

**City of Portales
Blackwater Well Field
Test Holes and Supply Well Drilling
ITB#: 2021-07-11, WTB-5104**

ADDENDUM NO. 2

July 30, 2021

This addendum provides changes and/or clarifications to the above-referenced project per the following.

Revisions to Technical Specifications

1. See revised Section 33 11 00 Test Hole and Well Drilling, including revised Table 1 (Attachment 1).
2. The bid form has been revised to reference the agreement for the time of completion (Attachment 2). A line item has been added to plug and abandon the replaced supply wells.
3. Figure 2 has been revised to correct the dimension shown for surface casing depth below ground surface (Attachment 3).

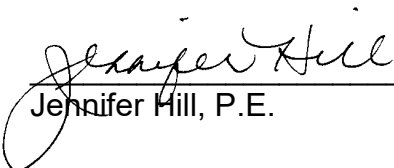
Bid Form - Article 7 Attachments to this Bid

Section 7.01, Item H. Acknowledgement of Receipt of Invitation to Bid Form is not required to be submitted with your bid.

All other provisions of the Contract Documents shall remain unchanged. This addendum is hereby made part of the Contract Documents to the same extent as those contained in the original documents and all itemized listings thereof.

Each bidder shall acknowledge receipt of any/all addenda on the bid form in the space provided.

Daniel B. Stephens & Associates, Inc.



Jennifer Hill, P.E.

City of Portales, Chief Procurement Officer



Sharleen McFadden

Attachment 1
Revised Specification
Section 33 11 00

SECTION 33 11 00

TEST HOLE AND WELL DRILLING

PART 1 GENERAL

1.1 Scope of Work

A. Test Holes and Monitor Wells

1. Drill six 6-inch-diameter test holes. Two of the test holes will be plugged once surveys are complete. Four will be completed as 2-inch-diameter monitor wells.
2. The selected Contractor shall furnish the labor, materials, supplies, and equipment required to complete the project described in these technical specifications.
3. To be considered for this work, bidders must have current New Mexico Well Driller and Business licenses, and must also have the appropriate General Contractor license required by the State. All work shall be performed in accordance with New Mexico Office of the State Engineer (OSE) and New Mexico Environment Department (NMED) requirements.
4. The Contractor shall be familiar with local conditions at the project site. Failure to do so shall in no way relieve the Contractor of the responsibility for performing any of the work or operations required as a part of this contract.
5. Total depth will be approximately 220 feet below ground surface for each borehole. The boreholes will extend up to 20 feet below the Ogallala Formation in order to accurately identify the bedrock contact with the red beds based on lithology and geophysics. This information is provided for Contractor use in preparing their bid and for understanding anticipated drilling conditions and possible equipment needed for successfully completing the project. Neither the Owner nor the Engineer (Daniel B. Stephens & Associates, Inc.) makes any representation as to the accuracy of conditions at the project location.
6. The locations of test holes and monitor wells are specified on the OSE permit applications, which are attached to this specification.
7. The locations of test holes and monitor wells are generally shown on Figure 1 (attached).
8. Monitor well construction is shown on Figure 2 (attached).
9. Drilling with mud will be required in order to maintain borehole stability during drilling and geophysical logging, which is expected to typically take 3 to 4 hours per hole. A logging contractor licensed to handle the radioactive source in the neutron probe is required. The logging company must be approved by the Owner and Engineer.
10. The work scope includes:
 - a. Construction: Mobilization/demobilization, site preparation, test hole drilling,
 - b. Geophysical logging.
 - c. Monitor well construction.
 - d. Test hole plugging in accordance with State of New Mexico regulations (NMAC 19.27.4).
 - e. Well development: development by bailing and airlifting techniques.

B. Supply Well Drilling

1. The work scope includes:
 - a. Construction: Mobilization/demobilization, site preparation, borehole drilling.
 - b. Geophysical logging.
 - c. Supply well construction.
 - d. Exploratory and pilot holes (if location is deemed unsuitable for a supply well) plugging in accordance with State of New Mexico regulations (NMAC 19.27.4).
 - e. Well development: development by bailing and airlifting techniques.
 - f. Step- and constant-rate aquifer tests
 - f.g. Plugging and abandonment of replaced well. Includes removal of the submersible pump and all connecting piping to transmission.
2. The locations of supply wells are generally shown on Figure 1 (attached) and are specified on the OSE permit applications, which are attached to this specification.
3. An exploratory pilot borehole will first be drilled at the locations of the supply wells. Formation sampling and geophysical logging will be performed in each exploratory borehole. The results of sampling and geophysical logging will be evaluated by the engineer prior to further well construction at each location.
4. If the exploratory and pilot-hole locations are deemed suitable for a supply well, the boring will be reamed to 18 inches and wells constructed with 10.75-inch-outside-diameter steel casing and stainless-steel wire-wrapped screen.
5. Supply well construction is shown on Figure 3 (attached).
6. Total depth will be approximately 180 to 208180 feet below ground surface (bgs) to the top of the redbeds below the Ogallala aquifer for each borehole. The completed supply wells will not extend below the contact with the redbeds as determined by the test and pilot hole well logs. For monitor wells, after the geophysical logging is complete, the lower portion of the boreholes will be plugged with bentonite chips placed via tremie pipe before monitor well construction. This information is provided for Contractor use in preparing their bid and for understanding anticipated drilling conditions and possible equipment needed for successfully completing the project. Neither the Owner nor the Engineer makes any representation as to the accuracy of conditions at the project location.
7. Drilling with mud will be required in order to maintain borehole stability during drilling and geophysical logging, which is expected to typically take 3 to 4 hours per hole.
8. A logging contractor licensed to handle the radioactive source in the neutron probe is required. The logging company must be approved by the Owner and Engineer.
9. Constructed supply wells will be developed by flushing, swabbing, airlifting, and development pumping, tested with step- and constant-rate pumping, and then assessed with video and alignment surveys.
10. Constructed supply wells will be disinfected immediately after development with calcium hypochlorite.

11. The selected Contractor shall furnish all the labor, materials, supplies, and equipment that is required to complete the project described in these technical specifications.
12. To be considered for this work, bidders must have current New Mexico Well Driller and Business licenses, and must also have the appropriate General Contractor license required by the State. All work shall be performed in accordance with OSE and NMED requirements.
13. The Contractor shall be familiar with local conditions at the project site. Failure to do so shall in no way relieve the Contractor of the responsibility for performing any of the work or operations required as a part of this contract.
14. All work shall be completed in strict accordance with American Water Works Association Standard for Water Wells (AWWA A100), New Mexico Standard Specifications for Public Works Construction (NM APWA Section 801), New Mexico Office of the State Engineer's Well Driller Licensing; Construction, Repair, and Plugging of Wells (19.27.4 NMAC) and the project specific specifications and drawings. The approximate well completion is detailed in Figure 3. The exact depths and lengths will be determined by the Engineer from the analysis of drill cuttings and geophysical logs collected during the course of the project.

1.2 References

- A. ANSI/AWWA A100-15. AWWA Standard for Water Wells. Effective December 1, 2015.
- B. New Mexico Standard Specifications for Public Works Construction (NM APWA Section 801)
- C. ANSI/AWWA C654-13. AWWA Standard for Disinfection of Wells. Effective July 1, 2013.
- D. Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers Recommended Standards for Water Works (2018)
- E. New Mexico Office of the State Engineer's Well Driller Licensing; Construction, Repair, and Plugging of Wells (19.27.4 NMAC)

1.3 Contractor's License

- A. The Contractor shall have a valid license for drilling water wells in the State of New Mexico.
- B. Qualifications: The Contractor shall have prior experience in the construction of at least 5 wells of similar size and construction within the past 3 years. The Contractor shall have engaged in the construction of wells in similar geologic materials and similar to the dimensions of the test holes specified herein. Prospective bidders shall provide evidence of the above requirements in the form of reference projects at the time of receipt of bids. Failure to provide references may result in bidders being deemed non-responsive. The Owner may contact references to verify experience and quality of work, and may make

other such investigations as necessary to determine the qualifications of prospective bidders.

