APACHE JUNCTION WATER UTILITIES COMMUNITY FACILITIES DISTRICT CONSTRUCTION AGREEMENT BETWEEN WATER UTILITES COMMUNITY FACILITIES DISTRICT (APACHE JUNCTION) AND YELLOW JACKET DRILLING SERVICES, LLC FOR DRILLING AND INSTALLATION OF SUPERSTITION VISTAS WELL #10

THIS AGREEMENT made and entered into this _____ day of _____, 20_, by and between APACHE JUNCTION WATER UTILITIES COMMUNITY FACILITIES DISTRICT (hereinafter designated as "District"), an Arizona Municipal corporation, and YELLOW JACKET DRILLING SERVICES, LLC, an Arizona limited liability company, (hereinafter "Contractor"), both of which may be identified as the "Parties" collectively or as a "Party" individually.

RECITALS

A. In response to District's Notice Inviting Bid Proposals dated July 16, 2025, Contractor submitted a proposal dated July 28, 2025, in which Contractor asserted its willingness, ability and qualifications to provide this work and service.

B. District and Contractor desire to set forth herein their respective responsibilities and the manner and terms upon which Contractor shall render the services.

AGREEMENT

NOW, THEREFORE, District retains Contractor to perform, and Contractor agrees to render the services in accordance with the terms and conditions set forth as follows:

1. PROJECT DESCRIPTION: Contractor shall do and perform or cause to be done and performed in a good workmanlike manner, the Work in accordance with and as more fully described in the Notice Inviting Bid Proposals for Project No. 2025-02 Drilling and Installation of Superstition Vistas Well #10 and in accordance with specifications, drawings and addenda, attached as Attachment "A" hereinafter referred to as the "Contract Documents" which also includes this agreement, all incorporated by reference.

2. PAYMENTS & COMPLETION: The total amount payable by District to Contractor is an amount not to exceed Two Million Two Hundred Eighty Five Thousand Four Hundred Thirty Five Dollars and Fifty Three Cents ($2,285,435.53) (the "Contract Sum") for the performance of the Work under the Contract Documents. Upon notice that the Work is ready for final inspection or acceptance, District representative shall promptly cause to be made an inspection. When District finds the Work acceptable under the Contract Documents, District shall promptly submit for processing a certificate for payment stating that to the best of their knowledge, information and belief and

on the basis of its observation and inspection, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that partial payment or the entire balance due Contractor is payable. No final payment shall become due until Contractor submits to all required lien waivers, releases and any other data establishing payment or satisfaction of all Contractor's obligations. If any subcontractor refuses to furnish a release or waiver required by District, Contractor may furnish a bond to indemnify District against any such lien. If any such lien remains unsatisfied after all payments are made, Contractor shall refund to District all monies that the latter may be compelled to pay in discharging such liens, including all costs and reasonable attorney fees.

3. CONTRACT TIME: The term of this agreement is September 16, 2025 to June 30, 2026. Upon failure to complete Work within the time specified, Contractor shall pay as liquidated damages for the loss of use of the benefit of this project the sum as provided in Table 108 of the Maricopa Association of Governments ("MAG") Specifications per day for each day the Work remains unfinished. This provision does not limit the liability of Contractor for actual damages sustained by District as a result of any breach of contract or warranty by Contractor.

4. INDEPENDENT CONTRACTOR: Contractor shall at all times during Contractor's performance of the services retain Contractor's status as an independent contractor. Contractor's employees shall under no circumstances be considered or held to be employees or agents of District, and District shall have no obligation to pay or withhold state or federal taxes or provide workers' compensation or unemployment insurance for or on behalf of them or Contractor. Contractor shall supervise and direct the Work to be done using his best skill and attention. Except as provided in this Agreement, Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the Work required by the contract documents. Contractor shall be responsible to District for the acts and omissions of its employees, sub-contractors and their agents and employees and other persons performing any of the Work under any Contract Document.

5. LABOR AND MATERIALS: Unless otherwise provided in the Contract Documents, Contractor shall provide, pay and insure under the requisite laws and regulations for all labor, materials, equipment, tools and machinery, water, heat, utilities, transportation, other facilities and services necessary for the proper execution and completion of the Work whether temporary or permanent, and whether or not incorporated or to be incorporated in the Work.

6. INSPECTIONS AND QUALITY OF WORK: Contractor understands and specifically agrees that all Work is to be performed pursuant to current American Water Works Association Standards, AJWD Project Number 2025-02

Project Specifications, Drawings and Addenda, and MAG specifications and details with Apache Junction additions. Contractor agrees that it will conduct at least one pre-construction meeting before any Work commences. While performing the services, Contractor shall exercise the reasonable professional care and skill customarily exercised by reputed members of Contractor's profession practicing in the Phoenix metropolitan area and shall use reasonable diligence and best judgment while exercising its professional skill and expertise. Contractor shall also be responsible for all errors and omissions Contractor commits in the performance of this Agreement. Contractor understands and agrees that inspection of the Work being performed hereunder will occur by District. Contractor agrees that District will have the exclusive right to determine, in its sole discretion, whether the Work has been performed in accordance with the Contract Documents, including MAG specifications and details. Contractor further agrees to make such corrections to the Work as may be directed by District to conform to said Contract Documents including MAG specifications and details, without requirement of change order or any additional charge or cost to District whatsoever. Contractor further agrees to make such corrections to the Work within the time allowed for completion as long as it does not affect the overall deadline of completion set forth in Section 3.

7. WARRANTY: Contractor shall guarantee the Work against defective workmanship or materials for a period of one year from the date of its final acceptance under the contract; ordinary wear and tear and unusual abuse or neglect excepted. Any omission on the part of District to identify defective Work or materials at the time of construction shall not be deemed an acceptance and Contractor will be required to correct defective Work or materials at any time before final acceptance; and within one year from the date of final acceptance due to faults in workmanship or materials, Contractor shall begin making the necessary repairs to the satisfaction of District within fourteen calendar days of receipt of written notice from District. Such Work shall include the repair or replacement of other Work or materials damaged or affected by making the above repairs or corrective Work all at no additional cost to District. In the case of Work materials or equipment for which warranties are required by the Contract Documents, Contractor shall provide or secure from the appropriate sub-contractor or supplier such warranties addressed to and in favor of the District and deliver same to the District prior to final acceptance of the Work. Delivery of such warranties shall not relieve Contractor from any obligation assumed under any other provision of the contract. The warranties and guarantees provided in this subsection shall be in addition to and not in limitation of any other warrantees, guarantees or remedies required by law, and shall survive the expiration of this Agreement for the time period mentioned above.

8. TAXES: Contractor shall pay all license, sales, consumer, use and other similar taxes for the Work or portions thereof provided by Contractor which are legally enacted at the time bids are received whether or not yet

effective or subsequently applicable due to acts of jurisdictions or bodies other than District.

9. PERMITS & FEES: Unless otherwise provided in the Contract Documents, Contractor shall secure and pay for all permits, governmental fees, licenses and inspections necessary for the proper execution and completion of Work which are customarily secured after execution of the contract, and which are legally required. Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work. District permits for this Work will be provided to Contractor at no cost. Contractor represents and warrants that any license necessary to perform the Work under this Agreement is current and valid. Contractor understands that the activity described herein constitutes "doing business in the City of Apache Junction" and Contractor agrees to obtain a business license pursuant to Chapter 8 of the Apache Junction City Code, Vol. I, and keep such license current during the term of this Agreement and after termination of this Agreement any time Work is performed pursuant to the warranty provisions set forth in Section 7. Contractor also acknowledges that the tax provision of the Apache Junction Tax Code, Chapter 8A, may also apply and if so, shall obtain a transaction privilege license and/or other licenses as may be required by the city code. Any activity by subcontractors within the corporate city limits will invoke the same business license regulations on any subcontractors, and Contractor ensures its subcontractors will obtain any required licenses. Further, Contractor agrees to pay all applicable privilege and use taxes that are applicable to the activities, products and services provided under this Agreement.

10. SUPERINTENDENT: Contractor shall employ a competent project superintendent who shall be in attendance at the project site during the progress of the Work. Superintendent shall represent and be the community agent of Contractor and communications given to the superintendent shall be as binding as if given to Contractor. Important communications shall be confirmed in writing. The designated superintendent shall be:

Name:_____
Address:_____
City/State/Zip:_____
Phone:_____
Cell Phone:_____
Pager:_____
Emergency Phone:_____

11. PROGRESS SCHEDULE: Contractor shall, immediately after entering into this Agreement, reaffirm or revise the estimated progress schedule as submitted with the bid proposal. Said progress schedule shall be maintained and updated during the project.

12. INDEMNIFICATION: To the fullest extent permitted by law, Contractor shall defend, indemnify and hold harmless District, its elected and appointed officers, officials, agents, and employees from and against any and all liability including but not limited to demands, claims, actions, fees, costs and expenses, including reasonable attorney and expert witness fees, arising from, or alleged to have arisen from, relating to, arising out of, or alleged to have resulted from the acts, errors, mistakes, omissions, Work or services of Contractor, its agents, employees, or any tier of Contractor's subcontractors in the performance of this Agreement, but only to the extent caused by the negligence, recklessness or intentional wrongful conduct of Contractor or its subcontractors in the performance of the Work under this Agreement or any subcontract. Contractor's duty to defend, hold harmless and indemnify District, its special districts, elected and appointed officers, officials, agents, and employees shall arise in connection with any claim, damage, loss or expense that is attributable to bodily injury, sickness, disease, death, or injury to, impairment, or destruction of property including loss of use resulting therefrom, caused by an Contractor's acts, errors, mistakes, omissions, work or services in the performance of this Agreement including any employee of Contractor, any tier of Contractor's subcontractor or any other person for whose acts, errors, mistakes, omissions, Work or services Contractor may be legally liable, but only to the extent caused by the negligence, recklessness or intentional wrongful conduct of Contractor or any tier of Contractor's subcontractors or any other person for whose acts, errors, mistakes, omissions, Work or services Contractor may be legally liable in the performance of the Work under this Agreement or subcontract. The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph. The rights and obligations under this Section shall survive termination of this Agreement.

13. SUB-CONTRACTORS: All subcontractors chosen by Contractor will be subject to District's approval. All subcontractors shall be identified by Contractor prior to award of contract. Contractor shall make no substitutions for any subcontractor, person or entity previously selected without the approval of District.

14. GOVERNING LAW AND VENUE: The terms and conditions of this Agreement shall be governed by and interpreted in accordance with the laws of the State of Arizona. Any action at law or in equity brought by either Party for the purpose of enforcing a right or rights provided for in this Agreement, shall be tried in a court of competent jurisdiction in Pinal County, State of Arizona. The Parties hereby waive all provisions of law providing for a change of venue in such proceeding to any other county. In the event either Party shall bring suit to enforce any terms of this Agreement or to recover any damages for and on account of the breach of any term or condition in this Agreement, it is mutually agreed that the prevailing Party in such action shall recover all costs including reasonable attorney fees to be determined by the court in such action.

15. **INSURANCE**: Contractor, at its own expense, shall purchase and maintain the herein stipulated minimum insurance with companies duly licensed in the State of Arizona, possessing a current A.M. Best, Inc. Rating of B++6, or approved unlicensed in the State of Arizona with policies and forms satisfactory to the District.

All insurance required herein shall be maintained in full force and effect until all Work or service required to be performed under the terms of the Agreement is satisfactorily completed and formally accepted; failure to do so may, at the sole discretion of District constitute a material breach of this Agreement.

Contractor's insurance shall be primary insurance as respect to District, and any insurance or self-insurance maintained by District shall not contribute to it.

Any failure to comply with the claim reporting provisions of the insurance policies or any breach of an insurance policy warranty shall not affect coverage afforded under the insurance policies to protect District.

The insurance policies, except Workers' Compensation, shall contain waiver of transfer rights of recovery (subrogation) against District, its Board, agents, officers, appointees, officials and employees for any claims arising out of the Contractor's acts, errors, mistakes, omissions, Work or services.

The insurance policies may provide coverage which contains deductibles or self-insured retentions. Such deductible and/or self-insured retentions shall not be applicable with respect to the coverage provided to District under such policies. Contractor shall be solely responsible for the deductible and/or self-insured retention and District, at its option, may require Contractor to secure payment of such deductibles or self-insured retentions by a surety bond or an irrevocable and unconditional letter of credit.

District reserves the right to request and to receive within ten (10) working days, certified copies of any or all of the herein required insurance policies and/or endorsements. District shall not be obligated, however, to review same or to advise Contractor of any deficiencies in such policies and endorsements, and such receipt shall not relieve Contractor from, or be deemed a waiver of District's right to insist on strict fulfillment of Contractor's obligations under this Agreement.

The insurance policies, except Workers' Compensation and Professional Liability, required by this Agreement, shall name District, its Board, agents, officers, appointees, officials and employees as additional insured parties.

REQUIRED COVERAGE

Commercial General Liability

Contractor shall maintain Commercial General Liability insurance with a limit of not less than $1,000,000 for each occurrence with a $2,000,000 Products/Completed Operations Aggregate and a $2,000,000 General Aggregate Limit. The policy shall include coverage for bodily injury, broad form property damage, personal injury, products and completed operations and blanket contractual coverage including, but not limited to, the liability assumed under the indemnification provisions of this Agreement which coverage will be at least as broad as Insurance Service Office, Inc. Policy Form CG 00011-03 or the equivalent thereof.

Such policy shall contain a severability of interest provision and shall not contain a sunset provision or commutation clause, nor any provision which would serve to limit third party action over claims.

The Commercial General Liability additional insured endorsement shall be at least as broad as the Insurance Service Office Inc.'s Additional Insured, Form CG 20101185, or the equivalent thereof, and shall include coverage for Contractor's operations and products and completed operations.

If required by this Agreement, if Contractor sublets any part of the Work, services or operations, Contractor shall purchase and maintain, at all times during prosecution of the Work, services or operations under this Agreement, an Owner and Contractor's Protective Liability insurance policy for bodily injury and property damage, including death, which may arise in the prosecution of Contractor's Work, service or operations under this Contract. Coverage shall be on an occurrence basis with a limit not less than $1,000,000 per occurrence, and the policy shall be issued by the same insurance company that issues Contractor's General Liability insurance.

Workers' Compensation

Contractor shall carry Workers' Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Contractor's employees engaged in the performance of the Work or services; and Employer's Liability insurance of not less than $100,000 for each accident, $100,000 disease for each employee, and $500,000 disease polity limit.

In case any Work is subcontracted, Contractor will require subcontractors to provide Workers' Compensation and Employer's Liability to at least the same extent as required of the Contractor.

Certificate of Insurance

Prior to commencing Work or services under this Agreement, Contractor shall furnish District with Certificates of Insurance, or formal endorsements as required by Agreement, issued by the Contractor's insurer(s), as evidence that

policies providing the required coverages, conditions and limits required by this Agreement are in full force and effect.

In the event any insurance policies required by this Agreement are written on a "claims made" basis, coverage shall extend for two (2) years past completion and acceptance of Contractor's Work or services and as evidenced by annual Certificates of Insurance, to be filed with the District Clerk of the Water Utilities Community Facilities District.

If a policy does expire during the life of the Agreement, a renewal certificate must be sent to District thirty (30) calendar days prior to the expiration date. All Certificates of Insurance shall be identified with bid serial number and title.

Cancellation and Expiration Notice

Insurance required herein shall not expire, be canceled, or materially changed without thirty (30) calendar days' prior written notice to District.

16. CHANGE ORDERS: A change order is a written order to Contractor, approved by District's Engineer, issued after execution of the contract authorizing a change in the Work or an adjustment in the contract sum or the contract time. A change order signed by Contractor indicates agreement with the change. District may, without invalidating the contract, order changes in the Work within the general scope of the contract consisting of additions, deletions or other revisions, the contract sum, and the contract being adjusted accordingly. All such changes in the Work shall be authorized by change order and shall be performed under the applicable conditions of the contract documents. District Director shall have authority to order minor changes in the Work not involving an adjustment in the contract sum or extension of contract time and not inconsistent with the intent of the Contract Documents. All such changes shall be affected by written order and shall be binding upon District and Contractor.

