already exists. No implement shall be used that will create an excessive amount of downward movement of soil or clods on sloping areas. The seedbeds may be prepared at the time of completion of earth-moving work.

4. Before seeding, necessary drainage controls such as dikes at tops of slopes and swales on slope benches shall be installed to prevent runoff from eroding slopes before grass is established. Temporary drainage controls shall remain in place until permanent drainage facilities are installed or until slopes are stabilized and temporary controls are no longer necessary for continued slope stability.

25.06 MULCH Mulch shall be wood cellulose fiber and shall be of such character that it will uniformly disperse into a slurry when mixed with water. The slurry, when hydraulically applied to the ground shall form an absorptive net of mulch uniformly impregnated with seed and other ingredients. No materials which inhibit growth or germination shall be present in the mixture.

25.07 WATER Water shall be of adequate quality to properly promote plant growth.
25.08 **FERTILIZER**
   A. Biosol Mix 7-2-3 at 1000 lbs / acre (low in Nitrogen, suitable for native plant)
   B. Am 120 – Mycorrhizal Inoculant at 60 lbs/acre

25.09 **SEED**
   
   Seed Mix (70 lbs per acre),
   
   30 lbs Festuca rubra ‘Molate’, Molate Fescue
   20 lbs Festuca idahoensis, Native Idaho Fescue
   20 lbs Festuca occidentalis, Western Fescue

25.10 **STRAW COCONUT BLANKET** Straw coconut blanket should contain 70% of straw and 30% of coconut fiber. It should be free of weed and suitable for application on slope 2:1 and less.

25.11 **ORGANIC BINDER**
   Organic binder shall be applied at 100 lbs per acre.

25.12 **EQUIPMENT**
   Equipment for the application shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend and homogeneously mix a slurry of fiber, fertilizer, seed and water. The discharge line shall provide even distribution of the slurry on the slopes to be seeded.

25.13 **SEEDING METHODS**
   All areas to receive erosion control seeding as shown on the plan shall be uniformly seeded with hydroseeding.

25.14 **HYDROSEED OPERATIONS**
   
   A. Mixing:
   
   Mixing shall take place at the site of the work. The hydromulching preparation shall be per manufacturer's directions. Spraying shall commence immediately after the tank is full. The operator shall spray the area with a uniform, visible coat by using color of the wood pulp as a guide.
   
   B. Application:
   
   1. Prior to application the Contractor shall receive approval of the hydromulch area preparation from the Architect.
   2. Evenly spread the mixture of Cellulose Fiber Mulch, recommended seed, organic binder and specified fertilizer. The operator of the hydromulching equipment shall apply the hydromulch in a sweeping motion to form a uniform mat. Care shall be taken to keep the slurry within the designated work area.
   3. Install Straw Coconut Blanket (or others depends on slope for expectant lifespan) on top of hydromulch.
   4. Slurry mixture which has not been applied within two hours of mixing shall not be used and shall be removed from the site.
   5. After application, the Contractor shall not operate any equipment over the area.
   6. Application Rates:
      a. Seed – see section 2.04
      b. Mulch Fiber - 1,800 pounds/acre
      c. Fertilizer – see section 2.03

25.15 **CLEAN-UP**
   Keep all areas of work clean, neat and orderly at all times. Keep all paved areas clean during planting and maintenance operations. Clean up and remove all deleterious materials and debris from the entire work area prior to final acceptance to satisfaction of the Engineer. Remove hydromulch overthrown onto pavement, construction or planting areas not
designated to receive hydromulch.

**25.16 MAINTENANCE, GUARANTEE AND ACCEPTANCE**

Maintenance of hydromulching shall consist of watering treatment of all diseases and insect pests, repair of erosion and all incidental work necessary to establish surface coverage and development of root systems adequately, in the opinion of the Engineer, to stabilize slopes and other surfaces in the work area. Initial maintenance shall be continuous until uniform coverage is established over 95% of treated soil areas with no individual bare area in excess of 10 square feet. After germination, any bare areas shall be reseeded at the direction of the Engineer.

**SECTION 26 - CONCRETE STRUCTURES**

**26.01 DESCRIPTION**

The Contractor shall furnish all labor, materials, equipment and incidentals necessary for concrete facilities and portions of structures. The work shall include, but not necessarily be limited to, excavating, compacting, forming, placing, and finishing all concrete and all related work.

**SUBMITTALS**

Submittals in accordance with Section 1.06 shall be required for all materials in this Section.

**MATERIAL**

**Concrete:**

Use a minimum of 6 sacks of cement per cubic yard of concrete.

Concrete strength to be 5,000 psi concrete at 28 days.

Special inspection is required for all concrete pours.

Concrete to have a maximum slump of 4 inches.

Water used in mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances deleterious to concrete or reinforcement.

Water shall be potable water free of taste or odor.

Maximum water cement ratio to be 0.40.

Maximum air entrainment is 6.0%.

Use type II cement.

Proposed designed mixes to be certified by a California registered civil engineer and submitted to the engineer, at least 7 calendar days prior to first pour.

Frequency of testing. Samples for strength tests for each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 100 cubic yards. Of concrete, nor less than once for each 5000 sq. ft of surface area for slabs or walls. Ready-mix supplier to keep duplicate test cylinders at is testing laboratory.

Mixing. All concrete shall be mixed until there is a uniform distribution of materials and shall be discharged completely before mixer is recharge.

Mixing. Ready mixed concrete shall be mixed and delivered in accordance with requirements of “Specifications For Ready- Mixed Concrete” (ASTM C 94) or “specification for concrete made by volumetric batching and continuous mixing” (ASTM C 685).

Curing. Concrete shall be maintained above 50 degrees F. And in a moist condition for at least the first 7 days of after
placement.

Cold weather requirements. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather. All concrete materials and all reinforcement, forms, fillers, and ground with which concrete is to come in contact shall be free from frost. Frozen materials or materials containing ice shall not be used.

Hot weather requirements. During hot weather, proper attention shall be given to ingredients, production methods, handling, placing, protection, and curing to prevent excessive concrete temperatures or water evaporation that could impair required strength or serviceability of the member or structure.

**Concrete Admixtures:**

Admixtures to be used in concrete shall be subject to prior approval by the engineer.

Water reducing admixtures, retarding admixtures, accelerating admixtures, shall conform to “Specifications For Chemical Admixtures For Concrete” (ASTM C 494) or “specification for chemical admixtures for use in producing flowing concrete” (ASTM C 1017).

Calcium chloride or admixtures containing chloride other than from impurities in admixture ingredients shall not be used.

Fly ash or other pozzolans used as admixtures shall conform to the “Specifications Of Fly Ash And Raw Or Calcined Natural Pozzolan For Use As A Mineral Admixture In Portland Cement Concrete” (ASTM C 618).

Ground granulated blast-furnace slag used as an admixture shall conform to “Specification For Ground Granulated Blast-Furnace Slag For Use In Concrete And Mortars” (ASTM C 989).

Admixtures used in concrete containing C 845 expansive cements shall be compatible with the cement and produce on deleterious effects.

Silica fume used as an admixture shall conform to “Specifications For Silica Fume For Use In Hydraulic-Cement Concrete And Mortar” (ASTM C 1240).

**Concrete Aggregate:**

Maximum aggregate size shall be 3/4 inch.

Aggregate shall be crushed aggregate, not round rock.

Aggregate shall have no Modification, and low shrinkage characteristics.

Concrete aggregates shall conform to “specifications for concrete aggregates”(ASTM c 33).

No alkali-reactive aggregates shall be used.

**Reinforcing Steel:**

Reinforcing steel shall be deformed bars, ASTM A 615. Use grade 60 for #5 bars and larger. Use grade 40 for #4 bars and smaller.

Embed all reinforcing bars a minimum 24 bars diameters, but in no case less than 12”. Lap all reinforcing splices a minimum 40 bars diameters, but in no case less than 24”. For top bar embedments and laps increase above lengths 25%.

For reinforcement in which the protective concrete is deposited against the ground, there shall be no less than 3 inches of concrete between the reinforcement and the ground contact surface.

Unless noted, all other main reinforcement shall be protected by 2 inches of concrete cover.
Bolts:

When bolts are in used in concrete-to-steel connections use cut washers between the steel and the bolt head and between the steel and the nut.

Machine bolts and anchor bolts shall conform to ASTM a307.

Epoxied all-thread or anchors to be set with Simpson epoxy.

Bolt designs are as follows unless otherwise noted on drawing:

<table>
<thead>
<tr>
<th>DIAMETER</th>
<th>BOLT EMB.</th>
<th>RFB EMB</th>
<th>MIN. EDGE DISTANCE</th>
<th>MIN. END DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8”</td>
<td>7”</td>
<td>12”</td>
<td>1 ¾”</td>
<td>5”</td>
</tr>
<tr>
<td>¾”</td>
<td>10”</td>
<td>14”</td>
<td>2 ¾”</td>
<td>5”</td>
</tr>
<tr>
<td>7/8”</td>
<td>12”</td>
<td>15”</td>
<td>2 ¾”</td>
<td>5”</td>
</tr>
<tr>
<td>1”</td>
<td>15”</td>
<td>16”</td>
<td>3”</td>
<td>5”</td>
</tr>
</tbody>
</table>

For epoxy embedded bolts and retro-fit bolts ((rft = all thread), drill hole per Simpson requirements. Provide Simpson "et" adhesive concrete and anchor system. Installed per manufacture's requirements and ICBO Report # 4945.