1.4 General Provisions

- A. Warranties: Contractor shall warrant against defects, all materials provided, and work performed under this contract for a period of 1 year from the date of Final Completion, as determined by the Engineer in accordance with the Contract Documents and amendments thereto. The Contractor shall replace promptly, at the Contractor's own expense, any materials and workmanship that fail during this warranty period as determined by the Owner or Engineer.
- B. Protection of site: The premises, materials, tools, and drilling equipment shall be maintained so as to minimize the potential for subsurface contamination during drilling operations. Except as otherwise provided herein, the Contractor shall protect all existing fences, structures, walks, utilities, trees, shrubbery, etc. The Contractor shall take a site photograph and video prior to starting work, in order to document pre-construction site conditions. During the progress of the work the Contractor shall remove all debris and unused materials and shall, upon completion of the work, restore the site as nearly as possible to its original condition to the satisfaction of the Owner. The restoration shall include the replacement, at the Contractor's sole expense, of any facility or landscaping that has been destroyed or damaged beyond restoration.
- C. Site Access: Prior to the start of construction, the Owner will provide the Contractor with right of entry to the proposed test hole locations.
- D. The Contractor shall be responsible for the construction of suitable access, temporary site fencing, and drill pads for construction of the project described herein.
- E. Utilities: Unless otherwise indicated in these Specifications, the Contractor shall arrange for and provide any required utilities at their sole cost and expense. This includes, but is not limited to, water for drilling, power for operating the drill rig or equipment (including testing equipment), and personnel sanitation facilities.
- F. Disposal of waste materials: The Contractor shall be responsible for containing and disposing of all debris, including but not limited to cuttings, drilling fluid and water produced during drilling, development or other operations, by such methods and to such locations that will not cause damage to, or interference with, structures, roads, or utilities, or with other construction projects. All costs incurred in connection with the disposal of drill cuttings and containment of discharged water shall be incidental to the Contract and shall be included in the contract price.
- G. Any water generated during test hole and well construction shall be discharged away from the construction area by way of conveyance supplied by the Contractor to an on-site disposal location identified by the Owner. The Contractor shall provide a temporary conveyance discharge plan for review and approval by the Engineer.
- H. Safety Requirements: The Contractor shall comply with all pertinent provisions of the Department of Labor "Safety and Health Regulations for Construction (Title 29 Code of

Federal Regulations Part 1926 [29 CFR Part 1926]),” with additions and modifications thereto, in effect during construction of this project. The following measures or provisions shall be adhered to at all times during the construction of this project:

1. All heavy construction machinery, such as trenching machines, bulldozers, and backhoes must be equipped with a roll bar meeting the requirements of the above regulation.
2. Safety helmets, eye protection, and hearing protection shall be worn by all personnel working at the site.
3. Safety shoes or boots shall be worn by all personnel working at the site.

The Contractor shall inspect the site for the presence of overhead and underground utilities and shall satisfy himself in regard to their existence and locations prior to submitting his bid. The Contractor shall have utilities spotted prior to beginning any subsurface work. A safe distance shall be maintained between equipment and materials and power lines. The Contractor shall provide temporary fencing, caution signs, or barricades as necessary to ensure the safety of personnel at the site and people adjacent to or passing by, the site. The Contractor shall develop a site-specific health and safety plan that is subject to the Engineer’s approval.

- I. Permitting: Test holes and wells will be drilled under approved OSE permits obtained by the Owner. The Owner will provide a copy of the well permit to the Contractor upon issuing Notice to Proceed. The Contractor shall file a Storm Water Pollution Prevention Plan (SWPPP) or notice of intent (NOI) to discharge, as may be appropriate, with the NMED prior to beginning work.
- J. Security: The Contractor shall be responsible for site security of materials, equipment, and protection of the test holes. The Owner and Engineer cannot be held responsible for security.
- K. The Contractor must protect test holes and wells from the entry of undesirable fluids and materials at all times. Any time the site is unoccupied by the Contractor, the test holes shall be covered and secured against tampering.
- L. Sanitary facilities: The Contractor shall provide and maintain portable sanitary toilet facilities for the duration of the project. Facilities shall be secured to prevent any spills on Owner property, and shall be maintained at regular intervals. The Contractor’s costs associated with providing and maintaining sanitary toilet facilities are considered incidental to the project, and no separate payment will be made.
- M. Standard specifications: When any of the following standards or specifications are referred to in these specifications, the latest edition, publication, standard, or specification should be used:
 1. ANSI/AWS American National Standard Institute/American Welding Society
 2. API American Petroleum Institute
 3. ASTM American Society for Testing and Materials
 4. EPA Environmental Protection Agency
 5. NSF National Sanitation Foundation
 6. OSHA Occupational Safety and Health Administration

1.5 Submittals

- A. The Contractor shall submit, in accordance with Section 01 33 00, to the Owner and Engineer (or other as noted) with his bid or during the course of the project the following items:
1. At the time of receipt of Bids:
 - a. Complete list of equipment and methods that are proposed for the work.
 - b. List of relevant projects and reference information.
 - c. Bid Form.
 - d. List of Subcontractors for Subcontracts valued at or above one half of one percent of the bid price.
 - e. EEOC Form.
 - f. Bid Bond.
 - g. Company's experience with similar projects.
 2. Prior to commencing construction activities:
 - a. Materials submittals for all items in this specification.
 - ~~a-b.~~ SWPPP in accordance with NMED and EPA regulations.
 - ~~b-c.~~ NOI.
 - ~~e-d.~~ Erosion Control Plan.
 - ~~d-e.~~ Dust Control Permit, if required.
 - ~~e-f.~~ Progress Schedule, including the Contractor's earliest available start date, estimated time to drill borehole(s), and install the wells.
 3. During construction
 - a. Daily Drilling Report upon request of the Engineer.
 - b. Cutting samples and alignment surveys to the Engineer.
 - c. Quality certificates for test hole materials.
 - d. SWPPP Inspection forms.
 - e. Cement grout mix design.
 - f. Safety data sheets (SDSs) on any chemicals introduced to the test holes or wells.
 - g. Geophysical logs
 4. Post-construction submittals
 - a. Well completion report with well logs including results of pump testing.
 - b. Disinfection and water quality testing.
 - ~~f-c.~~ Video inspection recordings.

1.6 Unit Price - Measurement and Payment

- A. Water and Monitor Well
1. Basis of Measurement: By vertical linear foot of well depth.
 2. Basis of Payment: Includes drilling, casing, and backfilling.
- B. Grouting
1. Basis of Measurement: By vertical linear foot.
 2. Basis of Payment: Includes materials and placement of grout.
- C. Well Development and Water Quantity
1. Basis of Measurement: By hours that development and pump tests are conducted.
 2. Basis of Payment: Includes development, step test and constant-rate test.

- D. Disinfection, Water Quality, Geophysics, and Video Survey
 - 1. Basis of Measurement: By lump sum.
 - 2. Basis of Payment: Includes disinfection, water quality tests, geophysics, and video survey.

- E. Replaced supply well plugging and abandonment
 - 1. Basis of Measurement: Per well
 - 2. Basis of Payment: Per well

PART 2 PRODUCTS

2.1 Contractor's Equipment and Methods

- A. General Requirements: The test holes shall be constructed using mud-rotary drilling methods. The Contractor shall supply capable and experienced personnel and suitable equipment to perform the work, as specified herein. The Contractor shall employ only competent workers for the execution of the work, which shall be directly supervised by an experienced drilling superintendent who shall be deemed satisfactory by the Owner/Engineer.
- B. The Contractor shall submit to the Engineer the proposed drilling program and schedule. No unnecessary delays or work stoppages will be tolerated.
- C. The Contractor shall be held responsible, and payment will be withheld for damages to the test holes due to any act of omission, error, or faulty operation by the Contractor or his employees or agents. Resulting repairs shall be completed by the Contractor to the satisfaction of the Owner/Engineer, or a replacement test hole and/or well shall be drilled by the Contractor at no additional cost to the Owner and without claim against the Owner, Engineer, or agents.