17. SUCCESSORS, ASSIGNMENT & DELEGATION: District and Contractor each bind themselves, their partners, successors, assigns and legal representatives to the other Party hereto and to the partners, successors, assigns and legal representatives of such other Party in respect to all covenants, agreements and obligations contained in the contract documents. Neither Party to the contract shall assign the contract or sublet it as a whole or delegate the duties hereunder, without the written consent of the other, nor shall Contractor assign any monies due or to become due to it without the previous written consent of District.

18. WRITTEN NOTICE: Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity, or to an office of the corporation for whom it was intended or if delivered at or sent registered or certified mail, return receipt requested, and first-class

postage prepaid to the last business address known to them who gives the notice.

19. CLAIMS FOR DAMAGES: Should either Party to the contract suffer injury or damage to personal property because of any act or omission of the other Party or of their employees or agents for whose acts they are legally liable, claims shall be made in writing to such other parties within a reasonable time after the first observance of such injury or damages.

20. PAYMENT & PERFORMANCE BONDS: District shall have the right to require Contractor to furnish bonds covering the faithful performance of the contract and the payment of all obligations arising hereunder.

21. SAFETY: Contractor and/or its subcontractors shall be solely responsible for job safety at all times in addition to any obligation District may have for inspection of trench excavation as created under Occupational Safety and Health Administration or other similar laws or regulations.

22. RIGHTS & REMEDIES: The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by District or Contractor shall constitute a waiver of any right or duty afforded any of them under the contract, nor shall any action or failure to act Constitute an approval of or an acquiescence to any breaches thereunder except as may be specifically agreed to in writing.

23. FORCE MAJEURE: Neither District nor Contractor, as the case may be, shall be considered not to have performed its obligations under this Agreement in the event of enforced delay (an "Enforced Delay") due to causes beyond its control and without its fault or negligence or failure to comply with applicable laws, including, but not restricted to, acts of God, fires, floods, epidemics, pandemics and related executive orders, quarantine, restrictions, embargoes, labor disputes, and unusually severe weather or the delays of subcontractors or materialmen due to such causes, acts of a public enemy, war, terrorism or act of terror (including but not limited to bio-terrorism or eco-terrorism), nuclear radiation, blockade, insurrection, riot, labor strike or interruption, extortion, sabotage, or similar occurrence or any exercise of the power of eminent domain of any governmental body on behalf of any public entity, or a declaration of moratorium or similar hiatus (whether permanent or temporary) by any public entity directly affecting the obligations under this Agreement. In no event will Enforced Delay include any delay resulting from unavailability for any reason of labor shortages, or the unavailability for any reason of particular Contractors, subcontractors, vendors or investors desired by Contractor in connection with the obligations under this Agreement. Contractor agrees that Contractor alone will bear all risks of delay which are not Enforced Delay. In the event of the occurrence of any such Enforced Delay, the

time or times for performance of the obligations of the Party claiming delay shall be extended for a period of the Enforced Delay; provided, however, that the Party seeking the benefit of the provisions of this Section shall, within thirty (30) calendar days after such Party knows or should know of any such Enforced Delay, first notify the other Party of the specific delay in writing and claim the right to an extension for the period of the Enforced Delay; and provided further that in no event shall a period of Enforced Delay exceed ninety (90) calendar days.

24. TERMINATION BY DISTRICT: District shall be permitted to terminate this Agreement if in the discretion of district manager or his or her designee, believes Contractor has failed to meet the terms of this Agreement. District shall provide Notice of Termination to Contractor by Certified U.S. Mail ten (10) calendar days before such termination takes effect.

25. TERMINATION BY CONTRACTOR: Contractor may terminate this Agreement if District fails to make payment as agreed upon in this document. Any other termination will be deemed a breach of contract by Contractor. Contractor shall provide Notice of Termination to District by Certified U.S. Mail ten (10) calendar days before such termination takes effect.

26. RECORDS: Records of Contractor's labor, payroll and other costs pertaining to this Agreement shall be kept on a generally recognized accounting basis and made available to District for inspection on request. Contractor shall maintain records for a period of at least two (2) years after termination of this Agreement and shall make such records available during that retention period for examination or audit by District personnel during regular business hours.

27. AMENDMENT: It is mutually understood and agreed that no alteration or variation of the terms and conditions of this Agreement shall be valid unless made in writing and signed by the Parties hereto, and that oral understandings or agreements not incorporated herein shall not be binding on the Parties.

28. ENTIRE AGREEMENT: This Agreement and any attachments represent the entire agreement between City and Contractor and supersede all prior negotiations, representations or agreements, either express or implied, written or oral. It is mutually understood and agreed that no alteration or variation of the terms and conditions of this Agreement shall be valid unless made in writing and signed by the Parties hereto. Written and signed amendments shall automatically become part of the supporting documents, and shall supersede any inconsistent provision therein; provided, however, that any apparent inconsistency shall be resolved, if possible, by construing the provisions as mutually complementary and supplementary.

29. SEVERABILITY: District and Contractor each believe that the execution, delivery and performance of this Agreement are in compliance with

all applicable laws. However, in the unlikely event that any provision of this Agreement is declared void or unenforceable (or is construed as requiring District to do any act in violation of any applicable laws, including any constitutional provision, law, regulation or city code), such provision shall be deemed severed from this Agreement and this Agreement shall otherwise remain in full force and effect; provided that this Agreement shall retroactively be deemed reformed to the extent reasonably possible in such a manner so that the reformed agreement (and any related agreements effective as of the same date) provide essentially the same rights and benefits (economic and otherwise) to the Parties as if such severance and reformation were not required. Unless prohibited by applicable laws, the Parties further shall perform all acts and execute, acknowledge and/or deliver all amendments, instruments and consents necessary to accomplish and to give effect to the purposes of this Agreement, as reformed.

30. TIME IS OF THE ESSENCE: Time is of the essence with respect to all provisions in this Agreement. Any delay in performance by either Party shall constitute a material breach of this Agreement.

31. PROHIBITION TO CONTRACT WITH CONTRACTORS WHO ENGAGE IN BOYCOTT OF THE STATE OF ISRAEL: The Parties acknowledge A.R.S. §§ 35-393 through 35-393.03, as amended, which forbids public entities from contracting with Contractors who engage in boycotts of the State of Israel. Should Contractor under this Agreement engage in any such boycott against the State of Israel, this Agreement shall be deemed automatically terminated by operation of law. Any such boycott is a material breach of contract.

32. CERTIFICATION PURSUANT TO A.R.S. § 35-394. In accordance with Arizona Revised Statutes § 35-394, Contractor hereby certifies and agrees that Contractor does not currently and shall not for the duration of this Agreement use: 1) the forced labor of ethnic Uyghurs in the People's Republic of China, 2) any services or goods produced by the forced labor of ethnic Uyghurs in the People's Republic of China, and/or 3) any suppliers, contractors or subcontractors that use the forced labor or any services or goods produced by the forced labor of ethnic Uyghurs in the People's Republic of China. If Contractor becomes aware during the term of this Agreement that Contractor is not in compliance with this Section, then Contractor shall notify the District within five (5) business days after becoming aware of such noncompliance. If Contractor does not provide the District with written certification that Contractor has remedied such noncompliance within one hundred eighty (180) days after notifying the District of such noncompliance, this Agreement shall terminate, except that if the Agreement termination date occurs before the end of such one hundred eighty (180) day remedy period, this Agreement shall terminate on such contract termination date.

33. CONFLICT OF INTEREST: The provisions of A.R.S. § 38-511 relating to cancellation of contracts due to conflicts of interest shall apply to this contract.

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be signed by their duly authorized representative as of this _____ day of _____, 20___.

CONTRACTOR:

YELLOW JACKET DRILLING SERVICES, LLC, an Arizona limited liability company

_____
By: _____
Its: _____

DISTRICT:

WATER UTILITIES COMMUNITY FACILITIES DISTRICT, an Arizona municipal corporation

_____
By: Walter "Chip" Wilson
Its: Chairman

ATTEST:

_____
Evie McKinney
District Clerk

APPROVED AS TO FORM:

_____
R. Joel Stern
District Attorney

STATE OF _____)
) ss.
COUNTY OF _____)

The foregoing was subscribed and sworn to before me this _____ day of _____, 20___, by _____ as _____ of Yellow Jacket Drilling Services, LLC, an Arizona limited liability company.

_____
Notary Public

My Commission Expires:

_____

STATE OF ARIZONA)
) ss.
COUNTY OF PINAL)

The foregoing was subscribed and sworn to before me this _____ day of _____, 20___, by Walter "Chip" Wilson as Board Chair of Water Utilities Community Facilities District, an Arizona municipal corporation.

_____
Notary Public

My Commission Expires:

_____

EXHIBIT A

TECHNICAL SPECIFICATIONS
DRILLING AND INSTALLATION OF THE SUPERSTITION VISTAS WELL #10
APACHE JUNCTION, ARIZONA

Prepared For:

Apache Junction Water District
300 E Superstition Blvd., Building D
Apache Junction, AZ 85119

Prepared By

Clear Creek Associates, LLC
8777 N. Gainey Center Dr., Suite 250
Scottsdale, Arizona 85258

June 2025

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1.0 GENERAL

1.1 DEFINITIONS

Throughout this specification, the term "OWNER" shall be understood to represent Apache Junction Water District (AJWD), and the term "CONSULTANT" shall be understood to represent Clear Creek Associates, LLC. The CONTRACTOR shall be the person, firm, or corporation with whom the OWNER will execute an agreement setting forth the terms and conditions for the work to be performed, as specified herein. The term "SUBCONTRACTOR" will apply to any person, firm, or corporation with whom the CONTRACTOR executes a secondary agreement for a portion of the scope of work.

1.2 LOCATION

The work to be accomplished under the following specifications consists of the drilling and completion of one (1) new Aquifer Storage and Recovery (ASR) well for the OWNER. The well to be installed is referenced herein as the Superstition Vistas Well #10 (SV-10; well). The well is located on the northeast corner of the intersection of Ironwood Road and Ray Avenue, in Apache Junction, Arizona (Figure 1). The legal location of the well is the NW ¼ (10-acre) of the SW ¼ (40-acre) of the SW ¼ (160-acre) of Section 20, in Township 1 South, Range 8 East of the Gila and Salt River Baseline and Meridian (also designated as D(1-8)20ccb).

1.3 SCOPE OF WORK

The installation of the well, as specified herein, consists of the CONTRACTOR drilling the pilot borehole to the specified depth and collecting cutting samples from the pilot borehole as specified. Geophysical logging and depth-specific (zonal) groundwater sampling will be conducted prior to borehole reaming at the well site. It is the responsibility of the CONTRACTOR to familiarize itself with the drilling conditions that may be encountered at the site, both surface and subsurface, prior to the bid submittal. It is the responsibility of the CONTRACTOR to examine the drilling area and site access in order to become acquainted with local conditions. No allowance will be made after

the bid has been accepted for any errors or omissions made by the CONTRACTOR. The CONTRACTOR will install the well pursuant to the final well design, which will be developed by the CONSULTANT and approved by the OWNER. A preliminary well design for the well is presented on Figure 2. The scope of work presented herein includes aquifer testing (step-rate discharge test and constant-rate aquifer test) after the well installation and development of the well is complete. The OWNER reserves the right to drill beyond the depth specified, or to stop at a lesser depth, depending on subsurface conditions.

To accommodate this scope of work, the CONTRACTOR will be required to provide an available start date to begin the drilling activities.

1.4 PERFORMANCE OF WORK

1.4.1 Contractor Qualifications

The CONTRACTOR shall have no less than five (5) years of local (within the Basin and Range geologic province of Arizona or equivalent) experience using reverse circulation rotary drilling. In addition, the CONTRACTOR must have successfully completed no less than five (5) separate well installation projects in the Basin and Range area within the past two (2) years, using reverse circulation rotary drilling, and involving installation of potable water production wells with similar casing dimensions and well depths as specified herein. An experience and qualifications summary for the CONTRACTOR shall be submitted with the bid submittal. Additionally, a specifications summary of the drilling rig to be used must also be provided with the bid submittal. In lieu of local experience, the CONTRACTOR may submit equivalent experience from other similar geologic settings.

The CONTRACTOR shall hold: (1) a valid Arizona Department of Water Resources (ADWR) Well Driller's License in the reverse circulation rotary category; (2) an Arizona Registrar of Contractor License type A, A-4, A-16, C-53 or CR-53; and (3) all other licenses required by Federal, State, County, or Municipal rules and regulations. SUBCONTRACTORS may also hold

a valid Arizona Well Driller's License in addition to that of the CONTRACTOR, but not in lieu of the CONTRACTOR'S ADWR Well Driller's License. No Performance or Payment Bonds will be required.

The CONTRACTOR shall provide a copy of their Arizona Well Driller's License and a copy of their Arizona Registrar of Contractor License with the bid submittal.

1.4.2 Operations

During installation or removal of drill tools or casing, the CONTRACTOR shall provide and use a drill tool "laydown line" (i.e., a stabilizing cable connected to the tail end of drill pipe, casing or drill collar, which will allow the pipe to be safely handled during its installation into or removal from the borehole). If such a laydown line is unavailable, the CONTRACTOR shall maintain no less than three (3) workers on site throughout the well drill tool or casing installation/removal operations (including tripping into or out of the well, making connections, and installation of the well casing or well screen). The laydown line system must comply with Occupational Safety and Health Administration (OSHA) requirements. All operations shall be performed under the direct and personal supervision of an Arizona-licensed well driller. The CONTRACTOR shall assign a foreman (tool pusher) to oversee all work required by this specification. After selection, the CONTRACTOR foreman shall provide to the CONSULTANT a written certification that he has read and fully understands this technical specification prior to mobilization to the well site.

The CONTRACTOR shall construct the well in accordance with the Rules and Regulations of the ADWR, Article 8, Well Construction and Licensing of Well Drillers. The well construction shall also comply with the guidelines of the Arizona Department of Health Services Engineering Bulletin No. 10, and all other applicable Federal, State, County, and local regulations. Rejection of any materials, work, or equipment by the CONSULTANT or OWNER shall be replaced in full at the CONTRACTOR'S expense, and at no cost to the OWNER. Replacement materials,

work, or equipment that is in accordance with these specifications and approved by the CONSULTANT will be paid for by the OWNER in accordance with the Bid Schedule.

1.4.3 Contractor Responsibilities

Should the well be lost due to any negligent action on the part of the CONTRACTOR (as determined by the CONSULTANT), the well shall be abandoned at no cost to the OWNER, in accordance with ADWR Article 8, Rule R12-15-816, and a replacement well shall be constructed in the immediate area. The replacement well location will be selected by the CONSULTANT or OWNER. The replacement well shall be completed in accordance with all the terms and conditions stated herein. The CONTRACTOR shall credit the OWNER for any and all costs associated with the lost well, and this credit shall be applied against any additional CONTRACTOR charges associated with the drilling and completion of the replacement well.

If the loss of the well was not due to any negligent action of the CONTRACTOR, the CONSULTANT or OWNER may designate a replacement well location and the OWNER shall provide reimbursement for the replacement well on the basis of the unit costs presented in the CONTRACTOR'S Bid Schedule.

If a work delay, deficiency of work performance and/or a material's deficiency is caused by the CONTRACTOR failing to comply with good practices and/or any item of these specifications, the CONTRACTOR shall bear the burden of additional expenses, including any additional CONSULTANT charges assessed to the OWNER as a direct result of the delay or deficiency. This includes delays due to equipment failure, if the equipment failure could have been prevented through proper maintenance.

1.5 CONFIDENTIALITY

The CONTRACTOR shall not disclose any information relating to this project or the well site to anyone other than the OWNER or CONSULTANT without written permission from the

OWNER, except as may be required by law. At all times during the performance of the CONTRACTOR'S services, the CONTRACTOR and its employees, SUBCONTRACTORS, and agents shall treat the work conducted by the CONTRACTOR and its SUBCONTRACTORS and the results thereof as confidential and proprietary to the OWNER.

Any questions regarding the purpose or scope of work that are directed to the CONTRACTOR from individuals or entities other than representatives of the OWNER or CONSULTANT while work is being conducted for this project, should be directed by the CONTRACTOR to the CONSULTANT or OWNER.