26.05 EXECUTION

Excavation and backfill shall conform to Section 2.03 of these Specifications.

Steel rebar installation shall conform to Section 52 of the CALTRANS Standard Specifications.

All surfaces shall have ordinary finish.

Typical details shall apply where no specific detail or section is given.

Because of site condition, dimensions are approximate. The contractor shall verify all dimensions, elevations and conditions prior to starting construction.

Any discrepancies on the plans or any deviations from the plans, which are necessitated by field conditions or any condition different from these indicated on plan, shall be called to the attention of the engineer and the building department prior to continuing construction.

All dimensions to take precedence over scale shown on plans, elevations, sections and details

Notes and details on drawings shall take precedence over general notes and typical details.

Contractor is responsible for all temporary bracing during construction.

Contractor shall repair or replace all damaged finish material and structural members as required.

The contractor's work shall conform to all applicable federal, state, and local building codes. The following shall specifically apply to this job: OHSA and Cal OSHA shall govern all platforms, ladders, and safety issues. Code requirements for environmental engineering concrete structures (ACI 350-01) and commentary (ACI 350-01).

Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades; and the satisfactory performance
of his work.

The construction contractor agrees that, in accordance with generally accepted practices, construction contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project, including safety of all persons and property; that this requirement shall be made to apply continuously and not be limited to normal working hours, and construction contractor further agrees to defend, indemnify and hold design professional harmless from any and all liability, real or alleged, in connection with the performance of work on this project, excepting liability arising from the sole negligence of design professional.

Unauthorized changes and uses: the engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes to the plans must be in writing and must be approved by the preparer of these plans.

The structural engineering performed by the consulting engineer, is limited to new construction only and its effects, if any, on existing structures. Does not make any judgments or conclusions as to the structural integrity of existing structures. All changes to the plans or the scope of work of this job shall be done in writing.

SECTION 27- PIPING AND FITTINGS

27.01 SCOPE OF WORK

Work includes all pipe, fittings, couplings, and other necessary appurtenances as shown, specified, and/or required.

18.02 QUALITY ASSURANCE

A. The Contractor shall furnish all labor necessary to assist the Engineer in inspecting pipe upon delivery. The Contractor shall remove rejected pipe immediately.

B. All pipe of any manufacturer may be rejected if there are unsatisfactory joint assembly operations, even if the pipe conforms to ASTM Specifications. The Contractor shall remove all unsatisfactory pipe of that manufacturer of same shipment from work and shall furnish pipe from another manufacturer conforming to these Specifications.

C. All tests shall be made in conformance with methods prescribed by ASTM and AWWA specifications, and acceptance or rejection is based on the test results.

27.03 SUBMITTALS

A. Certification: Manufacturer certification sheets shall be submitted to the Engineer with each delivery that pipe showing compliance reference standard specified herein.

B. 27.04 GENERAL PRODUCTS

A. Materials used in construction shall be as herein specified. When material is not listed specifically herein or on the drawings, the material shall be as approved, in advance, by the Engineer. The Engineer shall be the sole judge as to the acceptability of any and all materials to be used and of the acceptability of manufacturer's specifications, methods and products.

B. Pipe sizes are nominal inside diameter unless otherwise noted. All sizes shall be as called out on the Plans and specified herein. All pipe and fittings delivered to the job site shall be clearly marked to identify the material, class, thickness, and manufacturer. All material shall be new and free of blemishes.

C. The Contractor is responsible for furnishing and installing all items necessary to make a complete and workable piping system. These include, but are not limited to, valve boxes, manholes, insulating couplings and gaskets, piping specialties and all other items required by the nature of the installation. Any item not specified herein but required by the nature of the installation shall be of the first quality and equal in grade to similar materials specified herein.
27.05 DUCTILE IRON PIPE

A. Ductile Iron Pipe shall conform to the requirements of ANSI/AWWA C111/A21.11-90 and ANSI/AWWA C151/A21.51-90 and shall be cement mortar lined in accordance with ANSI/AWWA C104/A21.4-90. Pipe class thickness shall be Class 50 and pipe pressure rating shall be 250. Pipe shall have joints with “FIELD LOK” Gasket System or equal.

B. Any flanged pipe shall be fabricated in the shop and delivered to the site with flanges in place and properly faced. Threaded flanges shall be individually fitted and machine tightened on matching threaded pipe by manufacturer. Manufacturer's certificates showing conformance with AWWA C115 shall be delivered to the Engineer prior to installation.

C. All buried Ductile Iron Pipe shall be encased in polyethylene conforming to AWWA C105.

27.06 PIPE FITTINGS AND JOINTS FOR DUCTILE IRON PIPE

A. Push-On fittings for pipe shall be ductile iron or grey iron and shall conform to the requirements of ANSI/AWWA C153/A21.10-87 and C110 and ANSI/AWWA C111/A21.11-90 and shall meet a two hundred fifty (250) psi working pressure.

B. Flange fittings for pipe shall be ductile iron, faced and drilled, 125-pound flat face or 250-pound raised face conforming to the requirements of ANSI/AWWA C110/A21.10-87 and ANSI B16, 1-89. All fittings shall be cement mortar lined to match the specified pipe.

C. Push-on joints shall conform to the requirements of ANSI/AWWA C153/A21.10-87 and C111/A21.11-90 and shall meet a two-hundred-fifty (250) psi working pressure.

D. Flanged joints shall be ductile iron and shall be 125-pound flat face or 250-pound raised face, and threaded, conforming to the requirements of ANSI B16.1 for Class 125 and ANSI B16.1 for Class 250.

E. Manufacturer's certificates showing conformance with required specifications shall be delivered to the Engineer at least ten (10) days prior to inclusion in the work.

F. All fittings shall be equipped with “FIELD LOK” Gasket System or equal.

G. Flexible couplings and flanged couplings shall have wedge shaped, natural rubber gaskets, and ASTM 316 stainless steel bolts.

H. Gaskets for flanged joints shall be ring type. The gasket thickness shall be one-sixteenth-inch. Flange assembly bolts shall be stainless steel, hex head machine bolts with heavy hexagonal nuts. Bolt length shall be such that after the joints are made up the bolts shall protrude through the nut not more than ½-inch.

27.07 BOLTING

Bolting shall conform to ASTM A193 Grade B8M studs and washers and ASTM A194 Grade 8M hex head nuts (ANSI Type 316 stainless steel).

27.08 FUSION EPOXY COATING AND LINING

A. Valves, hydrant buries, spools, flanged adapters, and other ferrous materials to be installed underground on water mains and not specifically covered under a separate specification shall be coated with a nominal ten (10) mil minimum to twenty (20) mil maximum thickness of fusion epoxy coating prepared from a 100% dry epoxy resin applied by the fluidized bed method or flocking process. Exterior coating materials shall not be applied to valve stems, valve discs or parallel disc seats. External coating materials shall not build up in thickness to interfere with joint assembly or with operation of the valve or fitting being epoxy lined. Fusion Bonded Epoxy coating shall comply with AWWA C550 Standard as applied to ductile iron pipe.
B. Supplier's certificates showing conformance to this specification shall be delivered to the Engineer prior to installation.

27.09 THRUST BLOCKING AND THRUST RESISTANT FITTINGS

A. Thrust blocks as indicated on the plans to supplement thrust resistant fittings, shall be in accordance with Palo Alto Park Mutual Water Company Standard Details.
B. Cement for concrete thrust blocking shall be Portland Cement conforming to the applicable requirements of ASTM Designation C150 for Type V High Early Strength concrete.
C. Reinforcement for concrete thrust blocking shall be deformed billet-steel bars conforming to the applicable requirements of ASTM Designation A615 for Grade 60 bars.
D. All exposed reinforcing bars required for thrust blocks shall be epoxy coated or stainless steel bars with equivalent load carrying capabilities as specified for deformed steel bars to the satisfaction of the Engineer.
E. Contractor shall form thrust blocks to prevent bearing on other underground utilities. Where this is not practical the Contractor shall form an annular space with Styrofoam around other utilities within thrust blocks.
F. All fittings shall be furnished with mechanical joint thrust resistant fittings, such as Field-Lok or approved equal. Units shall have epoxy coating per these Technical Provisions.

27.10 GENERAL EXECUTION

A. Pipes, connections, and appurtenant work shall be installed in accordance with these specifications.
B. Excavation for thrust blocking shall be neat to the lines and dimensions shown or called for on the Drawings.
C. Existing landscaping, planting, or surface improvements removed, damaged or disturbed due to the installation of water mains, services, or appurtenances shall be replaced in kind to the satisfaction of the Company.

27.11 CONNECTIONS

A. Pipe connections shall be made in accordance with applicable standards and manufacturer's recommendations.
B. Non-conducting connections shall be provided wherever joining dissimilar metals.