2.2 Drilling Fluids

- A. Acceptable drilling fluid constituents must be NSF 60 certified and approved for use in water supply wells, and may include bentonite, synthetic polymers, inorganic-phosphate thinning agents, drilling detergents and foaming agents, and weighting materials, as preapproved by the Engineer. It is expressly understood that toxic and/or dangerous substances will not be added to the drilling fluid. Potable water only will be used for mixing the drilling fluid. The Contractor shall submit data sheets on drilling fluid additives.
- B. A mud engineer shall be made available at the Contractor's expense on an on-call basis to measure drilling fluid properties periodically during all drilling operations. The mud engineer and frequency of measurement shall be approved by the Engineer.
- C. The Contractor shall maintain current records on the site at all times to show (1) all materials added to the drilling system including type, amount, time, and depth, and (2) variances or modifications from agreed to drilling fluid program including time, depth, reason, and authorization.

2.3 Cement Grout and Bentonite Seals

- A. Annular seals for the well casing will consist of a neat cement grout mixture that meets the requirements of the ASTM C150 Type I. Grout density shall be 15.6 lb/gal (116.7 lb/ft³). A maximum of 3% bentonite and 2% calcium chloride by weight may be added to the grout.
- B. Hydrated bentonite seals, in pellet or granular form, will be installed to prevent cement and gravel invasion into the underlying filter pack, as directed by the Engineer, using a tremie pipe or equivalent method, as described below.
- C. The Contractor shall develop a plan to eliminate the potential for well casing collapse during cementing operations (e.g., staged lifts) for review by the Owner and Engineer. The cement water mixture shall be placed by pumping through the tremie tubing placed near the top of the bentonite seal, where it will rise in a uniform body up the sides of the steel casing forming a dependable seal. The cement will be allowed to set for a period of at least 36 hours before any downhole operations are performed.

2.4 Casing and Screen, Monitor Wells

- A. For bidding purposes, the length of the casing strings and screened intervals shall be as shown on the attached Figure 2 and bid schedule. The actual length of the well casing will be subject to change as determined by the Engineer.
- B. The Engineer will determine the final monitor well construction depths after reviewing field observations and in consultation with the Owner. If the footage of the boreholes drilled, or quantity of materials actually incorporated in well construction change, unit bid prices shall prevail.
- C. Well casing shall be 2-inch Schedule 40 flush-thread blank PVC casing for the monitor well. O-ring seals will be present at each joint union.
- D. The well screen shall be 2-inch Schedule 40 PVC, as noted above, with factory-slotted 0.020-inch screen openings.

2.5 Casing and Screen, Supply Wells

- A. The Engineer will determine final well construction depths after reviewing drill cuttings and geophysical logs and after consulting with the Owner. If the quantity of the boreholes drilled, or quantity of materials actually incorporated in well construction change, unit bid prices shall prevail. For bidding purposes, the length of the casing string shall be as shown on the drawings and bid schedule. The actual length of the casing will be subject to change as determined by the Engineer.
- B. All 10-inch nominal diameter blank and screen casing shall be provided by the Contractor. Once on-site, the casing and screen shall be kept free of oils, grease, paint, dirt, scratches, or other defects. Well casing shall be kept as clean as possible and shall not come in contact with the ground surface during installation.

- C. Supply well surface casing shall be 20-inch-outside-diameter (OD) blank, low-carbon steel casing, ASTM A-53 Grade B having a minimum wall thickness of 0.375 inch and a minimum weight of 78.6 pounds per foot (lb/ft).
- ~~D.~~ Supply well casing shall be 10.75-inch-OD blank, Schedule 40, low carbon steel casing, ASTM A-53 Grade B, having a minimum wall thickness of 0.365 inch and a minimum weight of 40.48 lb/ft.
- ~~D-E.~~ A dielectric coupling shall be installed wherever low carbon steel is joined to stainless steel. The coupling shall contain insulating rings that prevent contact of the dissimilar metals. The dielectric coupling shall be approved by the Engineer.
- ~~E-F.~~ The supply well screen section shall be nominal 10-inch, continuous slot wire-wrapped 304 stainless steel, 50-slot (0.050-inch), and having a yield strength greater than twice the total weight of the screen and sump. In order to provide this the screen support rods shall have a minimum cross-sectional area of 1.4388 square inches. The actual length of the screen will be subject to change as determined by the Engineer. The well screen shall be designed to withstand a minimum collapse pressure of 874 psi for a 0.050-inch slot opening. The surface wire shape shall cause the slot opening to widen inwardly to minimize clogging. Surface wrap-wire height shall be 0.295 inch to provide the desired collapse strength. The wrap-wire face width shall be of minimum dimension to provide 26% open area at the anticipated 50 slot opening. The well screens supplied shall be manufactured by Johnson Screens or approved equal. Screens shall be manufactured in various lengths complete with 8 PS 304 Stainless weld rings attached to each end. The weld rings shall be standard available lengths as requested by the Contractor and approved by the Engineer. The screen section ends shall be square to 0.100 inch over the first 2 feet of the assembly, and the assembly straight to within 0.200 inch over any 10-foot length of section. Screen barrels shall be provided in standard overall lengths which include the weld ring lengths.
- ~~F-G.~~ Screens shall be manufactured in various lengths complete with stainless steel weld rings. The weld rings shall be standard available lengths as requested by the Contractor and approved by the Engineer.
- ~~G-H.~~ The blank bottom casing (well sump) shall be 10.75-inch-OD, Schedule 40, 304 stainless steel, having a minimum wall thickness of 0.365 inches and a minimum weight of 40.86 lb/ft.
- ~~H-I.~~ Black steel pipe (2.375-inch-OD, ASTM A-120, Schedule 80) 2.375-inch-OD type 304 stainless steel pipe and 2.375-inch-OD type 304 stainless steel pipe used for the gauge and transducer lines shall be new and free of rust, pits, or other defects, and shall have a minimum weight of 5.02 lb/ft. The pipe and screen shall be attached by saddles welded to the outer surface of the well casing and shall be of the same composition as the well casing. Threaded and coupled or welded connections are acceptable. If used, couplings shall not be installed opposite well casing collars. The screen section shall be placed at depths and contain slot openings that match the well screen as determined by the Engineer. For bidding purposes, the length of the pipe string shall be as summarized in Table 1. The bottom of the string shall be capped and have at least 10 feet of continuous

slot wire-wrapped 304 stainless steel screen located immediately above the blank sump section at the bottom of the string.

2.6 Centering Guides and Landing Clamp

- A. Weld-on type centralizers of the same type and grade of steel as the screen or blank casing shall be installed at intervals no greater than 40 feet along the well casing string. At no point shall the weld encroach on the screen; centralizers shall only be welded to the blank sections at the end of the screened joints. Centering guides shall be aligned vertically with respect to each other and approved by the Engineer.
- B. A steel landing clamp shall be used to hang the well casing string on the surface casing. The clamp shall be bolted to the 10.75-inch well casing in such a manner that the clamp ears rests on the surface casing. The clamp shall then be welded to the casing around the circumference, top and bottom. The clamp shall be set into notches cut in the top of the surface casing and welded, sides and bottom, with the casing string kept suspended at all times. The landing clamp shall be capable of holding in place the well casing and screen having an estimated weight of 10 tons.

2.7 Filter Pack Material, Monitor Wells

- A. Filter material will consist of silica sand for the approximate intervals specified on attached Figure 2.
- B. The #10x20 silica sand grains shall be both round and spherical with a cumulative composition of no less than 95% (SiO₂). The material shall be composed of sound, durable, well-rounded particles, free from organic matter, silt, clay, or other deleterious materials. The material shall be washed, dried, and packaged at the production facility.
- C. The Contractor shall submit certificates of filter material quality and gradation to the Engineer. Under no circumstances shall crushed rock or any material with an excess of 5% flat faces be installed in the well.

2.8 Filter Pack Material, Supply Wells

- A. Filter pack material shall conform to AWWA B100-01 and shall be finalized once the sieve analyses of drill cuttings and geophysical logs from test hole drilling have been reviewed. The anticipated filter material will consist of multiple gradations of silica sand as specified by the Engineer, extending from the bottom of the hole to a depth specified by the Engineer, which will be no higher than the water table. For bidding purposes, the length of installed filter pack shall be as summarized in Table 1.
- B. The grains shall be both round and spherical with a cumulative composition of no less than 95% silica (SiO₂). The material shall be composed of sound, durable, well-rounded particles, free from organic matter, silt, clay, or other deleterious materials. The material shall be washed, dried, and packaged at the production facility.
- C. The Contractor shall submit a certificate of filter material quality and gradation to the Engineer. Under no circumstances shall crushed rock or any material with an excess of 5% flat faces be installed in the well.