The CONTRACTOR shall inform its employees of this confidentiality requirement, and shall obtain non-disclosure agreements from all SUBCONTRACTORS who will have involvement in the performance of any of the work and provide the OWNER with copies of the executed non-disclosure agreements. This provision shall survive the termination of contracted work tasks.

1.6 SITE SAFETY PLAN

The CONTRACTOR must develop a Site Safety Plan for this project, in accordance with applicable OSHA requirements. The CONTRACTOR is responsible for assuring that CONTRACTOR personnel and SUBCONTRACTORS are thoroughly familiar with the Site Safety Plan for the proposed work. CONTRACTOR personnel are required to have been trained in the use of personal safety equipment required by the Site Safety Plan. A copy of the Site Safety Plan must be kept at the well site, and shall be available to all CONTRACTOR personnel for review. The CONTRACTOR shall be responsible for having sufficient personal safety equipment at the work site for each of the CONTRACTOR personnel to comply with provisions of the Site Safety Plan. The CONTRACTOR shall meet the requirements of the Site Safety Plan at its own cost.

1.7 NOISE CONTROL

It is the CONTRACTOR'S responsibility to meet all ordinances regarding noise and noise control during all drilling, testing, well installation, and development operations. Sound barricades will be required at the well site. Sound barricades shall be a minimum of 16 feet tall. For bidding purposes, approximately 300 linear feet of sound barricades should be assumed for the well site. The noise control must be in accordance with the American Society for Testing and Materials (ASTM) Standard E 90-90, Maricopa and/or Pinal County, and rules and shall provide noise reduction as follows.

Center Band Frequency, Hz	125	250	500	1000	4000
Minimum acceptable calculated Silenced Sound Pressure Level (db) at 60 feet from site boundary	11	27	35	32	35

It is the responsibility of the CONTRACTOR to obtain any necessary permits or waivers for 24-hour work operations.

END OF SECTION

2.0 PROTECTION OF SITE

The CONTRACTOR shall take all necessary precautions to preserve the well site, as nearly as practical, in its present condition. The CONTRACTOR will be responsible for any required clearing and grubbing of existing vegetation or debris within the work area and access roads. The CONTRACTOR shall be responsible for replacing any damaged items.

The CONTRACTOR shall provide, at its own cost, an adequate roll-off bin to contain all debris and trash collected at the site. All litter and debris will be cleaned up daily and placed in the roll-off bin for off-site disposal.

The CONTRACTOR is responsible for the location and clearance of all underground utilities using Arizona 811 (previously, Blue Stake), a private utility location service or both. The CONTRACTOR shall be responsible for any and all damage resulting from its failure to identify and avoid underground utilities.

A plastic tarp (6 mil, minimum) and berm shall be placed beneath the drilling rig during mobilization to protect the site against oil or hydraulic fluid spills or leaks, and will remain beneath the rig until demobilization. A plastic tarp and berm shall also be placed beneath other stationary equipment that contains fuel or hydraulic fluid, such as air compressors and fuel tanks. Compressed air introduced into the well during drilling, sampling, or well development must be treated by passage through a carbon or coalescing filter to remove organic contaminants (e.g., compressor lubrication oil).

The CONTRACTOR is responsible to apply water for dust control to the work area and access roads as required to meet State, County, or local dust control ordinances, or as requested by the CONSULTANT or OWNER. The CONTRACTOR is responsible to acquire and maintain the dust control permit for the site at its own cost.

2.1 DRILLING FLUID CONTAINMENT

Circulation of drilling fluids will be conducted using below-grade pits or above-ground mud tank(s). If below-grade pits are used, the CONTRACTOR is responsible for the location and clearance of all underground utilities using Arizona 811 (previously, Blue Stake), a private utility locater service or both. The CONTRACTOR shall be responsible for any and all damage resulting from its failure to identify and avoid underground utilities.

All below-grade mud pits must be fenced to prevent accidental injury of residents or animals. The CONTRACTOR will provide fencing at its own cost. After completion of drilling, all sub-grade pits will be drained and allowed to dry to the maximum extent possible before backfilling. The mud pit excavation shall be filled with self-compacting aggregate (pea gravel or equal) to avoid future subsidence of the pit area. Backfill material must be approved by the OWNER prior to placement within the mud pits. The compaction of the fill material must meet the approval of the OWNER prior to use onsite. The backfilling shall be completed by the CONTRACTOR and the OWNER and CONSULTANT are required to be present prior to the work being completed.

2.2 DRILL CUTTINGS AND FLUIDS MANAGEMENT

During drilling, the mud pits or tank(s) shall be emptied of cuttings at necessary intervals. Drilled cuttings shall be disposed of within 500 feet of the drill site. The CONCTRACTOR shall spread the drilled cuttings evenly over an area designated by the OWNER.

Water pumped from the well during drilling, sampling, and development operations shall be conveyed to a location identified by the OWNER, where it will not cause damage to the property, contamination of other wells or waterways, or creation of a nuisance. Drilling fluid pumped from the well during drilling and well construction shall be contained, transported, and disposed of in a legal manner by the CONTRACTOR. For bidding purposes, the CONTRACTOR should plan to temporarily contain swab and airlift development water onsite in above-ground portable storage tanks (Baker Tank or equivalent), to allow suspended solids to

settle. Once the suspended solids have settled, the clarified water can be pumped to a location specified by the CONSULTANT or OWNER, within 500 feet of the well site. The mud pit backfilling must be conducted to the satisfaction of the OWNER. The OWNER must approve the cuttings disposal and site cleanup.

2.3 FINAL SITE CLEANUP

After completion of the work, the CONTRACTOR shall remove all debris, waste, oil-stained dirt, trash, and unused materials or supplies and shall obliterate all temporary construction facilities such as temporary work and/or staging areas, temporary structures, stockpiles of excess or waste materials and shall restore the site, as nearly as possible, to its original condition. In addition, any residual mineral oil within the well casings (on the groundwater surface) resulting from the use of test pumping equipment shall be removed prior to final acceptance of the well. The OWNER must approve the final cleanup and site restoration.

END OF SECTION

3.0 UTILITIES

3.1 WATER

Water for the drilling of the well will be the responsibility of the CONTRACTOR. The CONSULTANT and OWNER will provide reasonable assistance with locating the nearest available potable water source. The CONTRACTOR will be responsible for all piping, connections, ancillary equipment, and labor required to convey the water to the well site for use as well as the cost of the water used. The CONTRACTOR will be responsible for obtaining an adequate flow rate of construction water for all operations under this specification. The CONTRACTOR will be responsible for all costs associated with transporting water to the well site.

3.2 ELECTRICITY

The CONTRACTOR shall provide, at its own cost, all power required for its operations under this specification.

3.3 RESTROOM FACILITIES

The CONTRACTOR shall provide, at its own cost, a portable restroom facility at the well site during all operations of this project. The restroom shall be adequately cleaned and maintained, and shall be made available to the CONSULTANT and OWNER personnel for reasonable use, at no cost.

3.4 UTILITIES

Location of all utilities at the site shall be the responsibility of CONTRACTOR. Utility damage caused by CONTRACTOR shall be repaired at CONTRACTOR'S sole expense in accordance with all City, County, and State regulations and standards.

It is the responsibility of CONTRACTOR to contact Arizona 811 (previously, Blue Stake), a private utility location service, or both, and to coordinate with the OWNER to establish and maintain utility clearances prior to mobilization.

END OF SECTION

4.0 SUBMITTALS

The following submittals, samples, certifications, and information listed below shall be provided in accordance with these Specifications. Any materials installed without having an approved submittal for the same, if found to not be in compliance with these Specifications or the final well design, shall be removed and replaced at the CONTRACTOR'S expense, and at no cost to the OWNER.

Submittal Item:	**Required Time of Submittal:**
1. Statement of drilling equipment to be used, copies of Driller's License and ROC License, experience and qualifications summary	With Bid
2. Certification from drilling foreman, having read and understood the Specifications	Prior to mobilization to site
3. Subcontractor Non-disclosure Agreements	Prior to commencing work by subcontractors
4. Letter of Certification of Decontamination	Prior to equipment use
5. Certified Test Report of surface casing steel	Prior to delivery to site
6. Specific constituents of cement grout seal for surface casing	Prior to placement of grout
7. Certified test report of well blank casing, screen, gravel feed tube, and sounding tube steel	Prior to delivery to site
8. Screen tensile strength, collapse strength, weight, and maximum recommended hang weight	Prior to delivery to site
9. Filter Pack sieve analysis/sample	Three days prior to delivery to site

Submittal Item:	**Required Time of Submittal:**
10. Bentonite sample	24 hours prior to installation
11. Cement mix design for annular seal	Prior to placement of grout
12. Daily Driller's Report	Daily during operations
13. Driller's Well Completion Report	Within 30 days after well completion (per ADWR requirement) with copy to CONSULTANT and OWNER
14. Penetration Rate Log	Daily during drilling operations
15. Drilling Fluid Record	Daily during operations
16. Drilling Fluid Control Plan	Prior to start of drilling operations
17. Safety Data Sheets	Prior to use of material
18. Formation sampling method	Prior to start of drilling
19. Copies of geophysical logs (including electronic format)	Within 5 working days of logging
20. Affidavit of Compliance with welding provisions	Prior to acceptance of the well
21. Copies of Plumbness and Alignment report (including electronic format)	Prior to acceptance of the well
22. Sounding and Gravel tube "rabbit test" documentation	Prior to acceptance of the well
23. Two copies of final well video	Prior to acceptance of the well

END OF SECTION

5.0 EQUIPMENT

The CONTRACTOR shall furnish and maintain in safe and efficient working condition all equipment necessary to perform the specified work, including a drilling rig capable of performing the specified operations to the specified depths; pumping, testing, sampling equipment; and auxiliary equipment as specified or required to complete the described tasks. The CONTRACTOR shall submit a statement with their bid indicating the drilling equipment to be used. The drilling rig used for the installation of the well shall have a mast capacity no less than 1½ times the string weight of the well casing and screen (for SV-10, approximately 133,518 pounds), and the well shall be installed without the use of a float plate. All equipment requirements specified in this Section shall be provided at the CONTRACTOR'S expense.

The equipment supplied by the CONTRACTOR shall include, but not be limited to:

- A wireline depth indicator capable of measuring depths equal to the total depth of the borehole, and equipped with a counter device which provides for a depth measurement accuracy of ± 1 foot;
- Specified devices for measurement of drilling mud viscosity and weight;
- An operating and accurate inclinometer tool;
- An operating and accurate penetration rate indicator (Geolograph or equal);
- An operating and accurate gauge that indicates the hook load (weight) of the drill string;
- A stocked and maintained first aid kit;
- A fully recharged and operable type ABC dry chemical fire extinguisher; and
- An operable mobile telephone located at the well site.

The CONTRACTOR shall also maintain at the well site, or have the ability to rapidly fabricate, commonly used fishing tools (such as overshots, wall hooks, junk baskets, etc.) to accommodate the event that lost tools in the borehole require fishing operations.

In addition, the compressor used for air supply shall be capable of a minimum of 350 pounds per square inch (psi) and 750 cubic feet per minute (cfm). This requirement is for well development and zonal sampling. A smaller “air package” can be used during drilling. The drill pipe shall have a minimum 5½-inch inside diameter (I.D.), and the airline shall have a minimum 1¼-inch diameter to accommodate adequate air flow.

The drilling rig, pumping equipment and auxiliary equipment used for this project shall be well maintained, and shall meet the standards of OSHA. The rig walkways and stairways shall be guarded with rails to prevent falls, and CONTRACTOR personnel shall utilize a safety harness at all times when ascending the rig derrick. All high-pressure hoses shall be equipped with a whip check to protect site personnel in the event of hose failure.

Prior to the start of drilling, the CONTRACTOR shall decontaminate the drill rig and downhole tools by steam cleaning. The CONTRACTOR will be required to provide a letter of certification of the decontamination of the CONTRACTOR’S equipment, prior to utilization. The CONTRACTOR may certify, in writing, the decontamination of critical (downhole) pieces of drilling equipment in lieu of actual steam cleaning, provided the downhole pieces of drilling equipment have not been in contact with any hazardous or toxic materials since the last decontamination. All necessary steam cleaning will be conducted at the CONTRACTOR'S expense.

END OF SECTION

6.0 REPORTS, LOGS, AND RECORDS

6.1 GENERAL

The CONTRACTOR shall keep an accurate and legible daily log and record of all drilling, testing, and construction, describing all geologic material encountered during drilling, the depths at which changes in formation occur, and all difficulties or unusual conditions encountered. The logs and records shall also show the method of completing the well, including the lengths of the well casing and well screen installed and the volumes of all annular fill and seal materials. Each report or log entry must reference the correct ADWR well registration number.

6.2 PENETRATION RATE LOG

During the drilling of the borehole, a penetration rate log (Item 14 in the table shown in Section 4.0) shall be kept showing the actual penetration time required to drill each foot of the borehole. The types of bits used in each interval of the borehole shall be noted on this log and whether designed for soft, medium, or hard formations, including approximate weight on the bit and rotation speed (RPM) of the bit, and any other information that may be requested by the CONSULTANT. These logs shall be available for review by the CONSULTANT throughout the drilling program and shall be delivered to the CONSULTANT upon completion of drilling.

6.3 DAILY DRILLER'S REPORT

During the drilling of the borehole, a detailed driller's report (Item 12 in the table shown in Section 4.0) shall be maintained and provided daily to the CONSULTANT at the well site. The reports shall give a complete description of all formations encountered; number of feet drilled; number of hours at the well site; shutdown due to breakdown; any occurrence of lost circulation conditions or low penetration rate conditions (in accordance with Sections 7.4 and 7.5 of this specification); drilling fluid additives used; length and type of casing set; volumes of filter pack and annular seal installed, and such other pertinent data as may be requested by the

CONSULTANT. CONTRACTOR personnel will submit the reports to the CONSULTANT daily.

6.4 DRILLER'S LOG

During the drilling of the borehole, the CONTRACTOR shall prepare a detailed driller's log (Item 13 in the table shown in Section 4.0) in compliance with the requirements of the ADWR. The logs shall include the reference point for all depth measurements, a generalized description of each formation encountered, the depth at which each formation is encountered and the thickness of each formation. The lithologic logs prepared by the CONSULTANT will be made available to assist the CONTRACTOR in the preparation of the driller's logs. A copy of the driller's log shall be furnished to the CONSULTANT upon completion of drilling, prior to acceptance of the well.

6.5 DRILLING FLUID RECORD

During the drilling and reaming of the borehole, a log of drilling fluid properties (Item 15 in the table shown in Section 4.0) shall be maintained by the CONTRACTOR. The drilling fluid record will be recorded on an American Petroleum Institute (API)-approved form, and shall document all items listed in Section 7.2. The drilling fluid records shall be available for review by the CONSULTANT and OWNER throughout the course of drilling, and the logs shall be delivered to the CONSULTANT upon completion of each day’s work activities.

END OF SECTION

7.0 DRILLING FLUID CONTROL PROGRAM

7.1 DRILLING FLUID CONTROL PLAN

The CONTRACTOR shall provide a drilling fluid control plan to the CONSULTANT prior to the start of drilling. The plan will outline specific drilling fluid additives the CONTRACTOR plans to use, how anticipated changes in the drilling conditions will affect the drilling fluid control plan, fluid testing procedures, and equipment that will be used. Drilling fluid additives should be certified by the National Sanitation Foundation (NSF), standard 60 certification.

7.2 DRILLING FLUID TESTING

The CONTRACTOR shall retain an experienced drilling fluid engineer as a SUBCONTRACTOR. The drilling fluid engineer will be available within a 2-hour travel time of the sites during all drilling and well construction operations. Drilling fluid tests will be required during periods when any drilling fluid additives (not only clear water) are being circulated in the borehole. Physical and chemical properties of the drilling fluid are to be measured in accordance with the procedures of the API Standard RP 13B, "Standard Procedures for Testing Drilling Fluids." Samples tested are those collected at the rig discharge line, with care taken to assure a true and representative sample. Drilling fluid tests shall be conducted at a minimum of (1) every 24 circulating hours; (2) when significant changes to the drilling fluid are made; (3) whenever conditions appear to have changed or when problems arise; or (4) at the request of the CONSULTANT. A Marsh-type viscosity funnel and a mud scale will be available at the well site during all well construction operations and, upon request, will be made available to the CONSULTANT.