27.12 PIPE INSTALLATION

A. General: Pipe, valves, fittings, and appurtenances shall be installed in accordance with applicable provisions of AWWA C600-93 (Ductile Iron). Unless otherwise indicated, the pipe shall have a minimum cover of 3.0 feet measured to finish grade.
B. Handling and Storage of Pipe: Broken or damaged pipe, fittings, or appurtenances will be rejected by the Engineer and shall thereupon be removed from the work site and replaced at the Contractors expense.
C. Alignment: Each length shall be jointed as specified herein.
D. Pipe Deflections: The laying of pipe on curved alignment by means of unsymmetrical closure of joints will be permitted only up to eighty percent (80%) of the deflection recommended by the respective pipe manufacturer. Minimum radius for deflected eight-inch (8") ductile iron water mains shall be three hundred feet (300') without the use of short pipe sections. Short pipe sections may be used for other deflections as approved by the Engineer.
E. Cleaning: Before each new length of pipe is placed, the interior of the preceding pipe shall be carefully cleaned of all dirt and debris. Each pipe shall be maintained free of contaminants and Contractor shall adhere to applicable portions of AWWA C651-92, Section 4 (Disinfection of Water mains) and, if necessary,
corrective actions noted therein shall be employed by the Contractor, at his expense, when unsuitable water or debris enters into the new pipeline.

F. **Bearing:** Pipe in the trench shall have continuous uniform bearing along its bottom, except at bell holes. Blocking may be used to support the pipe during laying. However, it shall be used only at the end of the section and shall be removed before laying the next section.

G. **Positioning:** After final positioning, the pipe shall be held in place in the trench with backfill material placed equally on both sides of the pipe at as many locations as are required to hold the pipe section in place. After joints are completed, the backfill shall be redistributed and compacted as herein required.

H. **Closure:** At the end of each day and when work is not in progress, the open ends of pipe and fittings installed in the line shall be closed with watertight plugs or caps to the satisfaction of the Engineer.

I. **Thrust Block:** Concrete thrust blocks shall be provided at all changes in horizontal or vertical alignment where, in the opinion of the Engineer, thrust resistant fittings do not provide adequate protection and at such other points as may be called for on the Drawings. Thrust blocks shall be installed in strict conformance with the details shown on Palo Alto Park Mutual Water Company Standard Details, included in the Appendix.

### 27.13 CLEANING AND TESTING

#### A. Disinfection

Prior to acceptance and before being placed in service, all new water lines shall be chlorinated in accordance with the requirements of AWWA Standard C651-92. The Contractor shall have the option of applying chlorine to the entire water content of the line, including services, fire hydrants and stubs, in sufficient quantity to produce a residual of at least ten (10) ppm after twenty-four (24) hours retention; or of applying the chlorine to a portion of the water at a higher concentration which is passed through the line as a "slug", at a velo Company which will result in a contact period of at least one (1) hour; all as stipulated in the above mentioned AWWA Standard.

1. If the Contractor elects to employ the use of the "Tablet" form of chlorination by mounting HTH into the pipe sections as they are installed, he shall determine the minimum number of tablets per pipe length that will be allowed. In the event that adequate disinfection is not obtained using said minimum number of tablets, it shall be the Contractor's responsibility to re-chlorinate until a satisfactory result is obtained.

2. After chlorination has been completed to the satisfaction of the Engineer the lines shall be thoroughly flushed until the chlorine content in all parts of the system has been proven by test to be less than one (1) part per million (ppm).

3. It shall be the responsibility of the Contractor to dispose of the flushing water in a manner to be approved by the Engineer and to avoid flooding or damage to adjacent properties or facilities.

4. After flushing the chlorine from the water system, the Contractor shall engage the services of an approved Commercial Water Laboratory, designated by the State of California Department of Public Health, to gather an approved number of representative water samples, the location and number of which shall be determined by the Engineer.

5. No section of the water system shall be accepted when any sample of water tests reveal the presence of any coliform bacteria, i.e., MPN shall not exceed zero coliform bacteria per 100 ml sample. Should the laboratory report show that any sample taken contains any coliform bacteria, it is not acceptable. Contractor shall rechlorinate and test the water again as hereinbefore specified. This process shall be repeated until a satisfactory result has been obtained.

6. Contractor shall direct the laboratory to send copies of its Report of Bacteriological Examination to the Engineer, within two (2) days following completion of laboratory testing.

7. Chlorinated water shall be treated with a neutralizing agent prior to discharge to the storm drain system. Alternatively, chlorinated water meeting all DHS drinking water standards may be released to the water
system upon prior approval of the Engineer.

B. Pressure Testing
The Contractor shall provide all pumps, fittings, labor, equipment and materials and all assistance necessary for the pressure testing of all pipelines. Pressure testing shall be performed in the presence of the Company. Test pressures shall be a minimum of 150 psi or 150 percent of the service pressure for the pipeline, whichever is greater. At no time shall the test pressure be allowed to exceed the working pressure rating of the weakest pipe, valve, fitting or service on the line to be pressure tested.

Test pressures shall be held for a minimum of 2 hours.

Upon completion of pipeline construction all pipelines and pump suction barrels shall be pressure tested and observed for leaks. The Contractor shall schedule the pressure test with the Company at least 24 hours in advance of the test. The pipelines or pump suction barrels shall be filled and carefully brought to the test pressure. Failure of any portion of the system shall be cause for rejection and the Contractor shall promptly identify and correct the deficiencies causing the failure.

This procedure will be followed until an acceptable test is achieved. The Contractor may be charged for the Engineer's time for reinspection for all tests past the first retest.

Allowable Leakage - The allowable leakage will be calculated by the following formula:

\[ La = \frac{ND \sqrt{P}}{7,400} \]

where:  
\( La \) = Allowable Leakage  
\( N \) = Number of joints in the pipe run  
\( D \) = Nominal diameter of the pipe in inches  
\( P \) = Test pressure  

The allowable leakage per 1,000 feet of pipe run at a test pressure of 150 psi for the Class 150 pipelines and 200 psi for the Class 200 pipelines are as follows:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>150 psi</th>
<th>200 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>0.34</td>
<td>0.38</td>
</tr>
<tr>
<td>6&quot;</td>
<td>0.50</td>
<td>0.57</td>
</tr>
<tr>
<td>8&quot;</td>
<td>0.67</td>
<td>0.76</td>
</tr>
<tr>
<td>10&quot;</td>
<td>0.84</td>
<td>0.95</td>
</tr>
<tr>
<td>12&quot;</td>
<td>1.01</td>
<td>1.15</td>
</tr>
<tr>
<td>16&quot;</td>
<td>1.17</td>
<td>1.35</td>
</tr>
</tbody>
</table>

The allowable leakage for differing lengths of pipe runs and higher test pressures will be provided for by direction of the Engineer.

Equipment - The Contractor shall provide a test pump capable of supplying 300 psi static pressure, a means of adding replacement water during the test and gauges and meters to monitor the pressure and replacement water used.

C. Cleanup:
All surplus materials and construction debris remaining upon completion of the Work shall become the property of the Contractor unless otherwise specified herein or noted on the Drawings, and shall be removed from the work site by the Contractor and disposed of off-site in a lawful manner to the satisfaction of the Engineer.

27.14 Abandonment
All abandoned pipes within the trench limits shall be removed. Exposed ends of abandoned water pipes shall be filled
with a minimum of twelve inches (12") of concrete outside of the trench limits. Other abandoned pipes shall be plugged with a minimum of 12 inches (12") of concrete at both ends outside of the trench limits. Contractor shall remove completely the existing pipes within the trench limit and backfill with structural material to be compacted to ninety-five percent (95%) relative compaction. The Contractor shall restore paved sections in kind in conformance with the Standard Trench Detail.

All water mains that are taken out of service shall be abandoned in place. Open ends of pipes shall be plugged with a minimum of 12 inches (12") of concrete. Valves on abandoned lines shall be closed and the valve box and concrete collar shall be removed. Asphalt concrete shall be cut to neat vertical lines around abandoned valves. The valve shall be covered in Portland Cement Concrete to within four inches (4") of pavement surface. The remaining four inches (4") shall be filled with asphalt concrete one-half inch (½"), maximum gradation, properly placed and compacted. An asphalt crack sealer shall be placed around the joint between existing and new asphalt.

SECTION 28 - VALVES

28.01 SCOPE OF WORK

A. The Contractor shall provide all tools, supplies, materials, equipment, and labor necessary for furnishing, coating, installing, adjusting, and testing of all valves and appurtenant work, complete and operable, in accordance with the requirements of the Contract Documents. The Contractor shall furnish and install valve boxes to grade, with covers, extensions, and position indicators.

B. The provisions of this Section shall apply to all valves and valve operators specified in these Specifications except where otherwise specified in the Contract Documents.

C.

28.02 QUALITY ASSURANCE

A. Valve Testing: Unless otherwise specified, each valve body shall be tested under a test pressure equal to twice its design water-working pressure in both directions.

B. Bronze Parts: Unless otherwise specified, all interior bronze parts of valves shall conform to the requirements of ASTM B62, or, where not subject to dezincification, to ASTM B584.

C. Certification: The Contractor shall submit for all valves certified copies of the hydrostatic factory tests showing compliance with the applicable standards of AWWA, ANSI, ASTM, etc.

28.03 RESILIENT-SEATED GATE VALVES

Interior flanged gate valves larger than 3 inches shall be AWWA C500, wheel actuated, resilient seated, all iron body with bronze trim. All small gate valves of a size less than 3 inches shall be Crane Company #438 low pressure gate valve with wedge disc, rising stem and screwed ends.