2.9 Pea Gravel Backfill, Supply Wells

- A. Backfill material between the bentonite seals above the filter pack and below the surface grout seal will consist of clean pea gravel. Depths and intervals of pea gravel placement will be determined by the Engineer after the drill cuttings and geophysical logs from test hole drilling have been reviewed. For bidding purposes, the length of installed pea gravel shall be as summarized in Table 1.

2.10 Wellhead Completion, Monitor Wells

- A. The wellhead will be completed as shown on the attached Figure and adhere to the New Mexico Environment Department Groundwater Quality Bureau Monitor Well Construction and Abandonment Guidelines. All openings will have a temporary seal closed by means acceptable by the Engineer.

2.11 Wellhead Completion, Supply Wells

- A. A concrete pad shall be placed around the wellhead as follows:
 1. The surface area of the concrete pad shall be 4 feet by 4 feet square.
 2. The concrete pad shall be centered around the well.
 3. The pad shall be 6 inches in thickness and slope away from the well.
 4. The concrete shall be re-enforced with #5 steel rebar.
 5. The surface pad shall seal the top of the annular space between the production casing and the surface casing.
- B. The top of the casing shall extend 3 feet above the natural ground level and be equipped with a watertight, locking cap and vent.
- C. All vents installed in the well casing shall be protected against the entrance of foreign material by installation of down-turned and screened “U” bends. All other openings in casings shall be sealed to prevent entrance of foreign material and flood waters.

PART 3 EXECUTION

3.1 Drilling Methods

- A. Drilling shall be completed using mud-rotary methods to the total well depth. Methods shall be consistent with standard practices for test hole, monitor well, and water supply well construction.
- B. Control of drilling fluid properties shall be maintained throughout all drilling operations. Mud-based systems will consist of pre-approved additives for ease of drilling, filtrate control, flow control, and protection of the drilling operation. Adequate facilities for the collection of representative drill cutting samples shall be maintained at all times for drilling operations.

3.2 Contractor's Log and Records

- A. The Contractor shall keep an accurate, current log of operations at all times in the form of a daily drilling report. The report shall include, at minimum, the following information:
1. Bit number, size, type, and depth-in
 2. Length and diameter of in-hole drilling assembly, including bit, subs, collars, and drill pipe
 3. Time devoted to each activity
 4. Description of soil/rock type and notation of depth at each change
 5. Water volume used for drilling
 6. Drilling mud viscosity, weight, and volume of water or additives used
 7. Lengths, diameters, and types of casing and perforated casing run
 8. Volumes of filter pack material placed
 9. Grout volume, thickness, and location
 10. Time devoted to development and characteristics of fluid produced
- B. The reference of each depth given shall be properly denoted and the distance from ground level to the reference point shall be measured and included in the report. One copy of each Daily Drilling Report shall be made available to the Engineer on the following day. Upon completion of the drilling, a complete set of the Daily Drilling Reports shall be provided to the Engineer. Any signatures made on the daily field reports or other field documentation provided by the Contractor shall be considered only to acknowledge that the form or report was accepted, not an acceptance of the hours worked, footage drilled, materials provided, placed, or the like.

3.3 Pipe Tallies

- A. An accurate record of all drill-pipe, tubing, and casing on the location shall be maintained at all times. A current pipe tally shall be maintained for all drill bits, subs, cross-overs, drill-pipe, tubing, and casing run into the borehole.

3.4 Monitor Well Construction

- A. Surface protection: The open annulus shall be protected from entry of unwanted material at all times by preventing surface runoff from reaching and entering the boring during construction activities. Whenever work ceases on the boreholes and well, the top of the casing shall be capped to cover and protect the hole until the permanent wellhead assembly is installed.
- B. Drilling
1. For monitor wells, 6-inch boreholes shall be drilled from ground surface to a depth of 220, as shown on the attached Figure 2.
- C. Plumbness and Alignment
1. The boring will be of sufficient plumbness and alignment to facilitate geophysical logging and completion of monitor wells.

D. Blank Casing and Screen Installation

1. The placement of casing, screen, filter pack material, and annular seals shall be staged to allow continuous construction immediately after geophysical logging, as directed by the Engineer.
2. Prior to installation, all casing materials shall be measured to the nearest 0.01 foot and marked by the Contractor to determine the amount and location of screen and blank sections to be placed in the borehole.
3. All required materials shall be on-site and inspected by the Engineer prior to initiating installation activities.
4. The casing shall be suspended above the bottom of the borehole a sufficient distance to ensure that none of the casing is supported from the bottom.
5. Casing shall be fitted with approved centering guides installed at points as approved by the Engineer.

E. Bentonite Plug and Sand Filter

1. Plug the lower portion of the boreholes with bentonite chips before building the wells (bentonite chips 200–220 feet bgs).
2. Centralizers will be placed at the top and bottom of the screen.
3. A flush threaded end cap will be put on the bottom of the screen.
4. Filter pack: 10/20 silica sand will be placed in the annulus from the bottom of the boring (above the bentonite chips) to two feet above the top of the well screen (158–200 feet bgs).
5. A 3-foot-thick bentonite pellet seal will then be installed on top of the filter pack (155–158 feet bgs).
6. The remaining annulus will be filled with a cement/bentonite grout to ground surface.

3.5 Supply Well Construction

A. Surface protection: The open annulus shall be protected from entry of unwanted material at all times by preventing surface runoff from reaching and entering the boring during construction activities. Whenever work ceases on the boreholes and well, the top of the casing shall be capped to cover and protect the hole until the permanent wellhead assembly is installed.

B. Drilling

1. Install surface casing at the supply well exploratory boring location as noted in the drawings.
2. One 4-inch pilot hole shall be advanced from the bottom of the surface casing to the approximate depth as listed in Table 1 or as directed by the Engineer. Drill cuttings samples will be provided to the Engineer.
3. If the location is deemed suitable for a water supply well, a 24-inch-diameter (minimum) borehole shall be drilled from ground surface to an approximate depth of 20 feet bgs to accommodate the surface casing, as directed by the Engineer.
4. The exploratory or pilot hole shall be reamed to 18-inch-diameter (minimum) from the bottom of the permanent surface casing to the approximate depth as listed in Table 1 or as directed by the Engineer.

5. The Contractor shall contain all drilling fluids in accordance with applicable county, state, and federal requirements and the project approved SWPPP.
- C. Plumbness and Alignment
1. The alignment must be satisfactory for the successful installation of the specified water supply piping and future installation of permanent pumping equipment, and shall meet AWWA A100-15, Section 4.7.9 specifications for plumbness and alignment from the ground surface to the bottom of the well casing.
 2. The Owner may modify these requirements if in his judgment the Contractor has exercised all possible care in constructing the well and the defect is due to circumstances beyond his control, and the utility of the completed well will not be materially affected.
- D. Caliper and Deviation Logs: After completion of drilling, the following logs shall be run from the surface to the total depth of the production diameter borehole. Three (3) paper copies of each log, in addition to digital files, shall be furnished to the Engineer at log completion.
1. 3-arm caliper log
 2. Deviation survey
- E. Formation Sampling: For supply wells, the Contractor shall collect a set of cutting samples at 5-foot intervals; additional samples shall be taken at each formation change, or as directed by the Engineer. Samples shall be collected from the borehole discharge with an appropriate sample screen or at the shale shaker and immediately placed in cloth sample bags approved by the Engineer. The Contractor shall permanently identify each sample bag with the well name, the depth interval represented by the sample, and the date.
- F. Blank Casing and Screen Installation
1. The drilling fluid shall be circulated and thinned immediately before casing and screen installation. The placement of casing, screen, filter pack material, and annular seals shall be staged to allow continuous construction immediately after the hole has been reamed to its total depth. Prior to installation, all casing materials shall be measured to the nearest 0.01 foot and marked by the Contractor to determine the amount and location of screen and blank sections to be placed in the borehole.
 2. All required materials shall be on-site and inspected by the Engineer prior to initiating installation activities. The casing shall be suspended above the bottom of the borehole a sufficient distance to ensure that none of the casing is supported from the bottom; at no time shall the casing string be placed in compression.
 3. Casing shall be fitted with approved centering guides installed at points as approved by the Engineer. The casing string will be hung from the surface casing through the use of an Engineer-approved landing clamp.
 4. Casing and screen joints shall be welded by a certified welder in accordance with applicable ANSI/AWS standards. Welder's certification shall be approved by the Engineer. All welds shall be fully penetrating; the entire beveled or collared and flat area shall be filled with weld bead. The joint shall be watertight, straight, and as strong as the casing or screen.