The CONTRACTOR shall maintain current records at the site at all times to show: (1) the time, depth, and results of all drilling fluid tests; (2) all materials added to the system, (including type, amount, time, and depth); (3) variances or modifications from the agreed upon fluid program such as time, depth, reason, and authorization.

The CONTRACTOR is responsible for maintaining an adequate supply of drilling fluid additives at the drilling site and for the removal of all drilling fluids and additives from the borehole during development of the well. The subsurface mud pits or above ground mud tanks shall have a minimum depth of 6 feet and a total volume no less than that of the reamed borehole (approximately 6,400 cubic feet or about 48,000 gallons, based on the preliminary well design). The mud pits or tanks shall contain at least one baffle, to assist with the separation of cuttings and suspended solids from the drilling fluid.

7.3 GENERAL REQUIREMENTS

During the drilling and reaming of the borehole, and the installation of the well, the CONTRACTOR will be responsible to minimize the chemical and biological disturbance of the vadose zone and saturated alluvial matrix. The use of certain organic drilling fluid materials (such as starch, guar, or cottonseed hulls) will not be accepted for drilling, although some organic polymer additives may be allowed. Safety Data Sheets (SDS's) from the manufacturer for all drilling fluid additives must be provided to the CONSULTANT for review prior to their use. The CONSULTANT reserves the right to reject any and all proposed additives.

The CONTRACTOR shall be responsible for maintaining the quality of the drilling fluid to ensure:

1. Protection of water-bearing and potential water bearing formations exposed to the borehole;
2. Representative samples of the formation materials and groundwater;
3. Maximum development capacity and optimum potential yield of the completed well;
4. Inhibition of the formation and prevention of formation-caused drilling problems (e.g., heaving sands, swelling clays, lost circulation);
5. Protection of the integrity of the boring during drilling, zonal sampling, and well installation operations, and

6. Complete and accurate geophysical logging of the boreholes.

7.4 LOST CIRCULATION

During drilling or reaming operations, if Lost Circulation Conditions occur, then the OWNER will compensate the CONTRACTOR for the period of drilling under Lost Circulation Conditions at the CONTRACTOR'S hourly rate indicated in the Bid Schedule (Rig Hourly Rate with Crew), in lieu of footage compensation. The OWNER will also provide compensation at a rate of cost plus 10 percent markup to the CONTRACTOR for all drilling fluid materials and additives used during the period of Lost Circulation Conditions. If lost circulation is the result of the CONTRACTOR'S operations or activities (e.g., excessive fluid weight), all costs to regain circulation shall be borne by the CONTRACTOR.

"Lost Circulation Conditions" under this Section shall apply only when there is a loss of drilling fluid to the formation that exceeds the maximum available discharge rate of water into the borehole, to the extent that the fluid level in the annulus outside the drill pipe cannot be maintained to a level above the base of the surface casing for at least one (1) hour, due to no fault of the CONTRACTOR.

The CONTRACTOR is responsible to notify the CONSULTANT and OWNER immediately upon the occurrence of Lost Circulation Conditions, and to document the times, quantities, and circumstances of Lost Circulation Conditions during each occurrence. Failure of the CONTRACTOR to promptly notify the CONSULTANT of Lost Circulation Conditions will void the CONTRACTOR'S opportunity to implement this clause, but will not affect the CONTRACTOR'S responsibility to maintain the integrity of the borehole, as required in Sections 1.4.3 and 7.3 of this Specification.

The conditions of this Section shall apply from the beginning of the period of lost circulation, and shall continue only until such time that the drilling fluid level can be maintained within the surface casing. After an initial Lost Circulation Conditions event has occurred, should circulation

be lost again, the conditions of this paragraph will go into effect immediately, and continue until such time as drilling fluid circulation is regained, as described in this paragraph.

7.5 LOW PENETRATION RATE

During drilling or reaming operations, if a formation is encountered that results in a penetration rate of less than 4.0 feet per hour for a period of at least four (4) continuous hours, while at least 1,500 pounds per diameter inch is applied to the drill bit, then the OWNER will compensate the CONTRACTOR for the period of Low Penetration Rate Conditions at the CONTRACTOR'S hourly rate indicated in the Bid Schedule (Rig Hourly Rate with Crew), in lieu of footage compensation. The OWNER will also provide compensation at a rate of cost plus 10 percent markup to the CONTRACTOR for all drilling bits used during Low Penetration Rate Conditions. During Low Penetration Rate Conditions, the CONTRACTOR will credit the prorated values of used drilling bits to the OWNER.

The CONTRACTOR is responsible to notify the CONSULTANT ans OWNER immediately upon the occurrence of Low Penetration Rate Conditions, and to document the times, quantities, and circumstances of Low Penetration Rate Conditions during each occurrence. Failure of the CONTRACTOR to promptly notify the CONSULTANT and OWNER of Low Penetration Rate Conditions will void the CONTRACTOR'S opportunity to implement this clause. The conditions of this Section shall apply from the beginning of the time period of Low Penetration Rate Conditions (less than 4.0 feet per hour), and shall continue only until such time as drilling is resumed at a rate of 4.0 feet per hour or greater.

Upon invocation of this Section, if requested by the CONSULTANT, the CONTRACTOR will trip the drill string out of the hole for inspection. The conditions of this Section shall apply only if the drill bit does not indicate excessive bit wear, or improper bit type, that would substantially decrease the penetration rate. In the event that the drill bit inspection indicates that this Section applies, the time expended for drill bit removal will be paid by the OWNER under the conditions of this Section. If the CONSULTANT and OWNER is not notified during the initial 2-hour

period of low penetration, or if bit inspection reveals excessive wear or improper type, the provisions of this clause will not be invoked.

END OF SECTION

8.0 WELL DRILLING AND INSTALLATION

8.1 GENERAL DRILLING METHODS

Drilling will be conducted by the reverse circulation rotary drilling method. The CONTRACTOR is responsible for designing and controlling a drilling program that conforms to this specification.

8.2 SURFACE CASING INSTALLATION

8.2.1 Drilling

The surface casing installation for the well shall be conducted under the observation of the CONSULTANT. The surface borehole shall be drilled to a minimum 42-inch diameter, to a depth of at least 39 feet below land surface (bls). The CONSULTANT and OWNER reserve the right to direct the drilling of the surface borehole to a greater depth. The surface casing boring may be drilled using a rotary drilling method or by use of the bucket auger (solid stem auger) drilling method.

During the drilling of the surface borehole, the CONTRACTOR shall collect and preserve for the CONSULTANT samples of the drilled cuttings collected at 10-foot intervals. The samples shall be placed in 4½-inch by 6-inch cloth sacks (Hubco or equivalent) furnished by the CONTRACTOR.

8.2.2 Materials

8.2.2.1 Surface Casing

The surface casing for the well (Figure 2) shall be new low-carbon steel, and manufactured in accordance with ASTM Specification A53 Grade B steel or ASTM Specification A139 Grade B steel. The surface casing shall have a 36-inch outside diameter (O.D.) and have a minimum 0.375-inch wall thickness. The minimum length of the surface casing shall be 40 feet, to allow for a minimum 1-foot stickup above land surface.

Prior to casing installation, the CONTRACTOR shall submit certified test reports to the CONSULTANT to demonstrate compliance with the physical and chemical properties of the steel surface casing, as specified herein.

8.2.2.2 Surface Cement Grout Seal

The surface cement grout seal material shall consist of cement slurry containing 5.2 to 6.0 gallons of water per 94-pound sack of Portland cement. The Portland cement shall conform to ASTM Standard C150, Type II. The cement grout weight shall be measured prior to installation, as an indicator of the cement-water ratio. The cement grout slurry shall not exceed 17.0 pounds per gallon (lb/gal) (approximately 127 pounds per cubic foot, lb/ft^3). The cement grout slurry may contain sand, which shall not exceed 50 percent by volume of the cement. Bentonite may be used as an additive, and must be in powder form and shall not exceed 4 percent by volume of the cement, or cement and sand. Water added for bentonite shall not exceed 1.3 gallons per 1.88 pounds of bentonite (2 percent by weight in cement). Accelerator additives, such as calcium chloride, shall not exceed 2 percent by weight of the cement. For information purposes, an example of a sand cement mix design is presented in Appendix A. Water used for preparing the grout slurry shall be potable.

If the cement grout is not mixed on site, the CONTRACTOR must provide the specific constituents of the cement grout to the CONSULTANT prior to placement of the grout. No

cement grout shall be installed until the cement grout mix design is approved by the CONSULTANT. The cement grout slurry shall be mixed thoroughly and must be free of lumps to the satisfaction of the CONSULTANT. Cement grout that does not comply with this specification will be rejected.

8.2.3 Surface Casing Installation

Details for the surface casing construction are shown on Figure 2. The surface casing, conforming to Section 8.2.2.1, shall be furnished and placed from 1 foot above the ground surface to at least 39 feet bls. The surface casing installation shall be conducted under the observation of the CONSULTANT.

8.2.4 Surface Cement Grout Installation

Cement grout slurry conforming to the specification in Section 8.2.2.2 shall be placed from the base of the surface casing to the ground surface. The CONTRACTOR shall be responsible to maintain an equalization of pressures to the extent necessary to prevent collapse of the surface casing during cement grout installation. The grout seal shall completely fill the annular space and form a continuous seal between the surface casing and the wall of the borehole. To accommodate the reverse circulation rotary drilling method, the surface casing grout seal may be placed in two separate installations to completely extend from the base of the surface casing to the ground surface. The surface casing shall be maintained centered in the borehole during and after cement grout installation. A minimum curing time for the surface casing grout seal is 12 hours, with the cement grout obtaining a compressive strength of at least 500 pounds per square inch (psi).

8.3 PILOT BORING

8.3.1 Pilot Boring Drilling

The pilot borehole shall be drilled to a depth of approximately 1,300 feet bls, and shall have a maximum 17½-inch diameter unless otherwise approved by the CONSULTANT. The pilot boring

shall be drilled using the methods described in Section 8.1, and in compliance with the drilling fluid control program described in Section 7.0.

The CONTRACTOR shall take all diligent care to produce a plumb and straight boring. Single-shot deviation surveys ("A-1 Sureshot" or equal) will be required during the drilling of both pilot and reamed borings. Single-shot deviation surveys will be performed in the drill string at intervals of approximately 60 feet, from the base of the conductor casing to the total depth of the boring, unless otherwise directed by the CONSULTANT. Surveys will be recorded on a 3-degree target which will be replaced each time a survey is performed. The borehole plumbness will be maintained at one-half (1/2) degree or less at all times. If at any single location the survey results indicate that the borehole plumbness has exceeded the specified tolerance, the CONTRACTOR will be responsible for corrective measures to re-align the borehole until a survey indicates alignment is within acceptable limits. All survey results will be recorded on the geolograph logs and the daily drilling forms. Repeat single-shot deviation surveys may be required if requested by the CONSULTANT to verify the accuracy and repeatability of the tool.

During the drilling of the pilot borehole, the CONTRACTOR shall collect and preserve for the CONSULTANT samples of the drill cuttings collected at 10-foot intervals. The CONTRACTOR shall provide an acceptable means of sampling the drilled cuttings at the discharge pipe. A sump-type or baffle-type sample catching devise shall be provided by the CONTRACTOR. Each cutting sample shall be carefully collected from the sampling point, and the sample catching device shall be cleaned of all cuttings after each sample is taken.

The samples shall be placed in 4½-inch x 6-inch cloth sacks (HUBCO or equal) furnished by the CONTRACTOR. In addition, as an on-site visual record of the borehole stratigraphy, each sample shall be laid out in a sample storage area on a waterproof tarp or ground cloth for each sampled interval in descending order. The storage area and ground cloth must allow samples to be maintained in sequence and unmixed with surface material or other samples until they have been examined and logged by the CONSULTANT. Prior to the start of drilling, the CONTRACTOR shall submit details of the proposed formation sampling method to the

CONSULTANT, including the specific sampling equipment (e.g., sample collection box) to be used. The sampling program and equipment must be approved by the CONSULTANT.

8.3.2 Geophysical Logging

Geophysical logging from a depth of 39 feet bls to the total depth of the boring shall be conducted at the cessation of drilling of the pilot boring. After the pilot boring has been reamed to its final diameter, the final caliper log and magnetic deviation log will also be conducted to confirm the diameter and alignment of the borehole. The CONTRACTOR shall retain a geophysical logging company as a SUBCONTRACTOR for the logging at the well site including the final caliper log of the reamed borehole. The geophysical logging, including the pilot hole logging and the final caliper log of the well, shall be conducted under the observation of the CONSULTANT.

The geophysical logging suite for the borehole will include the following logs:

1. Spontaneous Potential and Resistivity Logs (Electric Log);
2. Acoustic Log (Sonic Log);
3. Natural Gamma Ray Log;
4. Caliper Surveys (2 surveys: pilot borehole and reamed borehole);
5. Focused Guard Log; and
6. Magnetic Deviation Log (2 surveys: pilot borehole and reamed borehole).

The CONTRACTOR shall keep the borehole full of drilling fluid at all times during geophysical logging, to stabilize the borehole and provide log integrity. The CONTRACTOR shall assist the geophysical logger in rigging of the geophysical survey equipment. The CONTRACTOR shall ensure that the logging tools can be run to the total depth of the pilot borehole and reamed boring without interference by obstructions or tight sections in the boring.

One digital field copy and two (2) paper field copies of each geophysical log shall be provided to the CONSULTANT upon the completion of logging. In addition, final digital copies and electronic data files (.csv file fromat) of all logs shall be provided to the CONSULTANT no later than 10 working days after completion of logging.

At the request of the CONSULTANT, the geophysical logging SUBCONTRACTOR shall conduct repeat sections in intervals of the borehole selected by the CONSULTANT. The repeat logging intervals will not exceed 100 feet per log. All costs associated with logging of repeat sections will be the sole responsibility of the CONTRACTOR.

8.3.3 Zonal Water Sample Collection and Falling Head Testing

After the completion of geophysical logging of the boring, the CONTRACTOR shall collect zonal (depth-specific) groundwater samples at depths designated by the CONSULTANT. It is anticipated that seven (7) zonal samples will be collected from the pilot borehole, although the CONSULTANT may add or omit samples based on subsurface conditions encountered. After each zonal sample is collected, the CONTRACTOR shall obtain a measurement of the static water level for that test interval. The required method of sample collection is:

1. The borehole below each sample interval will be filled with clean gravel or sand. The portion of the borehole immediately beneath the interval to the sampled shall be sealed with no less than 5 feet of bentonite pellets or chips. The bentonite shall be installed to the appropriate depth, which shall be measured (tagged) with a wireline or other measurement device.

2. A minimum 4-inch I.D. steel eductor pipe shall be installed to the sample depth. The eductor pipe shall have a bottom cap and be perforated in the bottom 15 to 25 feet.

3. An envelope of clean pea gravel shall be installed around the eductor pipe, to the top of the interval to be sampled. The gravel envelope will be capped with another layer of bentonite pellets or chips (minimum 5 feet in thickness).

4. The sample interval of the borehole shall be purged by air lifting or pumping for an adequate period to evacuate the drilling fluid from the borehole to the extent that a representative zonal sample can be obtained. The equipment used during purging and sampling operations shall be capable of providing a discharge of no less than 50 gallons per minute (gpm) of

water from the sampling interval (subject to the limitations of the formation being sampled). The bentonite seals must remain intact throughout the purging and sampling period for each zonal sample interval, to the satisfaction of the CONSULTANT. If it is determined that the bentonite seals were breached during purging, all time spent purging prior to the breach will be at the CONTRACTOR'S own expense. Additionally, if a zone is improperly set, the CONTRACTOR will be required to remove the sampling tool and clean out the borehole back down to sample interval at the CONTRACTOR'S own expense. The CONTRACTOR may also be required to reimburse additional CONSULTANT fees if additional expenses are incurred due to breached seals and/or improperly set zones, in accordance with Section 1.4.3. It is anticipated that approximately 12 hours of airlifting and/or pumping will be required for each zonal sample. After the interval to be sampled has been purged to the satisfaction of the CONSULTANT, the CONSULTANT will collect the water sample from the discharge line.