28.04 FLOWMETERS

Flowmeters shall be a propeller meter Model ML-08 150 psi as manufactured by Water Specialties. Each flowmeter shall indicate flow, record flow and be equipped with a 4-20 ma transmitter proportional to the flow. Readout shall in gallons per minute and million gallons.
28.05 PRESSURE GAUGE ASSEMBLIES
Pressure gauge assemblies shall be furnished and installed as shown on the drawings. Dials shall be nominal 4-1/2 inch diameter. Gauges shall have a shut off valve and pulsation damper between the gauge and the line. Gauge shall be graduated from zero to 200 psi with an accuracy of 2%. Gauges shall be manufactured by Marsh, Ashcroft or equal.

28.06 CHECK VALVES
The check valve shall be an globe type CLA-VAL Model 81-02, pressure class 150, bronze trim, complete with speed control option and all piping. The manufacturer shall set up and calibrate the valve in the field prior to startup.

28.07 AIR RELIEF VALVES
Air relief valve shall be an appropriately sized APCO Model #144 or equal.

28.08 FLANGED COUPLING ADAPTORS
Line size flanged coupling adapters with thrust stud restraint shall be as shown on the drawings.

28.10 VALVE INSTALLATION
All valves, gates, operating units, stem extensions, valve boxes, and accessories shall be installed in accordance with the manufacturer's written instructions and as shown and specified. All gates shall be adequately braced to prevent warpage and bending under the intended use. Valves shall be firmly supported to avoid undue stresses on the pipe. Butterfly valves shall be installed in such an orientation as to allow the placement of the actuator unit directly above the valve assembly. The actuator display, controls, and hand crank shall be readily accessible.

28.09 TESTING
Valves shall be tested at the same time the adjacent pipeline is tested. Joints shall show no visible leakage under test. Joints that show signs of leakage shall be repaired prior to final acceptance. If there are any special parts of control systems or operators that might be damaged by the pipeline test, they shall be properly protected. The Contractor shall be held responsible for any damage caused by the testing.

SECTION 29 - PUMP STATION BUILDING
29.01 DESCRIPTION
The Contractor shall furnish all labor, materials, equipment and incidentals necessary for construction of the buildings as shown on the Drawings. All building construction and components shall conform to the latest provisions of the Uniform Building Code.

29.02 SUBMITTALS
Submittals shall be required for all materials in this Section.

29.03 MATERIALS
A. Earthwork
Earthwork shall conform to Section 24 of these Specifications. Subgrade preparation of the concrete floor slab shall be as shown in Section 24 of these specifications.

A 0.004 inch thick polyethylene film vapor barrier with a 2 inch thick sand insulation layer over the polyethylene film shall be placed on the 3/4 inch drain rock layer.

B. Concrete
All concrete shall comply with the requirements of Section 26 of these specifications.

C. Carpentry and Lumber
The Contractor shall furnish all labor, materials and equipment required to complete all carpentry shown on the Drawings and specified herein including but not limited to the following principal items:

1. All beams and framing for roof or walls.
2. Installation of wood trim.
3. Miscellaneous items of rough and finish carpentry and millwork as required by the Drawings and for a complete installation.
Field conditions: Verify drawing dimensions with actual field conditions. Inspect related work and other surfaces. Report to the Owner's Representative in writing all inaccuracies and all conditions which prevent proper execution of this work.

Reference standards: All millwork shall conform to the requirements of the "Manual of Millwork" as published by the Woodwork Institute of California, current edition.

All materials shall be new, of the grades specified and of the best of their respective kinds.

Face woods: All exposed wood and veneer shall be of cut, slice, quality and species as indicated on Drawings and herein specified. It shall be clear and sound, free from checks or harmful conditioners, selected for figure and color to insure uniform appearance.

Rough hardware: Furnish items required to complete the work.

2. Washers shall be malleable iron.
3. Nails: Galvanized or non-corrosive in locations exposed to moisture. Trim to be installed only with stainless steel, aluminum or hot-dipped galvanized nails which penetrate a minimum of 1-1/2" into solid wood backing.
4. Connectors: All framed connections and beam seats shall be provided with metal connectors KC Metals "Superspeed" Connectors or approved substitute.

Lumber

1. Exterior wood trim: Kiln-dried, clear Heart Redwood, sizes as shown on Drawings.
2. Exterior plywood siding: 3/4" APA rated siding, clear Douglas Fir face, span rating to suit framing, exterior exposure.
4. Glulam beams shall be furnished and installed in accordance with Section 2511 of the Uniform Building Code, Douglas fir, 1600 psi allowable stress.

Adhesives: Except as otherwise specified, all gluing shall be done with Type I, waterproof glue in strict accordance with the manufacturer's recommendations.

Wood treatment: Shall be "Chem-Stop Wood" manufactured by ChemStop Manufacturing and Sales Corp., 9920 Flora Vista Avenue, Bellflower, CA 90706, or approved substitute. All wood sills shall be treated.

Install all wood finish level, plumb and true with members neatly and accurately scribed in place. Apply all trim in lengths as long as practical. Joints shall be tight and so formed as to conceal shrinkage. Bevel butt joints together, exterior angles mitered, interior angles coped. Set all exposed nails in finish for putty. Hammer marks are not acceptable on exposed finished surfaces. All finish work to be sanded and left ready to finish.

Finished wood shall be sealed or back primed on all cut edges and areas concealed in final work.

Mastic: All exterior items required to be weatherproof shall be embedded in mastic or caulked as necessary in accordance with caulking manufacturer's instructions. All material contacting exposed Redwood shall be non-staining type.

D. Gypsum Wallboard
The Contractor shall furnish all labor and materials necessary for completing the gypsum wallboard installation as shown on the Drawings and specified herein.

Gypsum Wallboard shall be 3/4" thick, 48" wide sheets, "WR" (water-resistant) type with tapered edges at both sides; U.S. Gypsum, Gold Bond or approved substitute.
Fasteners shall be 1-1/4" Type 'W' bugle head screws at 8" o/c. on edges and 12" o/c. in field.

Joint reinforcing tape, joint topping compound and texture finishing systems shall be products as recommended by wallboard manufacturer.

Trim:
2. Wall trim: #200-A or #200-B, U.S. Gypsum or approved substitute.

Wallboard application shall be with long dimension across supports.

Apply complete 3 coat taping and topping system at all joints, sanding between last two coats and after last coat. Provide smooth finish ready for painting.

Furnish and install metal trim and other accessories as recommended by the wallboard manufacturer and as shown on the Drawings. Installation to be straight and plumb for clean corners and edges.

E. Roof
The Contractor shall provide all labor, equipment and materials required for the complete asphalt shingle roofing system. The Contractor shall guarantee to make, at their own expense, all repairs necessary on the roofing system due to faulty materials or workmanship for a period of two years after acceptance of the work by the Owner.

The Contractor shall provide a manufacturers twenty-five year warranty for the shingles. The warranty shall be prorated based on replacement cost, not original cost which includes labor as well.

The following materials shall be used:

A. Asphalt Shingles: Shingles shall comply with UBC Standard No. 32-3. Shingles shall be fastened over a base sheet of 30# felt with 10 penny corrosion resistant galvanized nails. Drip flashings shall be installed over facia board.
B. Underlayment: ANSI/ASTM D226, No. 30 unperforated asphalt saturated felts as recommended for use in waterproofing and in construction of shingle roofs.
C. Nails: Standard round wire shingle type, hot dipped zinc coated steel minimum 3/8 inch head diameter and 0.080 inch shank diameter, of sufficient length to penetrate 3/4 inch into roof sheathing.

The Contractor shall perform the following items of work:

A. Verify existing site conditions.
B. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.
C. Verify deck surfaces are dry, free of ridges, warps or voids prior to application of roofing materials.
D. Fill knot holes and surface cracks with latex filler.
E. Broom clean deck surfaces.
F. Place one ply of underlayment with ends and edges weather lapped minimum 6 inches. Stagger end laps of each consecutive layer. Nail in place. Place second ply in a similar lapped and staggered manner and nail in place.
G. Install protective underlayment perpendicular to slope of roof.
H. Weather lap and seal watertight with plastic cement, items projecting through or mounted on roof.
I. Install shingles in accordance with manufacturer's instructions. Nailing pattern to comply with high-wind application.

F. Sheet Metal
The Contractor shall furnish and install all sheet metal fabrications required to complete the work shown on the Drawings and specified herein. The methods of fabrication, assembly and installation shall comply with the standards of the SMACNA Handbook (current edition) and the roofing manufacturer.

Galvanized sheet metal shall be standard brand of commercial quality steel complying with ASTM A526 and ASTM A525. Unless otherwise noted, use 24 gauge sheet metal. Solder shall be 50:50 alloy lead-tin, complying with ASTM B32. Flux shall be non-corrosive raw muriatic acid flux for galvanizing steel.

Fastenings shall be galvanized or cadmium plated, tamperproof fasteners where accessible after installation. Tinned rivets. Dissimilar metals shall be separated with bituminous paint.

Sheet metal shall be formed, fabricated and installed to adequately provide for thermal expansion and contraction and building movement. Sheet metal work shall be watertight and weathertight throughout.

All base flashings, reglets, counterflashings, scuppers and other sheet metal fabrications shall be of proper type for each condition, complete with all hangers, connectors, angles and corners, as detailed, noted on Drawings or appropriate for conditions.