5. The gauge and transducer lines shall be attached to the blank well casing by welding to saddles.
6. Extreme care shall be taken to ensure that the inner surface of the casing is not penetrated by the fittings or by burrs from welding. Before final acceptance of the well, the Contractor shall demonstrate to the satisfaction of the Engineer the entire length of each line is clean and free of obstructions by lowering an acceptable sinker bar through it to its total depth.

G. Filter Pack Installation

1. The annular space between the borehole and the casing string shall be filled with select filter pack material as directed by the Engineer. The placement depths of the filter pack will be determined by the Engineer after reviewing the drill cuttings and test hole logs.
2. While clear water is being added, heavy fluid shall be pumped to waste from the lower part of the suction pit. The fluid shall be circulated through the tremie pipe in the annulus or drill pipe inside the casing until the drilling fluid has been thinned back. The Contractor shall ensure that circulation will be continuous from the time that watering-back of the drilling fluid begins until the time the filter pack is completely in place. The drilling fluid characteristics shall be approved by the Engineer prior to introduction of the filter pack material.
3. The Contractor shall ensure that circulation will be continuous from the time that watering-back of the drilling fluid begins until the time the filter pack is completely in place. The drilling fluid characteristics shall be approved by the Engineer prior to introduction of the filter pack material.
4. The filter pack shall be placed in the annulus of the well through a tremie pipe by pumping or gravity feed. The feed line shall be gradually withdrawn as the filter pack is deposited. A minimum of 0.5 gallon of 12.5 percent sodium hypochlorite solution shall be added to every 6 cubic yards of filter pack as it is being placed. The circulating fluid shall have a minimum free chlorine concentration of at least 50 mg/L.
5. The Contractor shall maintain an accurate record of the volume of filter pack as it is installed, and continual checks shall be made to insure against voids or bridging of the filter material. The amount of filter pack introduced in the hole shall not be less than the amount as calculated by the Engineer based on the caliper log of the borehole. Any recorded amount placed that is substantially different than the computed amount shall be deemed a sign of voids or bridging, and the Contractor shall undertake appropriate corrective measures at no cost to the Owner.
6. The casing string shall be flushed, bailed, and swabbed as needed to fully settle the filter pack. At no time during any flushing or development procedure shall the filter material be allowed to drop to within 10 feet of the top of the screen. The volume of all filter material added shall be calculated and recorded.

H. Bentonite Seals and Pea Gravel Annular Fill

1. A 10-foot-thick bentonite seal will be installed above the top of the filter pack using the tremie pipe.
2. Pea gravel annular fill will be installed through the tremie pipe above the first bentonite seal ~~to a depth of 6035 feet bgs as shown on Figure 3.~~

3. A second bentonite seal will be installed above the pea gravel annular ~~fill to a depth of 5025 feet~~ as shown on Figure 3-s to prevent cement intrusion into the underlying annular fill materials.
4. The amount of bentonite and pea gravel introduced in the hole shall not be less than the computed amount of annular volume as calculated by the Engineer.

I. Cement Grouting

1. A continuous cement grout annular seal will be placed above the upper bentonite seal. The annular seal shall be a continuous cement plug. When completed, the annular seal shall completely fill the space between the casing string and the borehole, from the bentonite plug to ground level.
2. The cement grout shall be placed by pumping through a tremie pipe in accordance with AWWA A100-06, Appendix C: Section C.2 (Positive Displacement Exterior Method).
3. After the cement grout is in place, a minimum of 24 hours setup time shall be allowed prior to any additional work being performed in the well.

- J. Concrete Pad, Sanitary Seal and Vent: A concrete pad will be installed as described in Section 2.8. A watertight, locking cap will be installed on the top of the well casing to provide a sanitary well seal that prevents contamination from entering the well casing. The sanitary seal shall incorporate a vent that terminates in a down-turned position and shall be covered by a 24-mesh non-corrodible screen as shown on Figure 3.

3.6 Geophysical Logs

- A. Geophysical surveys of the completed test holes and water supply wells shall be performed by an Engineer-approved geophysical logging company using approved and calibrated geophysical well-logging equipment. The required logs are as follows:
1. Resistivity, 16-inch, and 64-inch normal
 2. Spontaneous potential
 3. Gamma
 4. Neutron
 5. Full wave form sonic
- B. The test hole and well logs shall have appended to them the well name, location, date, and any other information necessary for proper data interpretation. Four hard copies of each log shall be furnished to the Engineer or its representative. Digital log files shall also be provided on a DVD or by other electronic means, both as pdf files and raw data text files. The data interval shall be no greater than 0.5 foot.

3.7 Temporary Discharge Conveyance

- A. Water discharged from the water supply well during the drilling process shall be routed to mud pits in a location determined by the Engineer. Once mud water is no longer produced and drilling has ceased the ponds shall be cleaned and scarified, and removed material shall be disposed of appropriately at the Contractor's expense.

- B. Development water shall be conveyed away from the site using a lay-flat hose as directed by the Engineer, and shall be discharged onto the ground surface away from any surface water features.

3.8 Well Development, Monitor Wells

- A. Upon well completion, the Contractor shall develop the well through bailing and airlifting, as directed by the Engineer.
- B. Development of monitor wells shall proceed until the produced water is free of suspended sediment and groundwater parameters (temperature, electrical conductivity, pH) have stabilized, as approved by the Engineer.

3.9 Well Development by Zoned Airlift Pumping, Supply Wells

- A. The Contractor shall furnish all plant, materials, and labor required to accomplish the development. All hours counted toward development of the well will be actual time spent developing with appropriate equipment as specified. No time will be considered for downtime due to improper, inadequate, or malfunctioning equipment, test procedures or techniques. Circulation of fluids after the well is completed shall be included in the development time; circulation of fluids prior to or during well completion shall not be considered part of well development.
- B. The Contractor shall develop the well through a step by step procedure consisting of fresh water circulation while conducting swabbing and airlift development, followed by the introduction of a phosphate-free dispersant (PFD) to dissolve or loosen any remaining drilling mud from the borehole wall, and removal of the PFD by swabbing and airlifting and pumping development.
- C. During initial development, when produced water contains a high percentage of drilling fluid and sediment, water shall be impounded on-site. After the development water is returning to clear it may be discharged to the temporary discharge conveyance system constructed by the Contractor. Produced water shall be discharged to locations in accordance with the project's SWPPP plan, and approved by the Engineer.
- D. The Contractor shall run a tremie line to within 20 feet of the well bottom and circulate clean water until fluids return clear. Thereupon, the well shall be swabbed from top to the bottom and back to the top of the screen interval. Pipe joints shall be added as each interval clears. The Contractor shall add and subsequently remove PFD during this development process.
- E. The Contractor shall adequately flush out the gauge and transducer lines with fresh water to mobilize drilling mud from the filter pack.
- F. Zoned airlift pumping and swabbing will be completed in continuous 20-foot sections, from the bottom to the top of the screen. The airlift pumping device shall consist of a 20-foot-long pipe with appropriate-diameter double disc rubber washers that fit tightly to the inside of the screen and holes evenly placed around the circumference of the pipe between the discs. The compressor equipment shall be capable of producing adequate air

flow to lift water and sediment from the lower section of the well with an air-line placement depth estimated at 200 feet bgs within the development tool.

- G. Zoned airlifting and swabbing shall proceed for a minimum of 1 hour per 5 feet of screen or until the produced water is free of suspended sediment, as approved by the Engineer. The well development program outlined above shall be refined by the Engineer in consultation with the Contractor.
- H. Once airlift development is complete, the Contractor shall tag the bottom of the well using a weighted wire line graduated in no less than 1-foot increments. Any accumulated sediment shall be removed from the well to within 5 feet of the bottom of the casing.