5. A measurement of the static water level shall be obtained by the CONTRACTOR for the test interval. The CONTRACTOR then will standby while the CONSULTANT performs a falling head test on the zone. This process will consist of installing an electronic pressure transducer below the water level, injecting a "slug" of water of known volume, and recording the change in water level until the water level has returned to static conditions. The estimated standby time for each falling head test is approximately 2 hours.

6. After zonal sampling and testing has been completed for each interval, the CONTRACTOR shall raise the eductor pipe to the next interval, and the procedure shall be repeated for each sample location.

The specific zonal sampling procedure, the duration of pumping at each sample interval, and the point of discharge for purged water must be reviewed by the CONSULTANT. The zonal samples need not be free of sand grains, but must be reasonably clear.

8.4 PRODUCTION WELL INSTALLATION

The CONTRACTOR shall install the production well in accordance with the final design, which will be developed by the CONSULTANT and approved by the OWNER. It is the responsibility of the CONTRACTOR to review the final design and notify the CONSULTANT and OWNER of any concerns or questions prior to borehole reaming and well installation activities. Throughout the well installation and development process, the CONTRACTOR shall be responsible for preventing collapse of the well casing and screen.

8.4.1 Borehole Reaming

After the completion of zonal sampling operations, it is anticipated that the borehole will be reamed to a depth of approximately 1,200 feet bls, as shown on Figure 2. The borehole shall have a 32-inch diameter from 39 feet to 1,200 feet bls, unless otherwise approved by the CONSULTANT and OWNER. The boring shall be reamed using the methods described in Section and 8.1, and in compliance with the drilling fluid control program described in Section 7.0. A caliper log shall be conducted by a geophysical logger (SUBCONTRACTOR) after the boring has been reamed to its final diameter and depth.

8.4.2 Materials

The materials to be installed in the reamed boring are described below. The CONTRACTOR shall be responsible for the timely delivery of the well casing, well screen and other materials to the drilling site and as required to complete the well installation program.

Depending on which day of the week that the final zonal sample is collected and submitted to the laboratory, the CONSULTANT anticipates a period of 10 days (240 hours) after cessation of zonal sampling, to prepare the final well design, based on the analytical results from the zonal samples. No standby time will be allowed during this period.

Upon the completion of reaming the borehole to its final depth and diameter, as specified in the final design, and upon completion and approval of the final caliper log and deviation survey, the CONTRACTOR shall immediately commence well installation operations.

The CONSULTANT or OWNER may, at its discretion, reject any materials that do not meet these specifications or tolerances thereof. Any additional standby time or other costs incurred by the CONTRACTOR as a result of the rejection of any specified materials provided by the CONTRACTOR or its suppliers shall not be compensated by the OWNER and shall be the sole responsibility of the CONTRACTOR.

8.4.2.1 Well Casing Material

The blank well casing for the well shall be constructed of two distinct materials, joined by a dissimilar metal adaptor. New High Strength Low Allow (HSLA) casing will be used above the dissimilar metal adaptor and new, 316L grade stainless steel casing will be used below the dissimilar metal adaptor (Figure 2). All well casing steel shall conform to ASTM specification A606 Type 4 steel (for HSLA steel) or 316L grade stainless steel. The HSLA blank well casing shall have an 18-inch I.D. and a 0.375-inch wall thickness and will be 350 feet in length, including the 2-foot stickup (Figure 2) and excluding the 2-foot long dielectric metal connector (Figure 3). The stainless steel lower blank well casing shall have an 18-inch I.D. and a 0.375-inch wall thickness and will serve as the 190-foot long upper blank casing, 20-foot long pump galley, and 10-foot long bottom sump (Figure 2). Both the HSLA and stainless steel casings shall be new and free of rust, pits, or other defects.

The well casing shall be factory-assembled in not less than 40-foot long sections (except for the casing sections used for the bottom sump and casing stickup). The well casing sections shall contain one spiral seam along the casing axis, and shall contain no more than one circumferential seam per 10 linear feet. Ends of casing lengths shall be as described in Section 8.4.3.1.

SV-10 will be constructed using dissimilar metals (HSLA steel and stainless steel), so a dielectric connector shall be used to connect the blank HSLA casing and the blank stainless steel casing portions of the well to prevent galvanic corrosion (Figure 3). For bidding purposes, the depth of the dielectric metal connector shall be approximately 348-350 feet bls (Figure 2).

The bottom sump for the well shall consist of a 10-foot long section of blank well casing as described in this Section, installed at the base of the screened interval. The bottom sump shall be capped with a bottom plate consisting of the same steel composition and same wall thickness as specified above.

The CONTRACTOR shall obtain from the manufacturer, certified test reports that demonstrate compliance with the physical and chemical properties of both the upper and the lower well casing steel that are specified herein, and submit a copy of that certified test report to the CONSULTANT, prior to well casing installation.

8.4.2.2 Well Screen Material

The well screen for the well shall be new, Roscoe Moss, 316L grade stainless steel Ful Flo louvered screen. The well screen shall have an 18-inch I.D. and 0.375-inch wall thickness, with horizontal louvered openings. The horizontal louvered openings shall be factory-installed in the well screen with a 3-inch slot length, in rows that are spaced approximately 1 inch apart in the vertical direction. There shall be no less than 168 openings per linear foot. The screen slot size shall be 0.060 inches, and the open area of the screen shall be no less than 26 square inches per foot. The openings in the screen shall be machine made, horizontal to the axis of the casing, and of a louver form with the aperture facing downward. Ends of the screen lengths shall be as described in Section 8.4.3.1. The anticipated length of the screen shall be 620 feet (Figure 2). The CONTRACTOR shall obtain from the well screen manufacturer, the screen tensile strength (pounds), collapse strength (psi), screen weight (pounds per linear foot), and maximum recommended hang weight (pounds). This information shall be provided to the CONSULTANT for review prior to delivery of the well screen to the site.

Prior to the well screen installation, the CONTRACTOR shall submit certified test reports to demonstrate compliance with the physical and chemical properties of the well screen, as specified herein.

8.4.2.3 Sounding Tube Material

The well shall be equipped with an external sounder access tube to facilitate the collection of water levels from the well. The access tube shall be constructed of new 2-inch, Schedule 40 LCS and stainless steel tubing. The access tube shall be LCS to a depth of 370 feet bls and stainless

steel from 370 feet bls to 1,180 feet bls (Figure 2). The LCS and stainless steel sections shall be separated by a dissimilar metal adaptor. Sections of the access tube shall be no less than 20 feet in length, and section joints shall have welded connections. The sounding tube shall be installed in the well annulus on the outside of the casing and shall terminate within the filter pack at 1,180 feet bls. The tube shall be perforated with vertical mill slots (0.040-inch) from 980 to 1,180 feet bls and shall have a stainless steel end cap. The total length of access tube shall be approximately 1,181 feet, including a 1-foot stickup above land surface (Figure 2).

8.4.2.4 Gravel Feed Tube Material

The gravel feed tube shall be new LCS, manufactured from steel conforming to ASTM specification A53 Type B steel. The gravel feed tube shall be constructed of 2-inch, Schedule 40 LCS tubing. The gravel feed tube shall be installed in the well annulas on the outside of the well casing and shall terminate with an open bottom below the bentonite seal at 470 feet bls. The total length of the gravel feed tube shall be approximately 471 feet (including the 1-foot stickup). Sections of the access tube shall be no less than 20 feet in length, and section joints shall have welded connections.

8.4.2.5 Filter Pack Sand and Disinfectant Material

The filter pack shall be Sigmund Linder (SiLi) Beads R451011 (2.4 mm – 3.45mm diameter) over the interval from 450 feet bls to the bottom of the reamed borehole (Figure 2). The filter pack material shall be obtained from Sigmund Lindner or equivalent.

Samples of the filter pack glass beads and a sieve analysis (percent retained through U.S. Standard sieve numbers 4, 8, 10, 16, 30, 40, 50, 100, and 200) of the filter pack material shall be submitted to the CONSULTANT for review, a minimum of 3 days prior to delivery of the filter pack to the well site. The filter pack material shall be contained in a temporary storage area at the well site in such a manner as to prevent contamination. The filter pack material shall be bagged in approximately 3,000-pound (about one cubic yard) “super sacks” or metric ton super sacks.

Each bag must be labeled with its actual weight. Any filter pack material delivered unbagged or unlabeled will be rejected. Frosted glass beads will be rejected.

During installation of the filter pack, an NSF-60 approved, 12% by weight sodium hypochlorite solution shall be added to the filter pack at the rate of ⅓ gallon per cubic yard of filter pack material. The liquid sodium hypochlorite solution shall be applied in accordance with American Water Works Association (AWWA) Standard C654 for disinfection of wells, in such a way that will produce a chlorine concentration of not less than 50 milligrams per liter (mg/L) in the entire volume of fluid within the well. Documentation shall be provided to the CONSULTANT prior to installation to demonstrate the hypochlorite does not exceed a 60-day shelf life (unless otherwise documented by the supplier), in order to prevent deterioration of hypochlorite concentration.

Installation of the liquid sodium hypochlorite solution shall be accomplished by flushing it into the well through a closed system that will prevent workers from exposure to chlorine vapors, in accordance with OSHA protocol. Solid calcium hypochlorite may be used in equivalent concentrations in lieu of sodium hypochlorite, only if NO partially hydrolyzed polyacrylamide (PHPA) polymers such as Baroid's EZ-Mud were used during drilling or reaming of the borehole, and only if approved by the CONSULTANT. The specific hypochlorite concentration and installation method must be approved by the CONSULTANT.

8.4.2.6 Bentonite Seal Material

The bentonite seal material shall consist of sodium bentonite pellets or bentonite chips. The bentonite seal material shall contain no hazardous materials or gypsum. For bidding purposes, a 100-foot sealed interval of bentonite chips shall be installed above the annular filter pack envelope of the well (Figure 2). A sample of the bentonite chip material shall be provided to the CONSULTANT for review no less than 24 hours prior to installation.

8.4.2.7 Cement Grout Material

The cement grout seal material shall consist of a neat cement slurry containing 5.2 to 6.0 gallons of water per 94-pound sack of Portland cement. The Portland cement shall conform to ASTM Standard C150, Type II. The cement grout slurry may contain pozzolanic material (fly ash) as an additive, which complies with ASTM Standard C618, and which shall not exceed 50 percent by volume of the cement. No non-pozzolanic aggregate or sand may be added to the cement grout. An example of a pozzolan cement mix design is presented in Appendix A. The cement grout weight shall be measured prior to installation as an indicator of the cement-water mix ratio. The cement grout slurry shall not exceed 15.6 lb/gal (117 lb/ft^3). Accelerator additives shall not be used unless approved by the CONSULTANT. Water used for preparing the grout slurry shall be potable. The specific constituents of the cement grout must be reviewed by the CONSULTANT.

The CONTRACTOR must provide a cement mix design, the mix water source, and the specific constituents of the cement grout to the CONSULTANT prior to the start of cementing operations. The cement grout slurry must be mixed thoroughly and be free of lumps. Cement grout that does not meet the requirements of this specification, or is not adequately mixed will be rejected.

8.4.3 Casing and Screen Installation

During the installation of the well casing, the boring shall be kept full of drilling fluid of the type specified in Section 7.0 and be free from any obstructions detrimental to completing the casing installation. The well casing shall be set centered in the borehole so as not to interfere in any way with the grout seal, filter pack, well installation, or maximum efficient operation of pumping equipment within the well casing or screen. The CONTRACTOR will be required to work continuously, on a 24-hour per day, 7-day week basis, while installing and completing the well.

The well casing and well screen for the well shall be set by the CONTRACTOR at the depth intervals specified in the final well design. Stainless steel and HSLA steel casing centralizers shall

be secured to the consistent steel types of well casing and screen at intervals of not greater than 80 feet. The casing shall be hung in suspension until the filter pack and cement grout seal have been installed.

The dielectric metal connector, conforming to the specifications of Section 8.4.2.1, shall be installed in the blank well casing from approximately 348 feet to 350 feet bls, where the dissimilar well casing metals are in contact with each other. The dielectric metal connector shall be factory assembled and shall be welded in accordance with manufacturer recommendations, and applicable provisions of the AWWA Standard C206 for welded joints, as specified in Section 8.4.3.1.

8.4.3.1 Joints in the Well Casing

Joints in the steel well casing and well screen shall be field welded in accordance with applicable provisions of the AWWA Standard C206 for welded joints. A welding sequence will be followed that will avoid excessive distortion. All well casing joints or overlaps shall be made watertight to prevent the degradation of the water supply by the migration of poor quality water. All welding shall be performed by an experienced welder. An affidavit of compliance with the welding provisions of this section shall be provided to the CONSULTANT prior to the acceptance of the production well. The affidavit of compliance will certify that all welding conducted during this project was performed in accordance with all applicable provisions of this Section of this specification.

If the sounding tube, gravel feed tube, well casing or well screen sections are butt-welded without the use of welding rings, the ends of the casing lengths shall be ground, or sufficiently scarfed, to remove sharp edges or burrs. The ends of each casing section shall not vary more than 0.010 inch at any point from a true plane at right angles to the axis of the casing. The tubing, casing or screen ends shall be beveled at one end to allow complete penetration of the welds.

If the well casing or well screen sections are joined with welding rings, the ends of the casing lengths shall be ground, or sufficiently scarfed, to remove sharp edges or burrs. One end of the

casing section shall be furnished with a welding collar of the same wall thickness and have the same physical and chemical properties as the corresponding casing sections. The welding collars shall have a minimum 5-inch length, and shall fit the O.D. of the well casing within 0.0625-inch diametrical clearance. The welding collars shall be delivered to the well site connected to the casing sections at one end with factory-welded connections. The inside edge of the welding collars shall be ground or sufficiently scarfed to remove sharp edges or burrs. Three alignment holes shall be provided in each welding collar (spaced at 120°), to ensure proper abutment of the casing sections. The alignment holes shall be no larger than 1 inch in diameter, and shall be completely filled with fillet welding. The ends of each casing section shall not vary more than 0.010 inch at any point from a true plane at right angles to the axis of the casing.

8.4.4 Sounding Tube Installation

A 2-inch O.D. sounding tube (Schedule 40) shall be installed for the well from 1 feet above land surface to a depth of approximately 1,180 feet bls (Figure 2). The joints between sections of the tube shall have welded connections in accordance with applicable provisions of the AWWA Standard C206 for welded joints, in accordance with Section 8.4.3.1. The sounder access tube shall **Not** be welded to the well casing but hung freely during well installation. The upper 5-feet shall be installed to angle away from the well casing.

The CONTRACTOR is responsible for the installation of the sounding tube without crimps, obstructions, or other damage. After installation, the CONTRACTOR shall pass a 1.25-inch O.D. by 2-foot long "rabbit" through the entire length of the sounding tube to ensure that it is open and to remove any burrs or obstructions that may be in the tube. Verification of the sounding tube openness from top to bottom will be conducted under the observation of the CONSULTANT. The top of the sounding tube shall be equipped with a watertight threaded cap.

8.4.5 Gravel Feed Tube Installation

A 2-inch O.D. sounding tube (Schedule 40) shall be installed for the well from 2 feet above land surface to a depth of approximately 470 feet bls (Figure 2). The joints between sections of the tube shall have welded connections in accordance with applicable provisions of the AWWA Standard C206 for welded joints, in accordance with Section 8.4.3.1. The gravel feed tube shall **Not** be welded to the well casing but hung freely during well installation. The upper 5-feet shall be installed to angle away from the well casing. The CONTRACTOR is responsible for the installation of the sounding tube without crimps, obstructions, or other damage.