Surfaces of galvanized metalwork which are inaccessible after assembly and installation shall receive shop prime coat as specified elsewhere.

G. Skylights
The Contractor shall furnish materials and equipment and perform labor required to execute this work as indicated on the Drawings, specified herein and necessary to complete the work of this Section, including but not limited to, the following principle items:

a. Skylights
b. Glazing materials
c. Flashing contiguous to the skylights

Manufacturer: Skylights are to be manufactured by O'Keefe's Inc., 75 Williams Ave., San Francisco, CA 94124, (415) 822-4222, or equal. Units to be O'Keefe's Standard Dome Horizonlite Skylight, or equal.

Materials
b. Flashing: Aluminum sheet alloy 5005-H14, minimum .032" thick.
c. Fasteners: Aluminum alloy 2024-T4 or 302 non-magnetic stainless steel. Attach skylights to curb mounting with cadmium plated steel lag bolts with neoprene gaskets.
d. Glazing materials:
   1. Glazing shall be type recommended for a uniform and negative load of 20 psf with a 2.5 safety factor.

Fabrication: Skylights shall be factory fabricated. Provide condensate gutter and weep holes as required.

Finish: Skylights and accessories shall be mill finish as extruded.

H. Doors and Ventilating Louvers
The Contractor shall furnish materials and equipment and perform labor required to execute this work as indicated on the Drawings, specified herein and necessary to complete the work of this Section, including but not limited to, the following principal items:

1. Steel door frame
2. Steel doors
3. Steel ventilating louvers
Reference Standards: Steel doors and frames shall comply with the Steel Door Institute "Recommended Specifications for Standard Steel Doors and Frames" (SDI 100) and other requirements as specified herein.

Submittals: Provide shop drawings to include the following specific information for each type of door, frame and frame condition.

1. Elevations of all frames and doors
2. Jamb and head details
3. Hardware reinforcing details of doors and frames
4. Complete frame descriptive nomenclature
5. Material description and gauges
6. Methods of anchorage
7. Hardware preparation locations

Acceptable manufacturers are Ceco, Steelcraft or approved substitute.

Materials

1. Steel frames: Frames for exterior openings shall be made of commercial grade cold rolled steel conforming to ASTM designation A366, not less than 16 gauge, and shall have a zinc coating of not less than .10 ounces per square foot. Ceco series S or approved substitute, 7-3/4" profile.
   a. Shop paint: Manufacturer's standard pretreatment and baked on rust-inhibitive primer.
   b. All frames shall be formed from 16 gauge cold-rolled steel or galvanized steel formed to the manufacturer's profile with double return back bends to prevent marring wall surface. Frames shall be shop assembled and welded into a single unit, securely installed in the rough opening by means of masonry 'T' anchors and sill anchors. The anchor shall keep the frame rigid in the opening. Each jamb shall be equipped with sill anchors for secure anchorage to the floor.
   c. Standard jamb depth to be 2". Trim, profile and backbends shall be as scheduled and shown on approved shop drawings. Double rabbet profile typical.
   d. Hardware reinforcements: Frames shall be mortised, reinforced, drilled and tapped at the factory for fully templated mortised hardware only, in accordance with approved hardware schedule. Where surface mounted hardware is to be applied, frames shall have reinforcing plates only, all drilling and tapping shall be done on the job. Minimum thickness of hardware reinforcing plates shall be as follows:
      - Hinge reinforcements: 3/16" thick steel
      - Strike reinforcements: 12 gauge
      - Flush bolt reinforcements: 12 gauge
      - Reinforcements for surface: 12 gauge mounded hardware
      - Floor anchors: 14 gauge
   e. All frames shall be provided with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.

2. Steel doors: 1-3/4" thick, 7'-2" high, flush steel door with 18 gauge steel face sheets, factory primed and suitable for painted finish. See Drawings for door widths. Core to be appropriate for exterior installation. Provide concealed metal reinforcement and preparation as required for door hardware and louvers. Doors to be Ceco Regent style or approved substitute. Hardware reinforcements: Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only, in accordance with approved hardware schedule. Where surface mounted hardware is to be applied, doors shall have reinforcing plates having minimum gauges as follows:
   - Hinge reinforcements: 7 gauge
   - Reinforcements for lock face, flush bolts, or concealed holders: 12 gauge
   - Reinforcements for all other surface mounted hardware: 16 gauge

3. Steel ventilating louvers: Provide Anemostat Model AFDL steel inverted Y, non vision louver or equal.
   a. Material: 18 gauge cold rolled steel frame and 20 gauge cold rolled steel louver blades.
c. Size: Size to suit 2'-0" x 2'-0" opening in door and size shown on drawings. Door thickness to be 1-3/4".
d. Fasteners: Provide tamperproof or concealed fasteners.
e. Minimum 50% free area.
f. Provide with optional mesh insect screen.

I. Hardware
The Contractor shall furnish all hardware with each item clearly marked or numbered for easy cross reference with the Hardware Schedule. Deliver all finish hardware to the job site with all labels intact and legible. Verify that each item is complete with all necessary pieces and is properly wrapped and cushioned to prevent damage prior to installation.

Submittals

Product data: Submit the following items

1. A "Door Schedule" listing all doors in the work, and other locations requiring finish hardware, and assigning a "Hardware Group" to each such door and other locations.
2. A "Finish Hardware Schedule" listing each of the proposed "Hardware Groups", and defining in detail the proposed contents of each Hardware Group.
   a. Show the quantity of each type of item proposed to be supplied within each Hardware Group.
   b. Show the dimensions, when pertinent, and the manufacturer's catalog number.
   c. Show the finish of each item.
   d. Show the manufacturer's name by suitable legend.

Fasteners: Furnish necessary screws, bolts, and other fasteners of suitable size and type to anchor the hardware in position according to the recommendations of the hardware manufacturer.

Locksets and trim: CECO 1534, no substitute. Backset to be 2-3/4".

Butt hinges: Hinges to be supported full length in oilite sleeve bearings. All butts shall have flat tips and non-rising steel pins.

Silencers: Furnish for door frames at the rate of three for each single door and two for each door at pairs of doors.

Finishes: All hardware finishes to be US10B, Oil Rubbed Bronze, unless noted otherwise. Thresholds, dust proof strikes, door shoes and other accessory items to be bronzed aluminum or similar in appearance.

Door Holder: Door holder shall be Glynn-Johnson GJ 70M Series, heavy duty 1/2" arm.

Other materials: Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the review of the Engineer.

J. Lighting and Electrical
The Contractor shall install lighting and electrical work as shown on the drawings and in conformance with Section 35 of these Specifications.

29.04 CONSTRUCTION
The pump building shall be constructed in complete conformance with the requirements of the latest edition of the California Building Code.
SECTION 30 - PAINTING
The building and all exposed piping, valves, and metal appurtenances shall be painted. Surfaces to be painted shall be clean, dry, and all foreign materials shall be removed from the surface. Iron and steel surfaces shall be prepared in accordance with the surface preparation specifications of the Steel Structures Painting Council (SSPC).

Prior to painting, the Contractor shall submit a color chart and complete manufacturer's information on the painting system and manufacturer selected. Paint shall be as manufactured by Sherwin-Williams Company, Koppers Company Inc., Tnemec Company Inc., or equal.

Galvanized surfaces shall be solvent cleaned, washed with a 10% muriatic acid, and washed with fresh water. A pretreatment primer shall be immediately applied after washing.

Ferrous metal surfaces shall have a prime coat of phenolic primer at least 1.6 mills thick, followed by two coats of alkyd paint at least 1.5 mills thick each.

Galvanized surfaces shall have a prime coat of a passivator at least 0.5 mills thick, followed by two coats of vinyl/enamel at least 1.5 mills thick each.

Sheet rocked surfaces shall have one coat of enamel undercoat, followed by two coats of enamel.

Outside walls shall have one coat block wall primer followed by one coat of Graffiti Shield and primer. Graffiti Shield shall have a five (5) year warranty.

Interior and exterior wood trim shall have one coat primer followed by two coats of gloss enamel.

Code required labels or equipment identification, performance ratings, name or nomenclature plates shall not be painted.

SECTION 31 - PUMP AND MOTOR
31.01 GENERAL
The Contractor shall furnish all labor, materials, equipment and incidentals necessary for installation and construction of the well pump and vertical turbine pumps as shown on the Drawings. The work shall include, but not necessarily be limited to, manufacturing, furnishing, transporting, installing, adjusting, starting, training and all related work.

31.02 SUBMITTALS
Submittals shall be required for all materials in this Section. No pump equipment shall be shipped until the required drawings and curves have been submitted to and approved by the Company.

31.03 WELL PUMP
The Contractor shall furnish and install one multistage deep well vertical turbine pump that conforms to Part B Sections of AWWA E101. The pump for the well shall have the general characteristics and be suitable for installation at the setting shown below:

<table>
<thead>
<tr>
<th>Speed</th>
<th>1770</th>
<th>Flow Rate (gpm):</th>
<th>200</th>
<th>400</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Potable Water</td>
<td>TDH (ft):</td>
<td>210</td>
<td>185</td>
<td>130</td>
</tr>
<tr>
<td>S.G.</td>
<td>1.0</td>
<td>Max NPSHR (ft):</td>
<td>8</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>Viscosity</td>
<td>1.2x10-5 sq. ft</td>
<td>Min Eff. (%):</td>
<td>50</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>Type</td>
<td>Submersible Deep Well Turbine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Column Size</td>
<td>4&quot; ID</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Column Length</td>
<td>150 feet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case or Bowls</td>
<td>Bronze</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bowl Diameter</td>
<td>10&quot; maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Type</td>
<td>Premium Efficiency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>230 Volt, 60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horsepower</td>
<td>30 HP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temp.</td>
<td>40 Degrees C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The pump shall be a Floway Pump 8FKH, 10 stage, 30 hp pump or equal.