3.10 Development by Bailing, Supply Wells

- A. Bailing of the well will be performed to remove formation sediment and filter pack sand from the bottom of the well and to provide additional surging action on the filter pack. The Contractor shall furnish and operate a bailer constructed from 8-inch-diameter steel pipe.
- B. Development bailing shall be conducted for a minimum of 6 hours on each well, or longer as approved by the Engineer, and proceed by lowering the bailer rapidly to just above the bottom of the well and rapidly raising the bailer to the surface where bailing water is discharged.

3.11 Disinfection, Supply Wells

- A. The Contractor shall disinfect the well immediately after bailing development. Granular calcium hypochlorite shall be distributed evenly throughout the water column with a chlorine basket. The chlorine basket shall have a fine mesh exterior and be of such design so that it can be lowered on a wire line to the full depth of the well. The basket shall be run to the bottom of the well and slowly raised through the entire water column. This process shall be repeated until all of the chlorine has dissolved.
- B. The quantity of chlorine shall be sufficient so that the resulting solution within the well shall have an available chlorine concentration of a minimum 50 mg/L in accordance with AWWA A100. After the chlorine has been applied, the well shall be swabbed using a surge block worked through the entire screened area for no less than 4 hours. Time for swabbing of the well disinfectant will be accounted for under the lump sum disinfection pay item.
- C. After the test pump is installed, the well casing and pump column shall be disinfected with a solution of sodium hypochlorite and water. The solution shall be mixed at the surface and introduced into the well through the top of the casing and a portion recirculated via a valve on the pump discharge port. The amount of disinfectant added shall be sufficient so that the resulting solution shall have an available chlorine concentration of at least 50 mg/L but no more than 100 mg/L.
- D. The well shall be allowed to set for at least 24 hours after disinfection prior to running the test pump.

- E. During the time interval between disinfection as described above and installation of the test pump, the well shall be capped and secured as approved by the Engineer.

3.12 Development Pumping, Supply Wells

- A. The Contractor shall furnish all necessary equipment, materials, and labor to begin development pumping within four days of the airlift development work. The test pump shall be set near the bottom of the well and be capable of producing a minimum rate of 50 gpm and a maximum rate of 300 gpm with a pumping level of approximately 200 feet at maximum discharge.
- B. The test pump shall be suspended on column pipe of sufficient diameter to maintain the maximum flow rate. The Contractor shall supply and install a magnetic flow meter capable of instantaneous and total flow measurements and continuous data recording, a circular orifice with a manometer, a sampling port, a gate valve, a Rossum sand separator, and temporary discharge piping capable of discharging the produced water to a point up to 300 feet from the well. The test pump, valve, and equipment must be capable of maintaining a consistent pumping rate within 5% of desired pumping rate. The flow meter datalogger shall be set to record instantaneous flow rates at 1-minute intervals. The Contractor shall ensure that the flow meter is providing readings that are accurate to within 5% of the flow rate measured from the manometer readings and orifice chart.
- C. The Contractor shall provide a wire-line electric sounder capable of measuring water levels to a minimum 250 feet depth and calibrated in increments of not less than 0.01 foot for manual water level measurements. The wire-line sounder shall not contain wire which is stretched or no longer provides accurate measurements.
- D. During development pumping, the initial pumping rate shall be restricted and, as the water clears, shall be gradually increased until the maximum rate is reached. The maximum rate will be determined by the Engineer after consideration of the well drawdown and discharge. At intervals determined by the Engineer the pump shall be stopped and restarted to allow surging of the well.
- E. The cycle of pumping and surging shall be repeated for a minimum of 12 hours or until the sand content stabilizes to an acceptable level as determined by the Engineer, and the specific capacity does not increase by more than 10 percent in a 2-hour period. After the conclusion of development pumping, a minimum 12 hours shall be allowed for water level recovery, or longer as necessary until at least 95% recovery has been achieved.
- F. The Contractor shall keep independent records of pumping time, manually recorded flow rate per flow meter, manometer height and flow rate per manometer, pumping water level, sand production, and other discharge characteristics as directed by the Engineer recorded at 15-minute intervals throughout the time of pumping.

3.13 Test Pumping, Supply Wells

- A. Test pumping shall consist of:

1. A 12-hour step-drawdown test (four 180-minute steps) followed by a minimum 12-hour recovery period or until at least 95-percent water level recovery has been achieved
 2. A 24-hour constant-rate test followed by a minimum 24-hour recovery period to pre-pumping conditions
- B. The pumping rates for the step-drawdown test will be as directed by the Engineer.
- C. Water level data will be collected using manual and automated methods. The Contractor shall supply an In-Situ Level TROLL pressure transducer and datalogger for the tests. The Contractor shall consult with the Engineer to determine the appropriate specifications for the pressure transducer prior to its procurement.
- D. The pumping rate for the constant-rate test shall be near the maximum capacity, as determined by the step-drawdown test and approved by the Engineer. The pumping rate shall be held constant for the entire period and maintained to within 5% of the desired rate specified by the Engineer.
- E. Any time incurred for restarts or delays caused by mechanical or other failures will not be considered part of the test time and will be at no additional cost to the Owner. If the test pump is shut off for any reason during the pumping portion of the test, it shall remain shut off until 95% water level recovery has been achieved and the complete test rerun at no additional expense to the Owner.
- F. After the conclusion of the constant rate test, the test pump shall remain in the well for a sufficient time to observe water level recovery as directed by the Engineer to prevent recovery water levels from being influenced by pump removal. The test pump may not be removed until the Contractor receives approval from the Engineer.
- G. Upon completion of the step-drawdown and constant rate tests and collection of water level recovery data, the results shall be turned over to the Engineer for analysis.
- 3.14 Bacteriological Water Analysis, Supply Wells
- A. Near the end of the constant rate test, the Contractor shall collect and properly preserve, in containers provided by the laboratory, samples from the well for bacteriological testing. Residual chlorine from the two well disinfections (performed after bailing development – Section 1.22A; and after installation of the test pump – Section 1.22C) must be non-detectable at the time of sampling. Bacteriological tests shall include total coliform and E. coli.
- B. Residual chlorine concentrations shall be tested and must be non-detectable at the time of sampling. Bacteriological testing shall be performed and approved results received prior to the completion of pumping. Bacteriological tests shall include total coliform and E. coli.
- C. The water shall be deemed unacceptable if coliform bacteria are present. It is the Contractor's responsibility to see that the well is so tested and, if unacceptable, the well shall be disinfected again with a solution of sodium hypochlorite and water with an available chlorine concentration of at least 50 mg/L but not more than 100 mg/L. The

chlorine solution shall remain in the well for a minimum of 24 hours, after which the well will be flushed by pumping until no residual chlorine is detected prior to resampling the well. Disinfection and subsequent sampling and testing shall continue at the Contractor's expense until test results are approved, indicating acceptable conditions (non-detect for coliform). The test pump shall not be removed from the well until results are approved.

3.15 Water Quality Analysis, Supply Wells

- A. The Contractor shall collect and properly preserve, in containers provided by the laboratory, samples from the well for bacteriological testing.
- B. The Contractor shall assist the Engineer with the collection of additional samples for general water quality characterization during the constant-rate pumping test. The expense for laboratory analysis of these samples shall be borne by the Owner.

3.16 Video Inspection, Supply Wells

- A. The Contractor shall make a closed-circuit color video inspection of the entire depth of the well following removal of the test pumping equipment. The camera equipment shall have a wide-angle (fish-eye) lens directed downward, and shall also include right-angle (side-scan) capability. The camera depth, in feet bgs, shall be displayed on the video at all times. The Engineer must be present for observation of video monitoring and to determine where side scanning will be required.
- B. A flocculent shall be added to the well in sufficient quantity before logging to remove suspended material from the water column. The well water shall be sufficiently clear to allow examination of the entire borehole and well casing during the video monitoring. If not, the Contractor shall be required to clear the water at his own expense to allow examination of the entire borehole in subsequent video monitorings.
- C. If the video shows that the well completion does not meet specifications or that the casing or screen are deformed beyond the manufacturer's ellipticity tolerances, the Contractor shall remedy deficiencies.
- D. Four electronic copies of the video shall be furnished to the Engineer for delivery to the Owner.