8.4.6 Annular Materials Installation

8.4.6.1 Filter Pack and Disinfectant Installation

Filter pack sand or glass beads, conforming to the specifications of Section 8.4.2.5, shall be placed to completely fill the annulus in the specified interval (Figure 2). During the time of placement, fluid circulation shall be maintained through a swab block located no less than 40 feet below the fill depth of the filter pack sand. The swab block shall be periodically reciprocated to remove fine-grained material, prevent bridging, and aid in settling the filter pack in the borehole. Drilling fluid shall be maintained throughout the full depth of the well to the land surface and the well casing and screen shall be maintained in tension, until the filter material placement has been completed to the specified level. Care shall be taken to avoid bridging during installation of the filter pack sand.

In accordance with applicable provisions of the AWWA Standard A100 for water wells, before the introduction of filter pack into the well annulus, the drilling fluid shall be reconditioned until it has the following properties:

- Weight – no greater than 9.1 lb/gal (68 lb/ft3);
- Viscosity – no greater than 30 seconds per quart; and
- Sand content – no greater than 1 percent by volume.

The above standards may be exceeded in cases where different drilling fluid properties are required to protect or stabilize the well due to unstable borehole conditions, or other site-specific circumstances.

The filter pack shall be installed through a tremie pipe. At no time shall the bottom of the tremie pipe be located at a distance of greater than 30 feet above the interval being filled during filter pack placement. The level of the filter pack shall be measured periodically during placement with a wireline sounder. Placement of the filter pack will be continuous, except when additional precautions are necessary to prevent bridging, or while a measurement of the filter pack level is being conducted.

The quantity of filter pack material placed in the annulus shall not be less than that of the calculated volume. Upon completion of the filter pack placement, excess filter pack material will be judged an indication of voids in the gravel envelope and corrective measures shall be undertaken at the CONTRACTOR'S expense.

During installation, the filter pack shall be disinfected using hypochlorite or similar agent constituent in accordance with Section 8.4.2.5. The CONTRACTOR is responsible for the uniform application of the disinfecting agent throughout the filter pack interval, without relying on subsequent mechanical surging action for dispersing the disinfectant.

8.4.6.2 Bentonite Seal Installation

A 100-foot thick bentonite seal complying with Section 8.4.2.6 shall be installed in the well annulus immediately above the top of the filter pack interval.

8.4.6.3 Cement Grout Seal Installation

The well casing grout seal shall consist of a neat cement or pozzolan cement slurry conforming to the specification in Section 8.4.2.7. The cement grout shall be placed to completely fill the annular space between the well casing and the wall of the borehole, from the top of the bentonite

seal at approximately 350 feet bls, up to 39 feet bls (Figure 2). An additional cement grout seal conforming to the specification in Section 8.2.2.2 will be installed between the well casing and the surface casing from a depth of 39 feet bls to land surface.

The cement grout shall be placed by pumping through a tremie pipe. Prior to pumping, the cement grout shall be passed through a ½-inch slotted bar strainer to remove any unmixed lumps. During the cement grout installation, the discharge end of the tremie pipe shall be continuously submerged in the grout until the zone to be grouted is completely filled. During cement seal installation operations, the CONTRACTOR is responsible to maintain cement slurry hydraulic pressures and pumping pressures that will not reach excessive levels and cause casing collapse.

The well casing shall be hung in tension throughout the grouting operation, until the cement grout has cured sufficiently. The grout seal shall be placed in one continuous operation from the bottom to the top of the interval to be grouted, forming a continuous seal. The minimum curing time for the cement grout seal shall be 12 hours, or the cement grout obtaining a minimum compressive strength of 500 psi.

8.5 WELL DEVELOPMENT

Well development shall be accomplished by simultaneously swabbing and airlifting. A dual or triple flanged closed end swab tool shall be used. The well development for the well shall include an initial quick pass downward, after which the well development shall proceed from the bottom of the screen to the top of the screen, at an average rate of no less than 10 minutes per linear foot of screen, unless otherwise directed by the CONSULTANT. During swab and air-lift development, a discharge rate of no less than 50 gpm must be maintained (unless limited by aquifer characteristics). A non-phosphoric dispersant (such as Baroid PFD, Johnson Screen product NW-220, or equal) shall be added to the well bore in accordance with the manufacturer's recommendations, during development operations, after the initial pass downward. Costs for chemical additives, dry swabbing, and reaction times, as recommended by the manufacturer shall be provided as a lump sum.

The CONTRACTOR shall provide the CONSULTANT with an SDS for all chemical additives used for well development at least 3 days prior to their use. The CONSULTANT must review the specific type and placement method of all chemical additives prior to their use. Development water shall be contained and/or disposed of by the CONTRACTOR as specified in Section 2.0. Re-use of discharge water will not be allowed. The specific methods, chemical additives, and equipment used for well development must be reviewed by the CONSULTANT prior to commencement of development operations.

Payment for well development by swabbing and airlift pumping will be based on the unit price per hour shown on the bid schedule and shall apply only to those hours that the development tools are being operated for swabbing and airlifting and will not apply to other time such as trip time or dry (without airlift) swabbing. After swabbing is complete, all rock, sand, and foreign material shall be removed from the bottom of the production well. The CONTRACTOR shall provide the necessary equipment and air compressor capable of performing the required swabbing and airlifting without artificially raising the water level in the well boring.

After all sediment is removed from the bottom of the well, the well shall be chlorinated in accordance with AWWA Standard A100, through the drill string and surge block with the end open, starting at the bottom and working up. Approximately 1 gallon of 12 percent sodium hypochlorite (50 mg/L) per 30 foot interval, shall be placed into solution and injected down the drill string and into the formation, then briefly surged into place. This procedure shall be repeated for each section throughout the screened interval.

After swabbing and airlift development, the well shall be further developed by pumping and surging. The specific pump-and-surge development method must be reviewed by the CONSULTANT. The pump-and-surge development program is anticipated to have a 12-hour duration for the well with pumping rates ranging from 800 to 2,500 gpm.

8.6 PLUMBNESS AND ALIGNMENT

The CONTRACTOR shall perform and report the well plumbness and alignment tests described in this Section. If the well fails the plumbness and alignment test, the CONTRACTOR must correct the plumbness and alignment at their own cost, to the satisfaction and approval of the OWNER. Plumbness and alignment correction costs will be borne by the CONTRACTOR.

The plumbness and alignment requirements for the well are based on the following projected permanent pump equipment and anticipated conditions:

- The anticipated permanent pump for the well will be a line shaft vertical turbine pump with a **1½-inch diameter inner shaft** and **10-inch diameter column pipe**.
- The deepest anticipated permanent pump setting depth is **750 feet below land surface**.
- The static water level is assumed to be approximately **415 feet bls**, and pumping water level is assumed to be approximately **520 feet bls**.
- The anticipated pumping rate of the well is assumed to be approximately **1,500 to 2,500 gpm**.

8.6.1 Measurement and Reporting

To demonstrate compliance with Sections 8.6.2 and 8.6.3, the CONTRACTOR shall furnish all labor, equipment, and materials to conduct plumbness and alignment tests described in this Section, to the satisfaction of the CONSULTANT and OWNER.

Preliminary tests for plumbness and alignment shall be made by the CONTRACTOR during the drilling of the pilot borehole and after the construction and development of the well is complete. All plumbness and alignment tests will be conducted at the CONTRACTOR'S expense. During the drilling of the pilot borehole, inclinometer (A-1 Sureshot tool or equal) surveys shall be performed by the CONTRACTOR at 60-foot intervals. A 3-degree unit shall be used with the inclinometer, as described in Section 8.3.1. In addition, the CONTRACTOR shall review the results of a magnetic deviation survey of the pilot hole as described in Section 8.3.2, and take

required actions to meet the well plumbness and alignment requirements of Sections 8.6.2 and 8.6.3.

The CONTRACTOR shall engage a geophysical logger SUBCONTRACTOR to perform the work described in this Section. The CONTRACTOR shall be responsible for the work performed by its geophysical logger SUBCONTRACTOR. After completion of the well construction and development, the geophysical logger SUBCONTRACTOR shall conduct a plumbness and alignment test by use of a gyroscopic survey. The gyroscopic survey shall be conducted with a surface recording gyroscopic (SRG) logging tool or North-seeking gyroscopic logging tool equipped with an accelerometer that has an accuracy of at least ±0.25° and a resolution of at least ±0.01°. The plumbness and alignment of the well shall be determined from the gyroscopic survey data, based on the minimum curvature method or the radius of curvature method. The gyroscopic survey shall be conducted under the observation of the CONSULTANT.

If a SRG gyroscopic logging tool is used, the CONTRACTOR must provide documentation that the logging tool has been properly calibrated by the manufacturer or a qualified technician within the past year. Prior to conducting the gyroscopic survey, the logging tool must be aligned to true North (or an established starting position that has been approved by the CONSULTANT) from a line-of-sight horizontal distance no less than 40 feet from the well. The azimuthal deviation (variance from starting position) of the SRG logging tool shall be measured before and after the gyroscopic logging, and that variance shall not diverge more than 10°.

If a North-seeking gyroscopic logging tool is used, documentation shall be provided prior to performance of the gyroscopic survey, that the tool has been calibrated in an oriented calibration jig or equivalent calibration process, within the past year. The calibration shall include four measurements at 90° orientations and in at least 2 different inclinations from angles of 5° to 30° from the vertical, to ensure the tool is within calibration limits.

Whether a SRG logging tool or North-seeking gyroscopic logging tool is used, the logging tool shall be centralized on both the top and bottom, with centralizing bands expanded to within 1.0 inch of the inside diameter of the smallest casing or screen interval to be logged.

If requested by the CONSULTANT, the geophysical logger SUBCONTRACTOR shall conduct a 100-foot repeat section to demonstrate the accuracy and repeatability of the gyroscopic data. The 100-foot repeat section must reasonably duplicate that originally-logged section of the well and conducted at no cost to the OWNER or CONSULTANT. Immediately following the completion of the gyroscopic survey, the geophysical logger SUBCONTRACTOR shall provide three (3) field copies of the gyroscopic survey to the CONSULTANT at the well site at the completion of the test. Within 10 working days following completion of the gyroscopic survey, three (3) final copies of the gyroscopic surveys shall be provided to the CONSULTANT, as well as an electronic original of the logging data in (*.csv) format, or other CONSULTANT-approved electronic format. The written plumbness and alignment reports from the geophysical logger SUBCONTRACTOR shall include numerical values of the well deviation with deviation units labeled, and also graphical diagrams of the well alignment in both a profile perspective (both Northing and Easting views), and a vertical perspective. The quality and clarity of the gyroscopic logs must be reviewed by the CONSULTANT, and the plumbness and alignment report must be furnished to the CONSULTANT by the geophysical logger SUBCONTRACTOR prior to acceptance of the well.

8.6.2 Well Alignment Requirements

It is the CONTRACTOR's responsibility to drill, install and develop the well with sufficient alignment to permit the unobstructed installation of the permanent pump equipment at the projected setting depth indicated in Section 8.6, and to facilitate the operation of that permanent pump equipment without excessive vibration (not to exceed 0.17 inches per second, root mean square overall, as recommended by the Hydraulic Institute).

To demonstrate compliance with this requirement, the CONTRACTOR shall install a test pump of similar type and dimensions as the permanent pump (the pump length and diameter for the well are assumed to be 10 feet long x 12 inches in diameter), to the deepest anticipated permanent pump setting depth. The installation, operation, and removal of test pump equipment that complies with Section 9.0 of this Specification must be achieved without any well-related obstructions or operational problems. For the well, the deepest anticipated permanent pump setting depth is 750 feet bls.

The "misalignment diameter" is defined as the horizontal distance between the well casing centerline (as measured by the gyroscopic survey) and the proposed pump centerline (represented by a "best-fit" straight line oriented to minimize its horizontal distance from the well casing centerline). The misalignment diameter shall not exceed one half (½) the difference between the I.D. of the casing and the O.D. of the anticipated permanent pump column pipe. For these well's preliminary design (Figure 2), the misalignment diameter is represented by one half (½) the annular distance between the 18-inch casing I.D. and the 12-inch pump column pipe O.D. Therefore, the misalignment diameter for the well design (Figure 2) is 3.0 inches (Figure 4). The alignment standard of this Section shall apply for the well from the top of the well to the deepest projected pump setting depth of 760 feet bls.

The OWNER may waive the requirements for alignment in this Section if it is determined by the CONSULTANT that: (1) the CONTRACTOR has exercised all possible care in constructing the well and the defect is due to circumstances beyond the CONTRACTOR'S control; or (2) the utility of the completed well will not be materially affected.

8.6.3 Well Plumbness Requirements

It is the CONTRACTOR'S responsibility to drill, install and develop the well with sufficient plumbness to permit the unobstructed installation of the permanent pump equipment at the projected setting depth indicated in Section 8.6, and to facilitate the operation of that permanent pump

equipment without excessive vibration (not to exceed 0.17 inches per second, root mean square overall, as recommended by the Hydraulic Institute).

Section 8.6.3 will apply only if any of the well fails to meet the alignment requirements, in accordance with Section 8.6.2. If a well does not comply with the alignment requirements described in Section 8.6.2, the maximum allowable horizontal deviation from vertical (closure distance) shall not exceed two-thirds (⅔) the smallest inside diameter of the casing or screen, per each 100-foot depth interval of the well from the land surface to the projected pump setting. Based on the preliminary well design (Figure 2) and the projected permanent pump setting, the maximum allowable closure distance for the well design is 12 inches per 100 feet of depth, from the land surface to 750 feet bls.

The OWNER may waive the requirements for plumbness in this Section if it is determined by the CONSULTANT that: (1) the CONTRACTOR has exercised all possible care in constructing the well and the defect is due to circumstances beyond the CONTRACTOR'S control; or (2) the utility of the completed well will not be materially affected.

8.7 VIDEO SURVEY

After completion and testing of the well, the CONTRACTOR shall provide a color video survey of the well. The video survey camera shall include both downward-looking and side-view capabilities, and the video survey shall be conducted under the observation of the CONSULTANT. Both the quality and clarity of the well video must be acceptable to the CONSULTANT. Prior to acceptance of the well, the CONTRACTOR shall provide two electronic copies of the final well video file to the CONSULTANT and OWNER.

8.8 COVERING PLATE AND ACCESS PORT

After completion of all testing and surveys, the well shall be temporarily capped with a HSLA covering plate with the same composition and the same wall thickness as the well casing. The covering plate will be secured to the top of the well with a water-tight welded seam.

Additionally, the covering plate will be equipped with a ½-inch diameter access port with a watertight threaded cap, to allow for the measurement of water levels.

END OF SECTION

9.0 WELL TESTING

9.1 GENERAL

Aquifer tests to be performed at the well shall consist of a 10-hour step-rate discharge test and a 48-hour constant-rate aquifer test, which will be followed by an 8-hour water-level recovery period. The CONSULTANT and OWNER reserve the right to extend or shorten the test durations.

The CONTRACTOR shall obtain and record water level measurements in half-hour intervals throughout the duration of the 48-hour constant rate aquifer test, or as directed by the CONSULTANT.

9.2 TEST EQUIPMENT

The CONTRACTOR shall furnish pumping equipment capable of pumping at rates of up to 2,500 gpm (for the step-rate discharge and 48-hour constant-rate aquifer test), with a pumping lift of 750 feet bls (not including pipe friction losses). The pumping equipment shall include satisfactory throttling devices or valves such that the discharge can be adjusted to various rates, potentially below 800 gpm. The test pump setting for the well shall be identified by the CONSULTANT. The anticipated setting of the test pump inlet is 750 feet bls. The pumping unit shall be complete with an ample power source and shall be capable of being operated without interruption for a period of 48 hours for the well.

The pump equipment shall not be removed from the well until after the completion of the water-level recovery test. The CONTRACTOR shall provide a flow meter and calibrated orifice as specified in Section 9.3. Prior to installation, the CONTRACTOR shall provide the following information to the CONSULTANT for review: the test pump, motor, metering equipment, and accessories.

9.3 PUMP DISCHARGE

The CONTRACTOR shall operate the test pump at the discharge rate(s) that have been identified by the CONSULTANT. Discharge from the pump shall be controlled by a gate valve and/or engine throttle, or variable frequency drive (VFD). The discharge shall be controlled and maintained at the specified rate for the entire test duration at the well with an accuracy of plus-or-minus 5 percent.