**31.04 REQUIREMENTS**

The Contractor shall submit performance curves, shop and assembly drawings. The drawings shall show the dimensions, rating, component parts, arrangements, and materials of construction for all items covered under this specification. The performance curves shall be based on data secured during actual tests run at the factory on the model pump proposed for installation and signed by a representative of the manufacturer. The curves shall show model, size and trim of the impeller, and the developed head, brake horsepower, NPSH, and efficiency at intervals not to exceed 100 gpm in capa Company for the pump operating at the specified speed over the operating range of the pump.

The pump shall be designed for pumping clear, cool water. The pump characteristics shall be such that the motor name plate rating is not exceeded at any point on the operating curve of the pump.

All hydraulic velocity head and friction losses between the bottom of the pump and the pump discharge head outlet shall be considered in the pump design, pump performance and the maximum brake horsepower, including coupling losses, internal losses in the pump and such losses expressed in feet of water shall be added to the specified total pumping heads in the selection of the pump offered from the pump bowl performance curves. Pump bowl settings shall be set by the manufacturer.

1. **Materials** - Materials shall be as specified herein and shall meet the minimum requirements stipulated in the AWWA Specifications, free from all defects and imperfections.

2. **Pump Discharge Head Assembly** - The discharge head shall be accurately machined fabricated steel ASTM A283 GRB and shall incorporate a ASA standard flange connection.

3. **Pump Head** - The pump shall have a mechanical seal. The head shaft shall be heat treated ASTM A-582 Type 416 stainless steel turned and ground and shall be straight within 0.005 inch total indicator reading for a 10 foot section. The head baseplate shall be fabricated steel and sized for bolting to the concrete pedestal and pad. Copper drain pipe shall be provided.

4. **Column Assembly** - The pump shall be of the open lineshaft type with water utilized for bearing lubrication. The line shafts shall be of ASTM A-582 Type 416 stainless steel, turned and ground. They shall meet the minimum requirements of ANSI B.58, 1-1971 Section 4.3. The discharge bowl shall be screwed directly to the discharge head.

5. **Pump Bowl Assembly** - The pump discharge bowl, intermediate bowls and the suction bell shall be cast iron per ASTM A-48, CL30, accurately machined and free of all casting imperfections. The impellers shall be bronze, statically and dynamically balanced for the hydraulic conditions. The pump shaft shall be stainless steel per ASTM A-582, Type 416. All impeller keys and thrust rings shall also be stainless steel per ASTM A-582, Type 416. All bowl bearings shall be hi lead bronze, per ASTM B-584, alloy 938. The suction bell bearing shall be packed with a high grade of waterproof grease.

6. **Pump Impeller** - Pump impeller shall be bronze of the enclosed impeller type. The impellers shall be hydraulically and dynamically balanced. All exterior surfaces shall be machined. Interior surface of water ways shall be hand finished. The impeller shall be accurately balanced and locked to the shaft with a tapered lock bushing.

7. **Safety Screens** - All rotating shafts shall be provided with safety screens.

8. **Discharging Head Drain** - A 1/2" Type M copper tubing drain shall be installed with a 1" air gap to
the pedestal drain.

Contractor shall be responsible for the proper selection of a motor for the given application, torque and thrust developed by the pump under the operating conditions. The motor shall be suitable for variable frequency drive control. The horsepower rating shall be sufficient to drive the pump at all points on the head discharge curve. Motor material, workmanship, and tests shall conform with the requirements of NEMA, IEEE, and ANSI. All motors shall be high efficiency motors.

The motor shall be suitable for variable frequency drive speed control. The motor shall drive the pumps continuously under the specified operating conditions without exceeding allowable temperature for the class of insulation used. Efficiency and power factor at the rated load, speed, and frequency shall be as high as possible for the motor size. Guarantee values of efficiency and power factor at full, 3/4 and 1/2 load shall be supplied.

The motor shall conform to the following requirements:

a.  Bearing - Motor bearings shall be selected to have a life of 100,000 hours calculated minimum B10 rated bearing life per ANSI B3.15 when operated continuously at the rated speed of the motor and at the total dead weight load plus hydraulic thrust load imposed on the motor by the pump, when pumping in the operating range.

b.  Lubrication - The motor bearing shall be grease or oil lubricated as applicable provided that a visual level indicator and accessible filling plug are provided for oil lubricated motors. The lubrication system shall be designed to provide the correct quantity of the lubricant with a minimum foaming or aeration. The motor shall have a stainless steel plate, indicating all essential lubrication information such as type, viscosity, and frequency of lubrication.

c.  Protective Devices - The booster pump motor shall be equipped with a 120 volt space heater for operation when the motor is de-energized by the motor control. The space heater shall be of the size to prevent moisture condensation in the enclosure. The maximum size shall be 75 watt.

d.  Enclosure and Frame - Motor enclosure and frame shall be cast iron or heavy fabricated steel of such design and size to hold all motor components in proper position. The motor shall be of the open drip proof type. Lifting attachments shall be provided on the motor enclosure.

e.  Nameplates - The motor shall have a stainless steel plate upon which shall be indicated the motor connection diagram, and shall have a stainless steel name plate upon which the type, frame, insulation class, full load current, rpm, centigrade degree rise, manufacturer's name, serial number, model, voltage, locked rotor KVA code, and bearing numbers are recorded.

31.05 INSTALLATION

The pumps shall be installed in accordance with the approved procedures shown on the shop and assembly drawings. The equipment shall be tested in the presence of the Company by an authorized pump manufacture representative who shall certify, in writing, that the pump is operating in compliance with these specifications and free of binding, scraping, vibration, or other defects. Each pump shall be run and monitored for a minimum duration of 4 continuous hours during a test period. The Contractor shall run a pump efficiency test in for each pump as shown in Five copies of the efficiency test results shall be supplied.

The Contractor shall furnish any necessary oil and grease as recommended by the manufacturer for initial operation and a period of one (1) year.

The Contractor shall completely disinfect the pumps in accordance with applicable requirements of the DOHS and AWWA A100 prior to the acceptance of the work by the Company's Representative. The Contractor shall submit the proposed method of disinfection to the Company no later than 20 days after award of the contract. Sampling and bacteriological analysis will be completed and paid for by the Company. The pump shall be steam cleaned to assure that no residue of oils or solvents remain which could contaminate samples being tested for volatile organic chemicals. The Contractor shall supply written verification that cleaning has been accomplished.

31.06 PUMP EFFICIENCY TESTS
The following information and field test shall be preformed for the pump on this project:
PUMP EFFICIENCY TEST

Pump Station

Palo Alto Park Mutual Water Company
Date_________

A. NAME PLATE DATA:
1. Power Meter: Make______ Type______
   Serial No._______ Amps_______ Volts_______ Phase_______
   Wires ______________ Kh (Disk constant)________________________
   Km (meter installation constant)____________________________
2. Motor: Make__________ HP__________ Voltage_______________
   Full Load Amps_______ Phase_______ Meg. Reading (cold)_______

B. TEST DATA
1. Normal Load (run 30 minutes at normal load)
   A. Water
      1. Pump Flow_______________________________ Gallons
      2. Water Level (not pumping)_______________ P.S.I.
      3. Water Level (pumping)___________________ P.S.I.
      4. Discharge Pressure______________________ P.S.I.
   B. Electrical
      1. Motor Amps L1__________ L2__________ L3__________
      2. Motor Volts L1-L2_______ L1-L3_______ L2-L3_______
      3. Power Meter Disk Revolutions____________________
      4. Meg. Reading (hot)____________________________

2. Shut-off Load (run one [1] minute at shut-off load)
   A. Water
      1. Water Level______________________________ P.S.I.
      2. Discharge Pressure________________________ P.S.I.
   B. Electrical
      1. Motor Amps L1_______ L2_______ L3__________
2. Motor Volts L1-L2______ L1-L3______ L2-L3______

C. Remarks (condition, etc.)____________________________
_____________________________________________________
_____________________________________________________

D. Calculation
1. Input electrical HP = Disk RPM x Kh x Km =_______
   12.45
2. Reactive input Electrical HP = Amps x Volts =____
   431
3. Power Factor % = #1/#2 x 100 = _________________
4. Water HP =

   GPM (water level running + Discharge Pressure x 2.31)
   3960
   = _________________________________
5. Overall Plant Eff. % = #4/#1 x 100 =

________________________________________________

Water Test by _______________________________
Electrical Test by __________________________
Calculation by ______________________________

APPROVED BY _________________________________

SECTION 32 - ELECTRICAL
32.01 SCOPE
Electrical work includes all labor, tools and materials necessary to furnish, install, document, test and place into operation complete and operable electric power, lighting, and control systems as shown and/or specified.