3.17 Monitor Wellhead Completion

- A. The well site shall be graded so that the site is free from depressions, reverse grades, or areas too rough for proper ground maintenance so as to ensure that surface water will drain away from the well.
- B. Each monitor well, shall have a metal shroud with a locking lid. A concrete pad shall be poured around the wellhead and shroud of a minimum of 2-foot radius and 4-inch thickness. The pad shall be sloped away from the shroud to allow for proper runoff away from the well.

3.18 Supply Wellhead Completion and Water Supply Pipe Installation

- A. The well site shall be graded so that the site is free from depressions, reverse grades, or areas too rough for proper ground maintenance so as to ensure that surface water will drain away from the well.
- B. The Contractor shall construct the wellhead and foundation as configured in Figure 3 and directed by the Engineer.

3.19 Test Hole and Well Abandonment

- A. Exploratory borings and pilot holes that are not to be converted into monitor or supply wells shall be abandoned with expansive clay or a clay and grout mixture, in accordance with OSE and NMED requirements.
- B. In the event that the finished supply well is not accepted for completion because of insufficient capacity or unsatisfactory water quality, or if it is abandoned because of poor alignment, loss of tools, or for any other cause, the Contractor shall, as directed by the Owner in accordance with OSE and NMED requirements, fill the abandoned hole with expansive clay or a clay and concrete mixture.
- B-C. All replaced supply wells will be plugged and abandoned in accordance with OSE and NMED requirements. This includes removing the submersible pump and all connected piping to the transmission main. This work can only be completed after the replacement well is operational and connected to the transmission line. Replaced supply well abandonment shall be coordinated with replacement well equipping.
- C-D. The contractor must provide notification to the owner of any test hole or well to be abandoned 72 hours prior to abandonment activities. The is for the purpose of the owner notifying the New Mexico Office of the State Engineer 48 hours prior as per their requirements.

3.20 Waste Disposal

- A. Produced fluids shall be disposed of in a manner and at the location in accordance with the Contractor's SWPPP and the requirements of the Owner. Water produced during test hole construction shall be routed to either temporary aboveground containment or approved on-site disposal locations, as described above. The Contractor shall be responsible for supplying all discharge plumbing and additional pumps necessary for discharging the water. Discharge shall be such that erosion is minimized. Drainage of water from the test hole location onto surfaces adjoining the well site will not be permitted. Disposal of wastewater will be by such methods that damage to structures, roads, or utilities or interference with same or interference with construction projects will be prevented.
- B. Waste cuttings shall be removed from the site and properly disposed of upon completion of drilling operations, unless otherwise indicated by the Owner. At the request of the Driller, the Owner and Engineer may allow cuttings and drilling fluids to be spread on-site. All costs incurred in connection with the disposal of wastewater, drilling mud, cuttings, and cleaning will be incidental to well drilling and be borne by the Contractor.

3.21 Cleanup

- A. After the work is completed, the Contractor shall remove all debris, tools, equipment, supplies, and excess material from the site and shall restore the site to its original condition, as approved by the Owner/Engineer.

3.22 Additional Information

- A. The Contractor is responsible for the structural integrity of the test holes. If the bidder's professional opinion is that any of these specifications are inadequate to ensure the structural integrity of the test holes, the bidder shall notify Owner in writing prior to the bid date.

END OF SECTION

Table 1. Information for Supply Wells

Well Name	Longitude	Latitude	Depth of Bottom of Sump (feet bgs) ^b	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Length of Screen Interval (feet)	Length of Blank Casing (feet)	Length of Gauge Line (feet) ^c	Length of Transducer Line (feet) ^c	Length of Filter Pack (feet) ^d	Length of Pea Gravel (feet) ^e
Replacement wells^f											
3	-103.14373	34.21499	200	165	190	25	168	193	193	45	90
4	-103.16982	34.22287	190	160	180	20	163	183	183	40	85
5	-103.15244	34.2166	208	178	198	20	181	201	201	40	103
35	-103.178816	34.19948	180	150	170	20	153	173	173	40	75
38	-103.184774	34.19898	207	160	197	37	163	200	200	57	85
39	-103.168898	34.19282	188	160	178	18	163	181	181	38	85
Total			1173			140	991	1131	1131	260	523

^a 20 feet deeper than red bed contact.

^b 10 feet deeper than red bed contact to accommodate sump.

^c From bottom of screen to 3 feet above ground

^d Extends 10 feet above top of screen to bottom of sump.

^e Extend from 60 ft bgs to 15 feet above screened interval.

^f Coordinates are provided in GCS_North_American_1983, Well data from Portales 2017 Water Conservation and Use Report, Charles Wilson

Attachment 2
Revised Bid Form

BID FORM

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Chief Procurement Officer, City of Portales, 100 West First St., Portales, NM, 88130

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

<u>Addendum No.</u>	<u>Addendum Date</u>
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in SC-4.02 as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in SC-4.06 as containing reliable "technical data."

E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained

from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs.

- F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- 1. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
 - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;
 - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

- 5.01 Bidder will complete the Work in accordance with the Contract Documents for the price(s) shown in the table on the following pages.

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

Bid Form - Portales Test Hole and Supply Well Drilling 2021

July 30, 2021

Item	Description	Quantity	Units	Unit Price	Total Price
1	Initial Mobilization/Demobilization	1	LS		
2	Subsequent Mobilization/Demobilization to each site	1	LS		
3	Storm Water Pollution Prevention (SWPPP) - development, implementation, NOI & NOT submissions, and inspections.	1	LS		
4	Test hole drill borehole - 6-inch diameter (6 boreholes x 220 feet)	1320	FT		
5	Test hole geophysics	1320	FT		
6	Monitor well construction	4	EA		
7	Borehole abandonment (2 test holes)	440	FT		
8	Supply well site preparation and cleanup - Dig mud pits, backfill pits and regrade sites after completion, construction fencing, disposal of excess materials, cleaning up after completion of the work, and incidental items. Lump sum total per well site.	6	EA		
9	Install supply well surface casing - Install 20-inch-OD, 0.375-inch wall thickness low carbon steel surface casing within 24-inch borehole and cement in place. Quantity represents total length of all locations, furnished and installed.	120	LF		
10	Geophysical logging and formation sampling - For pilot holes at new/replacement supply well sites. Lump sum total is per well site.	6	EA		
11	Drill production diameter borehole - Drill 18-inch-diameter borehole from below the surface casing to bottom, collecting cuttings every 5 feet and taking drift measurements. Quantity represents total length for 6 supply well locations.	1173	LF		
12	Run Caliper and Deviation Logs - From surface to total drilled depth of production diameter borehole. Lump sum total is per supply well site.	6	LS		
13	Stainless steel blank and bullnose, in place – 10.75-inch-OD well casing, 0.365-inch wall thickness. Total length 6 supply wells	60	LF		
14	Stainless Steel Well Screen in place - 10.75-inch-OD 304 stainless steel, continuous wire wrap screen. Quantity represents total length of 6 supply well locations, furnished and installed.	140	LF		
15	Blank Casing, in place - 10.75-inch-OD 304 low carbon steel blank casing. Item includes centralizers. Quantity represents total length of 6 supply well locations, furnished and installed.	991	LF		

Bid Form - Portales Test Hole and Supply Well Drilling 2021

July 30, 2021

Item	Description	Quantity	Units	Unit Price	Total Price
16	Dielectric coupling	6	EA		
17	Gauge line, in place - 2.375-inch-OD black steel pipe, Quantity represents total length for 6 supply well locations, furnished and installed.	1131	LF		
18	Transducer line, in place - 2.375-inch-OD black steel pipe held in place with saddles welded to well casing. Quantity represents total length of 6 supply well locations, furnished and installed.	1131	LF		
19	Filter pack, in place - Silica sand gradations installed from the bottom of the borehole to the water table depth. Installation shall include disinfection of material, flushing, and swabbing to settle material. Quantity represents total length of 6 supply well locations, furnished and installed.	260	LF		
20	Bentonite seals - 10-foot-thick seals installed above the top of the filter pack and at 60 feet to 50 feet below ground surface. Quantity represents total length of 6 supply well locations, furnished and installed.	120	LF		
21	Pea Gravel annulus fill – Installed from 15 feet above top of filter pack to 60 feet below ground surface. Quantity represents total length of 6 supply well locations, furnished and installed.	523	LF		
22	Cement annular seal - Installed from 50 feet depth to ground surface. Quantity represents total length of 6 supply well locations, furnished and installed.	300	LF		
23	Well head completion - concrete pad, sanitary seal, vent, and locking well cap. Lump sum total is per supply well site.	6	EA		
24	Well Disinfection - Add chlorine to screened intervals, surge/swab, allow disinfectant to remain in well for at least 24 hrs. Lump sum total is per disinfection event	12	EA		
25	Well development by airlift pumping and swabbing- Perform development using zone airlift methods. Estimated time is for 6 supply well locations.	144	HRS		
26	Well development by bailing - Furnish and operate bailer and development rig. Estimated time is for all supply well locations.	48	HRS		