The pump discharge shall be measured with a propeller-type or magnetic inductive-type flow meter provided by the CONTRACTOR, in addition to a calibrated orifice and manometer installed in the discharge pipe by the CONTRACTOR. All in-line flow meters shall be located in a straight portion of the discharge pipe without any bends, valves, or other obstructions that may interfere with the operation and/or accuracy of the meters for a distance of no less than 10 pipe diameters upstream, and for a distance of no less than 5 pipe diameters downstream (unless otherwise recommended by the manufacturer of the meter). At all times during pumping, the discharge pipe shall be oriented in such a manner as to ensure that the pipe remains full of water at the location of the flow meter and calibrated orifice. The discharge pipe shall be equipped with a spigot or valve for water sample collection. The CONTRACTOR shall also furnish equipment and collect measurements of the sand production during pumping (a Rossum Sand Sampler, or equal) in accordance with AWWA Standard A-100. Discharge flow and sand measurement devices must be reviewed by the CONSULTANT.

The discharge water from the well shall be directed to the specified point of discharge (Section 2.0). The anticipated discharge point will be within 1,500 feet of the well site. The discharge piping shall be watertight and capable of conveying the specified flow rates for the specified pumping periods. The CONTRACTOR is responsible for providing adequate piping for the actual distance to the discharge point, and for providing appropriate scour protection at the point of discharge. The CONTRACTOR is responsible for coordination of any required permits, traffic control, and other considerations that may be required to address potential flooding or pipeline roadway crossings that result from the discharged water.

END OF SECTION

10.0 VISITATION AND INSPECTION

The CONSULTANT and OWNER representatives shall, at any reasonable time during the term of work, be entitled to review the CONTRACTOR'S facilities, its program operation, and the records that pertain to the program.

The CONTRACTOR agrees that the CONSULTANT, OWNER, or any of their duly authorized representatives, shall have access to the CONTRACTOR'S facilities and have the right to examine books, documents, and records of the CONTRACTOR involving transactions related to these specifications.

The CONTRACTOR further agrees to include in all subcontracts hereunder, a provision that the SUBCONTRACTOR agrees that the CONSULTANT, OWNER, or any of their duly authorized representatives, shall have access to the SUBCONTRACTOR'S facilities and have the right to examine any books, documents, and records of the SUBCONTRACTOR involving transactions related to the subcontract and these specifications.

END OF SECTION

11.0 MEASUREMENT AND PAYMENT

11.1 GENERAL

Payment for the lengths, areas, volumes, weights, or times shall be compensation in full for the furnishing of all overhead, labor, materials, tools, equipment, and appurtenances necessary to complete the work in a satisfactory manner as specified with all connections, testing and related work completed. Each item, fixture, piece of equipment, etc., shall be complete with all necessary connections and appurtenances for the satisfactory use of and/or operation of said item. No additional payment will be made for work related to each item unless specifically noted or specified.

11.2 BASIS OF MEASURMENT AND PAYMENT

Compensation for all work specified to be performed under this specification will be made under the payment items presented in this Section. The prices for the said payment items shall be full compensation for all costs in connection therewith. Principal features of the work to be included under the various payment items will be on a linear foot, hourly, per ton, per cubic foot, per cubic yard, per each, or lump sum basis, as designated. Measurement of completed work will be made in place, with no allowance for waste. Measurement of lengths, areas, volumes, weights, or time will be based on the dimensions indicated in this Section, unless altered by the CONSULTANT or OWNER to accommodate field conditions, but shall not exceed bid item amount unless authorized by OWNER.

11.3 BID SCHEDULE PAYMENT ITEMS

The payment schedule for well construction, development, and testing of SV-10 is presented in the Bid Schedule. A detailed description of each item of the payment schedule is presented below.

11.3.1 Item 1 – Mobilization and Demobilization

Item 1 consists of moving and assembling all drilling, testing, and support equipment to the job site, removing the equipment from the job site when the work is completed, and job site cleanup and restoration. Payment will be made on a lump sum basis. Up to 50% of the initial Mobilization/ Demobilization lump sum cost can be billed after mobilization to the well site. The remaining 50% of the lump sum cost can be billed after demobilization from the well site, approval of job site cleanup and restoration, and verification of submittal of the Well Driller's Report to ADWR.

11.3.2 Item 2 – Sound Barricades

Item 2 consists of all labor, equipment, and material costs associated with providing noise control for the well site in accordance with Section 1.7. Payment will be made on a lump sum basis.

11.3.3 Item 3 – Surface Casing Construction

Item 3 consists of all labor, equipment, material costs associated with drilling the surface boring for the well, and placement of the surface casing and surface grout seal in accordance with Section 8.2. This item includes: drilling the surface borehole in accordance with Section 8.2.1; providing the materials specified in Sections 8.2.2.1 and 8.2.2.2; and installation of the surface casing in accordance with Sections 8.2.3 and 8.2.4. Payment will be made on a linear foot basis.

11.3.4 Item 4 – Pilot Hole Drilling and Sampling

Item 4 consists of all labor, equipment, and material costs associated with drilling the maximum 17½-inch diameter pilot hole at the well site, geophysical logging, zonal sampling, and falling head testing for the well in accordance with Sections 8.3.1, 8.3.2, and 8.3.3. Payment will be made on a linear foot, lump sum, per each (per sample), and hourly basis.

11.3.5 Item 5 – Borehole Reaming

Item 5 consists of all labor, equipment, material costs associated with reaming the pilot hole to the final diameter in accordance with Section 8.4.1. Item 5 also includes the cost for the final caliper log and deviation survey for the reamed borehole. Payment will be made on a linear foot and lump sum basis.

11.3.6 Item 6 – Casing and Screen Material

Item 6 consists of the material cost of the well casing and well screen for the well, dissimilar metals adaptors, sounding tube and gravel feed tube, as specified in Sections 8.4.2.1, 8.4.2.2, 8.4.2.3, and 8.4.2.4. Item 6 also includes the bottom cement plug for the well casing, as specified in Section 8.4.2.1. Payment will be made on a linear foot basis for actual quantities approved, after delivery to the site.

11.3.7 Item 7 – Well Installation

Item 7 consists of all labor and equipment costs required for the installation of the well casing and well screen, sounding tube and gravel feed tube for the well, including welding requirements, logs, and records, as specified in Sections 6.0 and 8.4.3. Payment will be made on a linear foot basis.

11.3.8 Item 8 – Furnish and Install Annular Materials

Item 8 consists of all labor, equipment, and material costs to furnish and install the filter pack, disinfectant, and bentonite seal in the well, as specified in Sections 8.4.2.5 and 8.4.2.6. The item 8 annular material volumes indicated in the Bid Schedule are based on the calculated volume plus a 30 percent overage for bentonite and a 10 percent overage for glass beads. Payment will be made on a per ton and per cubic foot basis for actual quantities installed and approved, and after placement is complete.

11.3.9 Item 9 – Furnish and Install Cement Grout Seals

Item 9 consists of all labor, equipment and material costs to furnish and install the cement grout seals in the well in accordance with the requirements of Sections 8.4.2.7 and 8.4.6.3. The item 9 cement grout material volumes indicated in the Bid Schedule are based on the calculated volume plus a 30 percent overage. Payment will be made on a per cubic yard basis for actual quantities installed and approved, and after placement is complete.

11.3.10 Item 10 – Well Development and Completion

Item 10 consists of all labor, equipment, and material costs associated with well development by swabbing and airlifting, as well as pump-and-surge development for the well as specified in Section 8.5. Item 10 also consists of all costs to furnish and install the discharge equipment, storage tanks, and lines in accordance with the requirements of Section 2.0 and 8.5, the testing for plumbness and alignment at the well as described in Section 8.6, the final well video for the well as described in Section 8.7, and the covering plate for the well as described in Section 8.8. Payment will be made on an hourly and lump sum basis.

11.3.11 Item 11 – Well Testing

Item 11 consists of the cost of all labor and equipment associated with the well testing requirements for the well as described in Sections 2.0 and 9.0. Payment will be made on a lump sum and hourly basis.

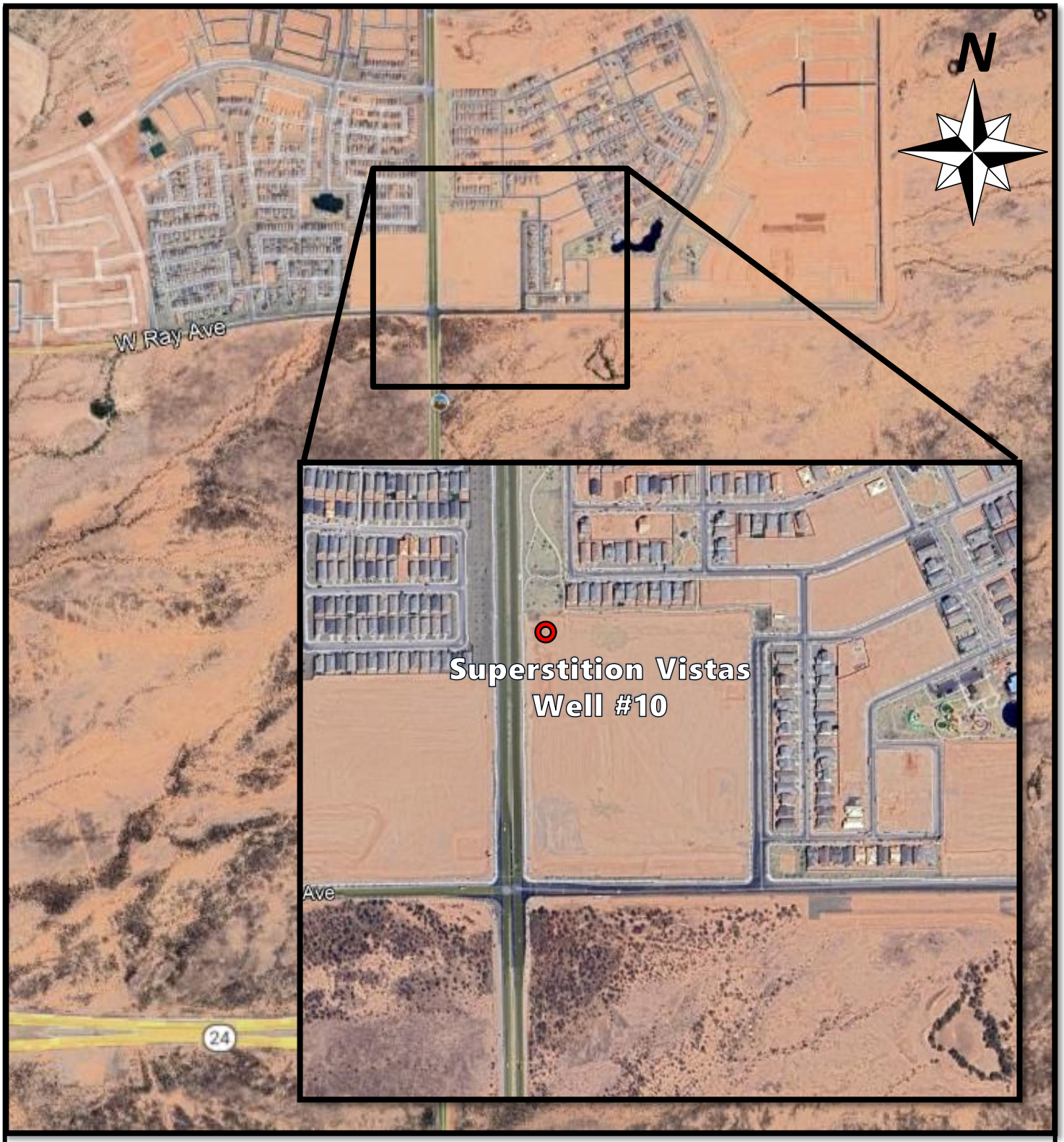
11.3.12 Item 12 - Rig Hourly Rate (Allowance Item)

Item 12 consists of the cost of maintaining equipment with and without personnel if a work stoppage occurs at the well, which is not due to any fault of the CONTRACTOR or SUBCONTRACTORS. Payment for any hourly time is subject to approval by the OWNER. The hourly rate with crew is also applicable to Lost Circulation Conditions as described in Section

7.4 and Low Penetration Rate Conditions as described in Section 7.5, assuming all conditions of each clause are met in full. Payment will be made on an hourly basis.