The Contractor shall examine the specifications for the various items of mechanical equipment and shall provide all starters, circuit breakers, switches, pushbuttons, and other controls and appurtenances which are not specified to be with the mechanical equipment. The Contractor shall erect all electrical equipment not definitely stated to be erected by others and shall furnish and install all conduits and cables necessary to make all connections required to place all equipment in complete operation.

The contractor shall verify existing equipment and provide all required new items for a complete installation as indicated.

32.02 DRAWINGS
The electrical layouts indicated are generally diagrammatic. The location of equipment is approximate unless dimensioned. The exact locations and routing of conduits shall be governed by structural conditions and physical interferences and by the location of electrical terminations on equipment.
All equipment shall be located and installed so that it will be readily accessible for operation and maintenance. The Owner reserves the right to require minor changes in location of equipment, prior to roughing in, without incurring any additional costs or charges.

The Contractor shall examine the drawings for the various equipment in order to determine exact routing and final terminations for all conduits and cables. Conduits shall be stubbed up as near as possible to equipment terminals.

Electrical work shall be performed in cooperation with all other trades in order to secure the best arrangement of the work as a whole. No changes in the work shall be made without the written acceptance of the Owner.

### 32.03 PERMITS AND FEES
The Company will pay all costs incident to obtaining and connection PG&E Company power and AT&T telephone service on the new location. The Company will pay the cost of all testing and commissioning power. The Contractor shall comply with all requirements of PG&E regarding temporary and permanent power service.

### 32.04 TEMPORARY INSTALLATIONS
Temporary installations used during construction shall conform to the requirements of the California Administrative Code, Title 8, Industrial Relations Safety Orders (ESO), National Electrical Code (NEC), and the California Construction Safety Orders for the protection of personnel and property.

### 32.05 CODES
The completed installation shall, as a minimum requirement, comply with all applicable requirements of the latest edition of the NEC and the requirements of any local codes or requirements effective at the construction site.

### 32.06 RULES AND REGULATIONS
All work and material shall be in full accordance with the latest rules and regulations of the following:

1. California Administrative Code, Title 8, Chapter 4
2. National Electrical Code
3. Local Company and County Codes
4. Applicable regulations of local utility companies
5. WUESSC Standards
6. General Order 95 of Public Utilities Commission
7. Occupational Safety and Health Act (OSHA) Standards

Nothing in these drawings or specifications shall be construed to permit work not conforming to the above codes. Any conflict with the designs as shown or implied shall be resolved by the Owner.

### 32.07 EXAMINATION OF SITE
The Contractor shall be held to have visited the site and satisfied himself/herself as to the conditions under which the work is to be performed. The Contractor shall check existing conditions which may affect the work required. No allowances shall be subsequently made in the Contractor's behalf or any extra expense to which he/she may put due to failure or neglect to discover conditions affecting his/her work.

### 32.08 MATERIALS
All material shall be new, free from defects and of the quality specified or shown, and shall be approved and listed by Underwriters' Laboratories, Inc. (UL) for the purpose for which it is to be used. Each type of material shall be of the same manufacture and quality throughout the work.

### 32.09 SUBMITTALS
The Contractor shall, within 14 days after the notice to proceed, submit six copies of a complete material list with brochures containing complete product information and catalog cuts on all equipment. Any materials erected by the Contractor prior to acceptance of the same will be at his/her own risk and materials not accepted must be removed immediately from the site.

Shop drawings shall be submitted for acceptance prior to manufacture for panelboards, switchboards, and control panels. These drawings shall show layouts, dimensions, construction details, elementary diagrams, connection diagrams, and nameplate engraving tables. All diagrams shall conform to Joint Industrial Conference (JIC) standards.
Submittals shall also meet the requirements of any Special Provisions of these specifications.

Should the Contractor fail to submit the specified items within the time schedule or fail to name items meeting specifications, then the right is reserved by the Owner to select any or all items in question which shall be final and binding upon the Contractor. The materials selected or approved by the Owner shall be used in the work at no additional cost to the Owner.

Should the Contractor's first submittal fail to meet approval, then the right is reserved by the Owner to select any or all items or systems whose selection shall be final and binding upon the Contractor. The items or systems selected or approved by the Owner shall be used in work at no additional cost to the Owner.

Whenever an item of equipment or system is described herein or on the drawings in a descriptive, functional, or operational manner as opposed to catalog number or type, then the Contractor's submittal shall include all such descriptive, functional, or operational features to prove full equality to specified item or system.

Approval of substitution does not authorize any deviation from the utility, size, or function of the specified item unless specifically pointed out and approval requested in the letter of submittal. Responsibility for conflicts due to space limitations is not relieved by approval of a substitution.

Should any item deviate from these specifications, the deviations shall be clearly identified and explained upon submittal.

Unless otherwise shown or specified, material shall be new, full weight, standard, the best quality of its kind, and satisfactory to the Owner. Unless otherwise shown or specified, major equipment shall be the product of a manufacturer who has, for a period of not less than five (5) years, been in successful manufacture of the equipment and who has a nationally distributed catalog covering ratings and specifications of said equipment.

Samples of fixtures, materials, and equipment shall be submitted for approval of the Owner, if requested.

### 32.10 IDENTIFICATION OF EQUIPMENT

Engraved Nameplates shall be installed on electrical equipment. Nameplates shall adequately describe the item and its function or use of the particular equipment involved. Equipment to be labeled shall include the following:

1. Individual enclosures such as disconnect switches, timers switches, pushbuttons, contactors, relays, motor starters, etc.
2. Group mounted equipment such as panelboards.
3. Individual circuit breakers on switchboards.

Nameplate material shall be laminated phenolic plastic, black front and back with white core. Engraving shall be through the outer layer. Embossed plastic pressure sensitive labels are not acceptable.

In lieu of plastic plates, typed pasteboard insert fastened behind clear plastic holder and installed inside door may be used to identify circuit breakers in panelboards.

Nameplates shall be securely fastened to the equipment with No. 4 Phillips round head stainless steel, self-tapping screws or brass bolts.

### 32.11 PHASE ARRANGEMENT

The phase arrangement when facing the front panels, shall be A-B-C from left to right, front to back, and top to bottom. All relays, instruments, other devices, buses, and equipment involving three-phase circuits shall be arranged and connected in accordance with this phase arrangement whenever possible. Similar devices shall be wired in a similar manner.

### 32.13 CONDUCTORS

#### Circuit Identification

Each branch circuit and control conductor shall be labeled with the circuit number or terminal number it is connected to. Use T&B Vinyl or Brady Permashield Mylar Markers. Conductors shall be labeled at control equipment, pullbox,
and each point of utilization such as fixtures, motors, controls, etc. Labeling shall correspond to control diagrams where applicable.

**Connection to Terminals**

Connection to terminals shall be as follows:

1. Use lugs or socket type terminals furnished with equipment.
2. For No. 10 and smaller: T&B, Sta-Kon, Buchanan "Termend" or approved equal, self-insulated forked tongue lug.
3. For No. 8 to No. 4/0: single hex head screw or bolt clamp type with double-hole-tongue, T&B Locktite, or Burndy Quicklug Type QA.

**Splices**

1. For No. 10 and smaller including fix taps: pre-insulated spring type connectors 3M Scotchlocks, T&B piggy, or equal.
2. For No. 8 to No. 4: split bolt service connectors, T&B locktite, Burndy Servit, or equal, insulated with Scotch No. 88 Okoweld four purpose tape.
3. Splices in underground pull boxes or in other areas subject to moisture shall be provided with cast resin kits. Use Scotchlock sealing packs for wire size to No. 10 and Scotchlock kits for larger splices as recommended by 3M Company. All splices to be prepared as herein before specified before resin kits are applied.
4. Wire splicing devices shall be sized according to manufacturer's recommendations.
5. Direct burial signal cables shall not be spliced. Conductors in control equipment, etc., shall be laced with T&B TY-RAP. Ultra Violet rated wire ties shall be used where applicable.

**32.14 RECORD DRAWINGS AND OPERATING/MAINTENANCE MANUALS**

Record drawings and operating manuals shall be furnished by the Contractor in four bound and indexed (with tabs and table of contents) sets, covering the following items:

1. Exact location of all underground or buried conduits.
2. Shop drawings of all panelboards, wiring diagrams, and control equipment.
3. Detailed control wiring diagrams, both schematic and as-built construction interconnection wiring for all control panels, motor starters, and transformers.
4. Maintenance and operation manuals clearly showing and explaining operation of all starters, circuit breakers, controls, and electrical equipment.
5. Renewal parts lists for all equipment requiring maintenance, adjustment, or repairs.
6. In addition to the above, all CAD drawings and details shall be provided on magnetic media and compatible with AutoCad 12.

Operation and maintenance information must be provided at least 14 days prior to final equipment operational tests. One additional set of record drawings of the exact location of all underground or buried conduits shall also be provided.

**32.15 MATERIALS GENERAL**

1. Electrical materials shall bear the label of or be listed by the Underwriters Laboratories.
2. Materials and components shall conform to industry standards including:
   - ANSI - American National Standards Institute
   - ASTM - American Society for Testing Material
   - CBM - Certified Ballast Manufacturers
   - ICEA - Insulated Cable Engineer's Association
   - NECA - National Electrical Contractor's Association
   - NEMA - National Electrical Manufacturer's Association

**32.16 RACEWAYS AND FITTINGS**

**Conduit Fittings**

Except where otherwise noted, conduit fittings shall be Appleton, Crouse-Hinds, or approved equal. Unilets shall be malleable iron and fitted with cover and gasket.