Bid Form - Portales Test Hole and Supply Well Drilling 2021

July 30, 2021

Item	Description	Quantity	Units	Unit Price	Total Price
27	Supply, install, and remove test pumping equipment - Install test pump capable of pumping at a rate between 50 and 300 gpm from a pumping level of 200 feet with electromagnetic flow meter and datalogger. Remove pumping equipment upon completion of testing. Lump sum total is per supply well site.	6	EA		
28	Well development pumping - Develop wells by pumping until AWWA standards are met. Includes providing, operating, and maintaining generator and/or drive motor. Estimated time is for 6 supply well locations.	144	HRS		
29	Test pumping - step test - Operate and maintain pump and generator and/or drive motor during 12 hour test, exclusive of pump setting or removal time, installation of discharge plumbing, or breakdown time. No measurement for recovery time will be allowed. Estimated time is for all supply well locations.	72	HRS		
30	Test pumping - constant rate - Operate and maintain pump and generator and/or drive motor during 24 hour test, exclusive of pump setting or removal time, installation of discharge plumbing, or breakdown time. No measurement for recovery time will be allowed. Estimated time is for 6 supply well locations.	144	HRS		
31	Video Survey - Conduct closed circuit downhole video log with Engineer present and provide 3 copies on DVD. Lump sum total is per supply well site.	6	EA		
32	Abandonment of existing supply wells - Includes pulling of existing submersible pump, removal of all piping and fittings, and plugging of wells according to OSE regulations. Assume 190' per well.	6	EA		
Total					
<i>NMGRT @ 8.1875%</i>					
Grand Total					

ARTICLE 6 – TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete and complete and ready for final payment in accordance with ~~within 36560 calendar days after the date when the Contract Times commence to run as provided in~~ Paragraph 2.03 of the General Conditions, on or before the dates or within the number of calendar days indicated in the Agreement, ~~and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 39590 calendar days after the date when the Contract Times commence to run.~~
- 6.01 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

- 7.01 The following documents are submitted with and made a condition of this Bid:
- A. Required Bid security in the form of _____;
 - B. List of Proposed Subcontractors;
 - C. List of Proposed Suppliers;
 - D. List of Project References;
 - E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;
 - F. Contractor's License No.: _____;
 - G. PWA Registration Certificate;
 - H. Acknowledgement of Receipt of Invitation to Bid Form;
 - I. Campaign Contribution Disclosure Form;
 - J. Preference Certification.

ARTICLE 8 – DEFINED TERMS

- 8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual’s signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____
(CORPORATE SEAL)

Attest _____

Date of Qualification to do business in New Mexico is ____/____/____.

A Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of first joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of second joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business Address _____

Phone No. _____ Fax No. _____

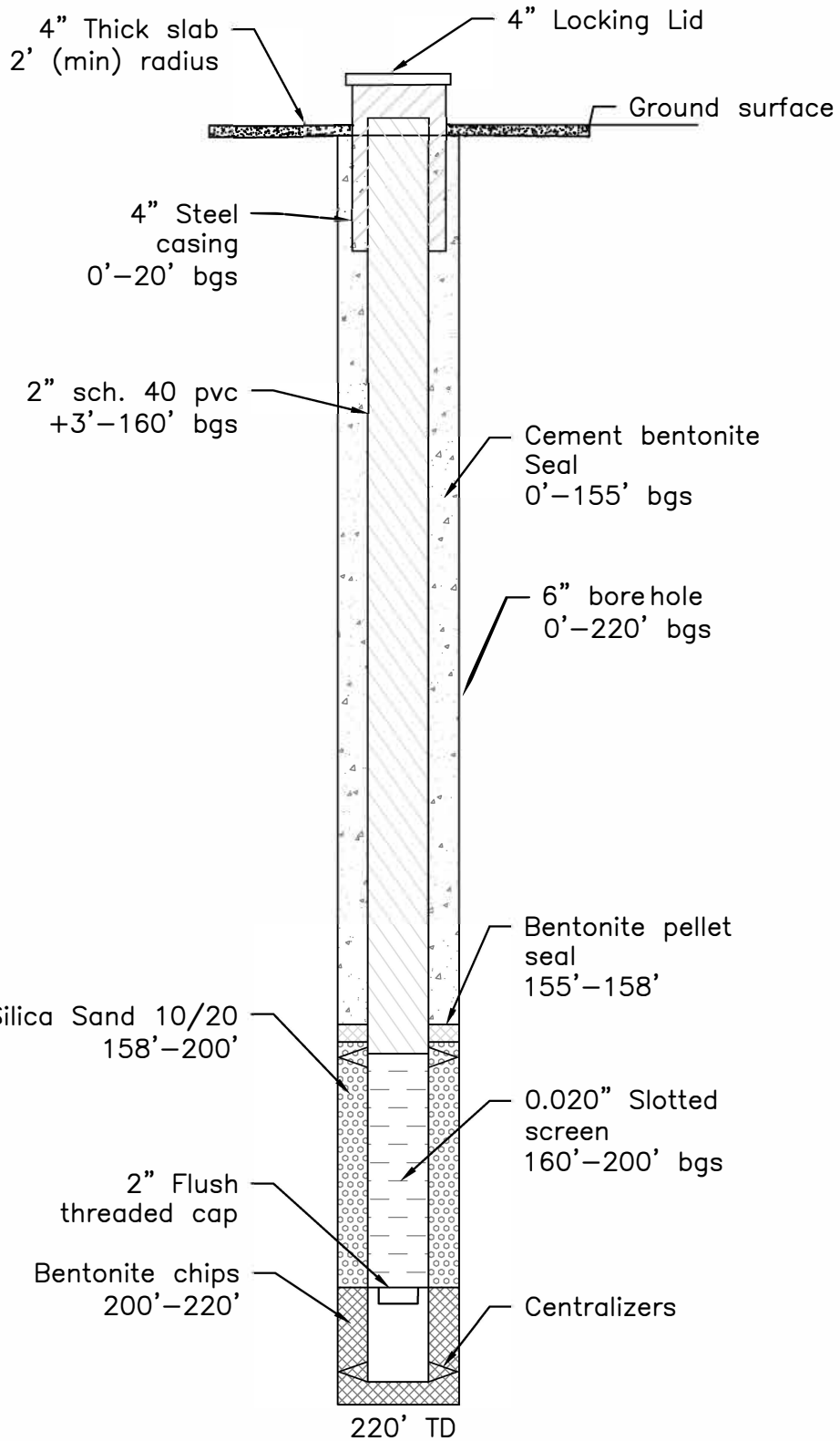
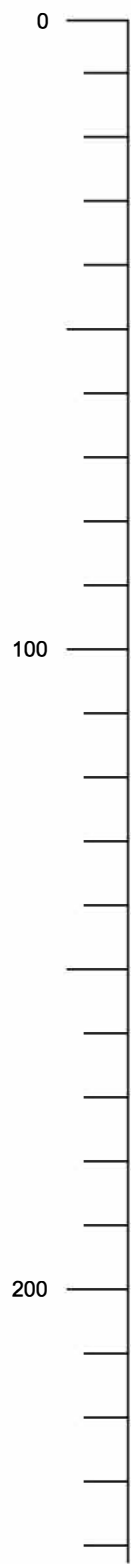
E-mail _____

SUBMITTED on _____, 20____.

State Contractor License No. _____. *[If applicable]*

Attachment 3
Revised Monitor Well
Diagram

Feet Below Ground Surface



Not to Scale

- Notes:
1. O.D. = Outside diameter
 2. TD = Total depth
 3. Centralizers installed as shown

PORTALES TEST HOLES
PORTALES, NEW MEXICO

Monitor Well Construction Diagram