END OF SECTION

FIGURES

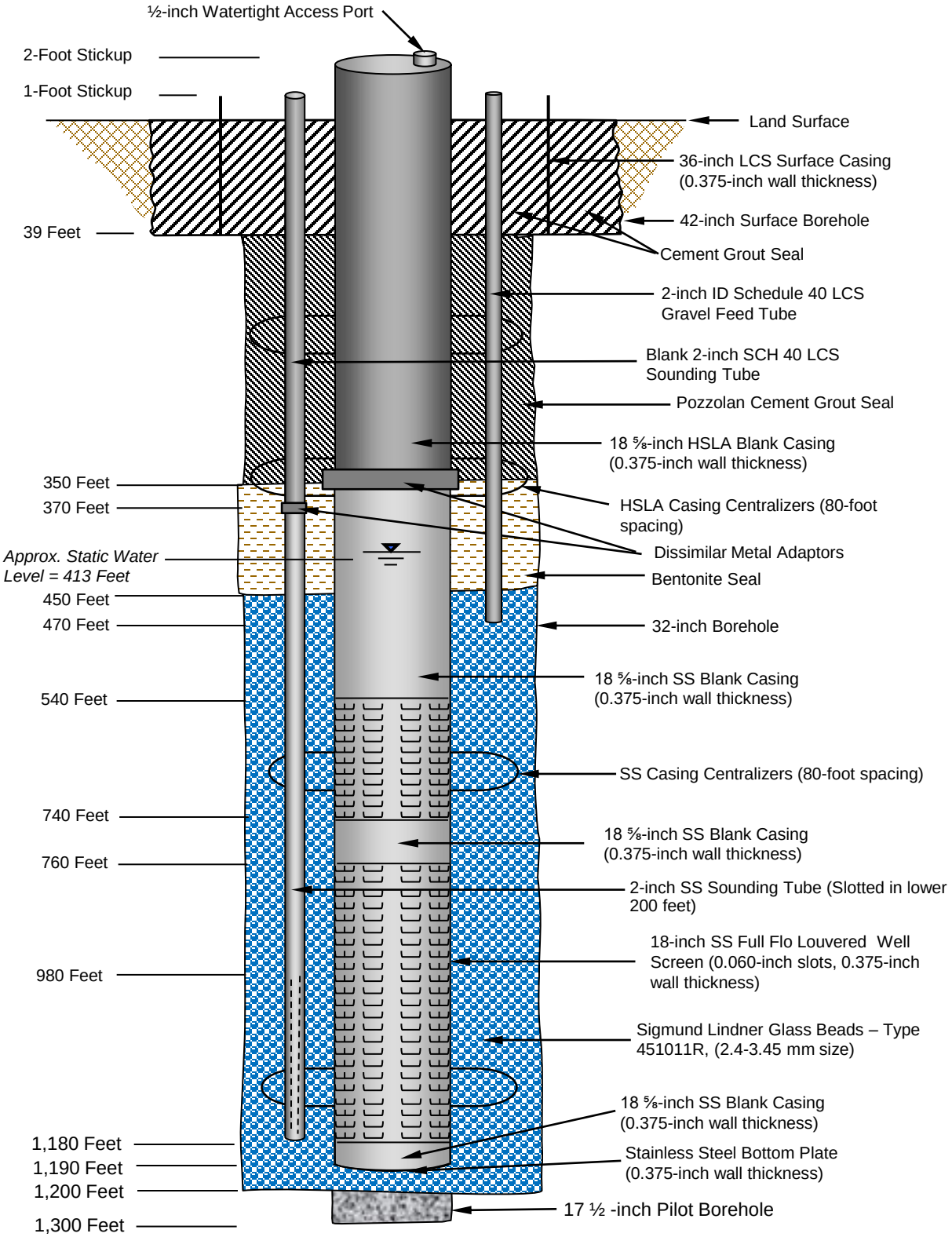


Aerial Photography curtesy of Google Earth, February 26, 2025

CLEAR CREEK ASSOCIATES

FIGURE 1
WELL LOCATION MAP
Superstition Vistas Well #10
Apache Junction, Arizona

Well Location: D(1-8)20ccb

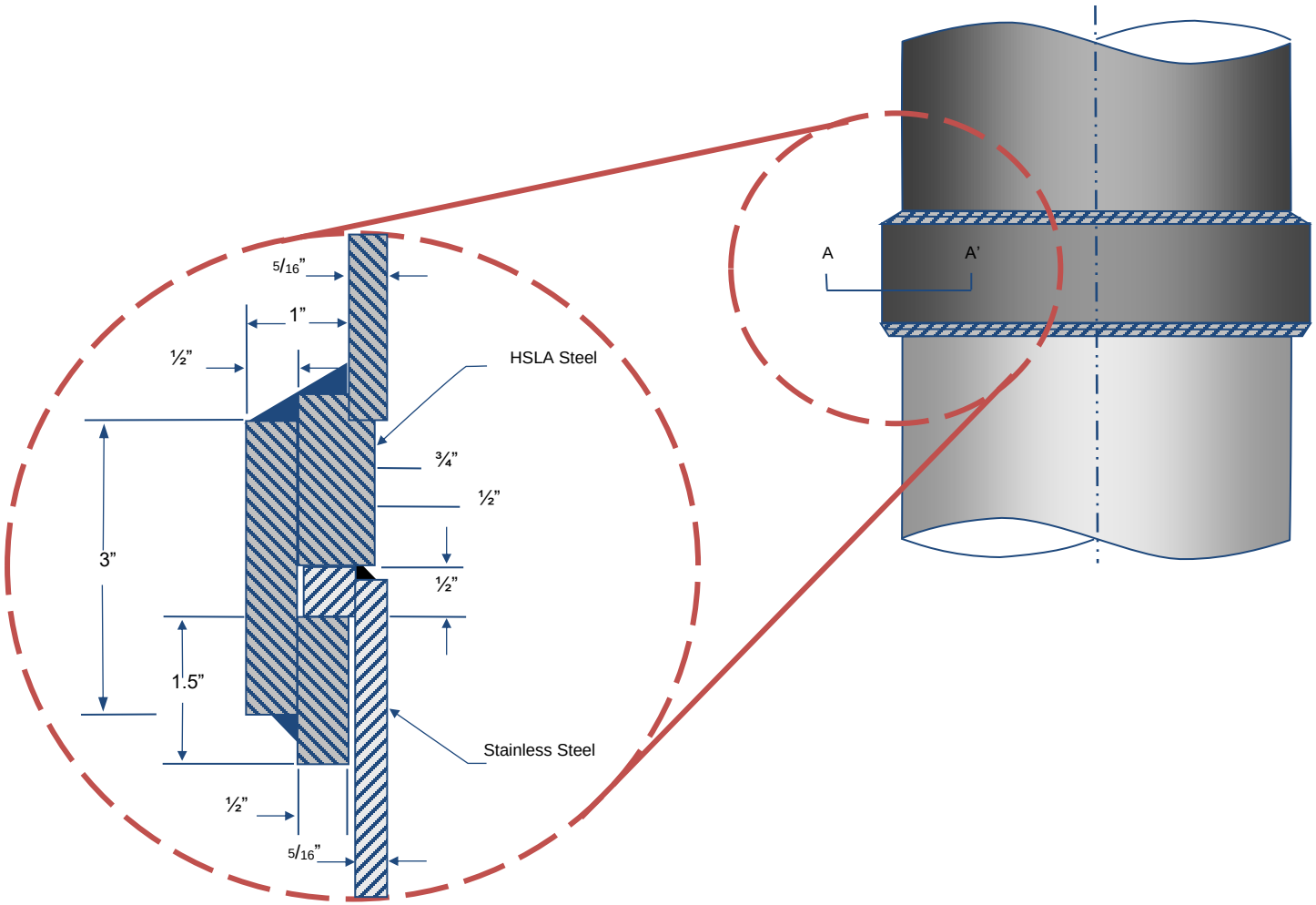


Not To Scale

Notes: LCS = Low-Carbon Steel`
HSLA = High Strength Low Alloy Steel
SS = Stainless Steel
All diameters are O.D. except the well screen, which is nominal, or if stated differently.

CLEAR CREEK ASSOCIATES
A Geo-Logic Company

FIGURE 2
PRELIMINARY WELL DESIGN
Superstition Vistas Well #10
Apache Junction, Arizona



Cross-Section A-A'

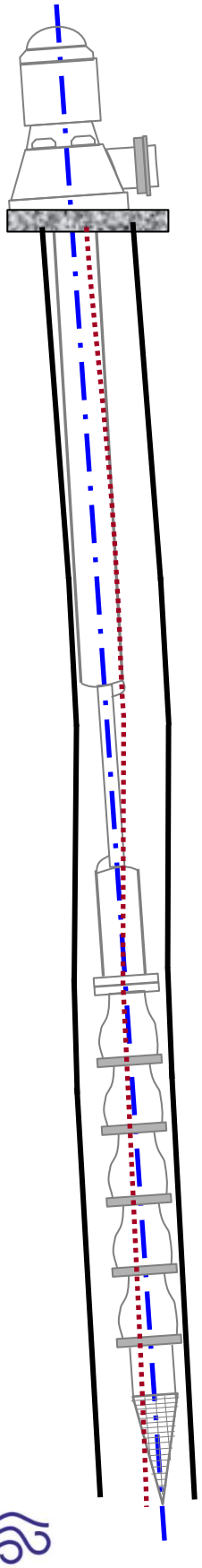
Modified from: Roscoe Moss Company

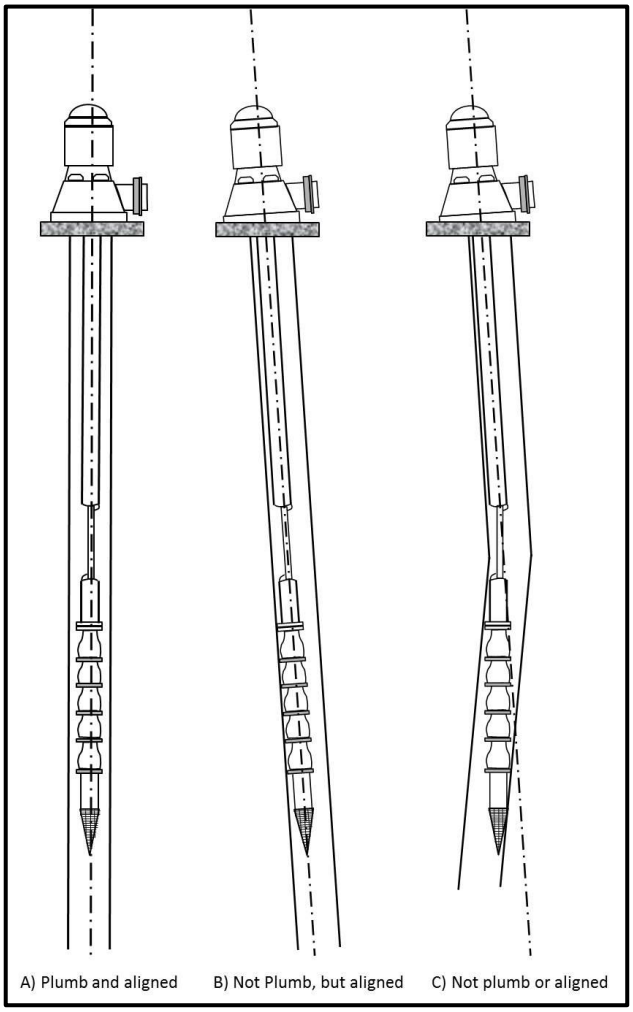
NOT TO SCALE

Note: HSLA = high strength low alloy steel

CLEAR CREEK ASSOCIATES

FIGURE 3
GENERALIZED DIELECTRIC CONNECTOR DESIGN
Superstition Vistas Well #10
Apache Junction, Arizona





From: DePonty, Glotfelty, DePinto, and Kornrumph, *Plumbness and Alignment Standards – Analysis and Recommendations:* Water Well Journal, January 2014, p. 25.

Note: Allowable deviation between the Well Centerline and the Pump Centerline is **4.0 inches**, per Section 8.6.2 of this Technical Specification

Explanation

Pump Centerline
(based on conceptual alignment of 10-inch diameter pump column pipe)

Well Centerline
(based on conceptual gyroscopic survey of 18-inch inside diameter well casing)

CLEAR CREEK ASSOCIATES

FIGURE 4
WELL ALIGNMENT REQUIREMENT
Superstition Vistas Well #10
Apache Junction, Arizona

APPENDIX A

CEMENT MIX DESIGN EXAMPLES

SAND CEMENT MIX DESIGN EXAMPLE

1 sack of cement = 1 bulk ft^3 *

= 94 lbs.

= 3.6 absolute gallons

*A sack of cement has a bulk volume of approximately 1 cubic foot, which is composed of 0.52 cubic feet of air and 0.48 cubic feet of solids (actual space occupied by the solids of one sack of cement when mixed with water to form a slurry).

Calculations are based on the specific gravity of cement equal to 3.15 gm/cm^3 and the specific gravity of sand aggregate equal to 2.65 gm/cm^3.

Conversion: (specific gravity) (62.4) = lb/ft^3

Materials	**Pounds of Material**	**Factor (Absolute ft^3/lb)**	**Absolute Volume (ft^3)**	**Water Requirement (gallons)**
Cement	94	.0051	0.48	6.0
Sand	80	.0060	0.48	
Water	50	.016	0.80	
TOTAL	224		1.76	6.0

Slurry Wt. = 224 lb/1.76 ft^3 = 127 lb/ft^3 (17 lb/gal)

Slurry Yield = 1.76 ft^3/sack cement

Slurry Yield = 15.34 sack cement/yrd^3

For 1 yrd^3:	Cement	1,447 lb	7.36 ft^3
	Sand	1,217 lb	7.36 ft^3
	Water	766 lb	12.27 ft^3
		3,430 lb	27 ft^3

POZZOLAN CEMENT MIX DESIGN EXAMPLE

1 sack of cement = 1 bulk ft^3*

= 94 lbs.

= 3.6 absolute gallons

*A sack of cement has a bulk volume of approximately 1 cubic foot, which is composed of 0.52 cubic feet of air and 0.48 cubic feet of solids (actual space occupied by the solids of one sack of cement when mixed with water to form a slurry).

Calculations are based on the specific gravity of cement equal to 3.15 gm/cm^3 and the specific gravity of pozzolan equal to 2.46 gm/cm^3.

Conversion: (specific gravity) (62.4) = lb/ ft^3

Materials	Pounds of Material	Factor (Absolute ft^3/lb)	Absolute Volume (ft^3)	Water Requirement (gallons)
Cement	47	.0051	0.24	3.0
Pozzolan**	37	.0065	0.24	1.95
Water	41	.016	0.66	
TOTAL	125		1.14	4.95

Slurry Wt. = 125 lb/1.14 cu ft = 110 lb/ft^3 (14.7 lb/gal)

Slurry Yield = 1.14 cu ft/sack cement and pozzolan

Slurry Yield = 23.68 sack cement and pozzolan/yrd^3

For 1 yrd^3:	Cement	1,114 lb	5.68 ft^3
	Pozzolan	874 lb	5.68 ft^3
	Water	977 lb	15.63 ft^3
		2,965 lb27 ft^3	

** Added as 50% by volume of cement. Example is for Halliburton's Pozmix A. Water requirements will vary depending on composition and grind of pozzolan material.

Exhibit A
REPLACE WITH CLEAR CREEK's BID TAB

BID SCHEDULE[a]

Drilling and Installation of
Superstition Vistas Well #10
Apache Junction, Arizona

Company Name: Yellow Jacket Drilling Services, LLC

Apache Junction Water District
300 E Superstition Blvd., Building D
Apache Junction, AZ 85119

Item	Description	Unit	Number of Units[b]	Unit Price ($)	Total Price ($)
1	Mobilization and Demobilization	Lump Sum	1		$251,141.00
2	Sound Barricades	Linear Foot	300	$150.00	45,000.00
3	Surface Casing Construction	Linear Foot	39	635.00	24,765.00
4	Pilot Borehole Drilling and Sampling				
	A. Drill 17.5-inch borehole to 1,300'	Linear Foot	1,261	65.00	81,965.00
	B. Geophysical Logging	Lump Sum	1		14,085.00
	C. Furnish, Install and Remove Zonal Sampling Tool	Per Each	7	11,865.00	83,055.00
	D. Purging for Zonal Sampling	Hourly	84	700.00	58,800.00
	E. Standby During Falling Head Tests	Hourly	14	700.00	9,800.00
5	Borehole Reaming				
	A. Ream borehole to 1,200'	Linear Foot	1,161	110.00	127,710.00
	B. Reamed Geophysical Logging - Caliper and Deviation	Lump Sum	1	$0	11,075.00
6	Casing and Screen Material[b]				
	A. 18 5/8 inch O.D. HSLA Well Casing[b]	Linear Foot	350	269.00	94,150.00
	B. 18 5/8 inch O.D. 316L SS Well Casing[b]	Linear Foot	220	735.00	161,700.00
	C. 18 5/8-inch O.D. 316L SS Well Screen[b]	Linear Foot	620	819.00	507,780.00
	D. Dielectric Coupling for Casing	Lump Sum	1	$0	1,280.00
	E. Sounding Tube and Dielectric Coupling for Tube	Linear Foot	1,181	23.00	27,163.00
	F. Gravel Feed Tube	Linear Foot	471	6.00	2,826.00
7	Well Installation				
	A. Well Casing and Screen	Linear Foot	1,192	55.00	65,560.00
	B. Sounding Tube	Linear Foot	1,181	1.00	1,181.00
	C. Gravel Feed Tube	Linear Foot	471	1.00	471.00
8	Furnish and Install Filter Pack[c]				
	A. Filter Pack - Glass Beads	Metric Ton	132	2,195.00	289,740.00
	B. Furnish and Install Bentonite Seal[c]	Cubic Foot	475	23.00	10,925.00
9	Furnish and Install Cement Grout Seal[c]	Cubic Yard	65	360.00	23,400.00
10	Well Development and Completion				
	A. Air Lift Development	Hourly	120	700.00	84,000.00
	B. Chemical Additives Materials and Installation	Lump Sum	1		4,680.00
	C. Pump and Surge Development	Hourly	12	450.00	5,400.00
	D. Plumbness and Alignment Test	Lump Sum	1		4,290.00
	E. Final Well Video	Lump Sum	1		2,500.00
11	Well Testing				
	A. Furnish, Install and Remove Test Pump and Equipment	Lump Sum	1		63,866.00
	B. Pumping Tests	Hourly	58	450.00	26,100.00
12	Rig Hourly Rate (Alternate Item)[d]				
	A. With Crew	Hourly	8	700.00	5,600.00
	B. Without Crew	Hourly	8	600.00	4,800.00
				Total	$ 2,094,808.00

BID SCHEDULE[(a)]

Drilling and Installation of
Superstition Vistas Well #10
Apache Junction, Arizona

Company Name: Yellow Jacket Drilling Services, LLC

Apache Junction Water District
300 E Superstition Blvd., Building D
Apache Junction, AZ 85119

Grand Total in Written Words: Two Million Ninety Four Thousand Eight Hundred Eight Dollars and 00/100

Notes:

a The Contractor's Total Bid is based upon unit prices and allowances. Bid amounts shall include all costs for the required labor, equipment, and materials, and shall also include all applicable sales/contracting taxes.

b Quantities are not guaranteed. Final payment will be based on actual quantities installed and approved. If the required quantities of the items listed above are increased or decreased by Change Order, the unit prices set forth above shall apply to such increased or decreased quantities unless the change is greater than 35 percent, at which point the prices may be renegotiated.

c The filter pack weight (metric tons) is based on a glass bead density of 95.51 lb/cubic foot, and 10 percent over calculated annular volume. The bentonite and cement grout volume estimates are based on gravel weight of 100 lb/cubic foot, and 30 percent over the calculated annular volume.

d Any hourly time is subject to the approval of the CONSULTANT and OWNER.

Signed by: _____

Print Name: John Truax, Executive Vice President

Date: 07/28/2025