**Conduit Supports**

Kindorf, Unistrut, T&B, or approved equal. All multiple hanger and support parts shall be zinc coated by hot
dipping or electroplating or otherwise protected against corrosion.

**Conduit Straps**
T&B, Gedney, or approved equal, one or two hole malleable iron or snap type steel with ribbed back, galvanized or cadmium plated. Conduit straps and clamps used with plastic jacketed conduit shall be plastic coated.

**Rigid Steel Conduit**
- Standard weight, zinc coated, or approved corrosion resistant coating on inside and galvanized on the outside.
- Fittings shall be threaded and finished similarly to conduit. Threadless fittings shall not be used. All joints shall be coated with conductive anti-seize compound, T&B, Koprshield, or approved equal.
- Where installed in contact with earth or fill material, conduit shall be wrapped with net four layers (two layers half-lapped) of Schotchrap No. 50 or approved equal, or shall be PVC coated.
- Conduits not connected with locknuts and bushings shall be fitted with insulated grounding bushing, OZ "BL" Series, UL approved and bonded. Grounding bushing shall be used whenever grounding conductors are installed.
- Conduits connected to boxes, cabinets, etc., exposed to weather or in areas subject to excessive moisture shall be fitted with water-tight sealing hubs of steel or malleable iron with sealing ring and insulated throat. T&B 370 series, EFCOR 40-50B series, or approved equal.

**Liquid-Tight Flexible Metal Conduit**
- Minimum trade size: 1/2-inch
- Connectors: Appleton STB Series, Crouse-Hinds, or approved equal may be used.
- Length shall be practical minimum but to allow for movement of equipment connected without restricting flexibility of conduit.

**PVC Conduit, Schedule 40 and 80**
PVC conduit shall be provided for horizontal embedded runs (rigid elbow risers) except as noted on the drawings provided that it is UL listed and labeled for direct burial and meets the following requirements:
- Minimum trade size: 3/4-inch
- Shall be used with minimum of 3 inch red concrete envelope when used with voltages higher than 240volts.
- Continuation of run above grade or slab shall be galvanized rigid steel.
- Duct separation shall be provided using plastic conduit spacers specifically designed for the purpose. Place spacers maximum of 4 feet 0 inches on center.
- Bends, elbows, and risers shall be made with rigid galvanized steel conduit using threaded adapters. Protect metal portions from corrosion as specified hereinbefore.
- A copper bonding conductor shall be pulled in each raceway and bonded to equipment at each end with approved lugs.
- Conduit to be at least two feet below finished grade for all horizontal runs.

**PVC Coated Conduit**
Direct buried conduit, where provided in lieu of encased PVC, shall be plastic coated, rigid steel conduit having a 40 mil thick polyvinyl chloride coating. Bond strength shall exceed the tensile strength of the plastic coat. All fittings used with plastic coated conduits shall be similarly coated with not less than 40 mils of polyvinyl chloride and shall be provided with Type 316 stainless hardware.

Conduit and fittings shall be as manufactured by Occidental Coating Company, Pittsburgh Standard Conduit Company, Plastic Applicators Division Schlumberger Corp., or approved equal.

**32.17 CONDUCTORS**
Wire and cable for power, lighting, and control shall be in raceways and shall be as follows:
1. Minimum size shall be No. 12 AWG unless noted otherwise.
2. All wire shall be Class B stranded copper unless noted otherwise on the drawings. Solid copper wire shall not be used.
3. Insulation shall be type THWN or THHN except all aerial cable shall have crosslinked polyethylene insulation. Conductors for grounding may have TW insulation. All insulation shall be 600V rated.

Conductors in sizes up through No. 10 AWG shall have solid color finish. No. 8 AWG and larger shall be coded by
application of phase tape for minimum of six inch length on conductor. Coding shall occur on all splices and termination and pull boxes.

32.25 TESTING AND START-UP

General
This section covers the tests and checks that shall be made on all electrical equipment and wiring to ensure compliance with all applicable codes and standards including the intended design and specifications. If possible, all checks and tests shall be made prior to energizing the equipment or circuits. The Owner shall be given at least 48 hours advance notice of testing, and he/she shall have the right to witness the tests.

The Contractor shall furnish all power, labor, material, instruments, and tools to make all connections, adjustments, and other work required to satisfactorily inspect, test, and start up the equipment, systems, and subsystems. All protective devices shall be operative while the above work is being performed.

Joints and connections in conductors No. 4 AWG and larger shall be inspected by the Owner after the joints have been made and prior to application of any insulating material. After the visual inspection of joints and connections and the application of tape and other insulating materials, all sections of the complete system of wiring shall be thoroughly tested for shorts and grounds. The Contractor shall correct all defects and retest for shorts and grounds.

Before testing and energizing a system, all necessary precautions shall be taken to ensure the safety of personnel and equipment. All conductors and electrical equipment shall be properly insulated and enclosed. All enclosures for conductors and equipment shall be properly grounded. Insulation resistance measures must have been made and approved on all conductors and energized parts of electrical equipment.

Minimum acceptable values of insulation resistance shall be in accordance with the applicable ICEA, NEMA, or ANSI standards for the equipment or material being tested unless greater values are specified. The temperature at which insulation resistance is measured shall be recorded.

Test reports shall be prepared to document all tests required by these specifications. To facilitate accurate reporting of results, the Contractor shall prepare and submit for approval 30 days prior to testing all test forms to be used during testing.

Final test report forms, calibration results, and pertinent data shall be furnished by the Contractor in three bound sets within 14 days after completion of the final tests.

Wire and Cable Tests
The insulation resistance of each circuit phase-to-phase and phase-to-ground shall be measured with a 500 volt megger as follows:

1. Motor feeders shall be measured with the motor disconnected.
2. Control circuits shall be measured with push buttons, interlocking relays, instruments, overcurrent devices, and the like disconnected.
2. Power feeders shall be measured with switches and circuit breakers in place. Values of resistance less than 10 megohms will be unacceptable.

Equipment Tests
1. Control Panels
   The following tests shall be carried out:
   a. Megger, using a 500 volt megger, all power and control circuits. All measurements shall be recorded and two copies shall be supplied to the Owner. Any measurement of less than 10 megohms shall be immediately called to the attention of the Owner for final decision of acceptability.
   b. Check the wire terminals for solid, clean connections.
   c. Check all control devices for proper operation.
   d. Check the thermal overload heaters for each motor and the reset mechanism.
e. Check the motor nameplate full-load circuit as the basis for checking the heater selection.
f. The thermal overload heaters shall be in accord with the starter manufacturer's heater tables for motor enclosure and starter enclosure.

2. Phase Rotation
The following tests shall be carried out:
   a. The connections of all equipment shall be checked for correct phase rotation.
   b. The NEMA and ANSI standard phase rotations are 1, 2, 3 counting from front to back, top to bottom, left to right as viewed from the operating mechanisms side.

3. Circuit Breakers
The following tests shall be carried out:
   a. Inspect each circuit breaker.
   b. Check for loose connections.
   c. Operate each circuit breaker manually.
   d. Set the adjustable trips to the values as required by the Owner.

Motor Data
The Contractor shall compile by visual inspection of equipment installed and field measurement, for each motor, the following data in neatly tabulated form:
   1. Motor number
   2. Drive title
   3. Horsepower
   4. Volts
   5. Nameplate amperes
   6. Code letter
   7. RPM
   8. Service factor
   9. Enclosure
   10. NEMA design letter
   11. Insulation resistance
   12. Overload heater catalog number and ampere rating
   13. Frame size
This information shall be filed with the Owner, five copies of all data, ten days prior to start-up of any equipment.

Motor Testing
Each motor shall have its insulation resistance to ground measured with 500 volt megger prior to connection for acceptance testing. After start-up of each motor, the current on each phase shall be measured with the motor running at maximum operating load. All measurements shall be recorded and two copies shall be supplied to the Owner. Any megger reading of less than 10 megohms or current reading greater than the motor nameplate full load current shall be immediately called to the attention of the Owner for final decision of acceptability.

Final Test (Electrical)
Insulation resistance measurement of each 480 volt circuit shall be made, using a 500 volt megger with loads connected and all contacts, if any, shall be blocked closed to give complete circuits.

Insulation resistance of complete circuit shall be measure from the circuit breaker load terminals with the breaker open. Values of resistance less than 10 megohms shall be brought to the attention of the Owner. All new equipment, subsystems, and systems shall be operated to demonstrate to the Owner proper operation. Length of operation and sequencing of operation shall be determined by the Owner.

Equipment, subsystems, and systems may be tested in part or in whole for a preliminary test but final testing shall, if required by the Owner, be run on a completed system or in conjunction with other associated systems.

When a system fails a test, or is otherwise worked on to correct defects or otherwise changed or adjusted, retesting shall be performed on the entire system and associated systems to demonstrate proper overall operations. The above
tests shall be made in the presence of the Owner and the results recorded by him/her. All deficiencies or unsatisfactory conditions as determined by the Owner or inspecting authorities shall be corrected by the Contractor as part of the work. The Contractor shall provide a letter of certification that testing, as specified herein, has been accomplished which shall be included in the three sets of test report.