

SPECIFICATIONS
FOR
WATER WELL IMPROVMENTS

PONCA TRIBE OF OKLAHOMA
MARCH 2026



P.O. Box 579 Stillwater, Oklahoma 74076-0579

PHONE: (405) 372-4848 FAX: (405) 372-7055

CA NO. 2659 - 06/30/2018

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ADVERTISEMENT FOR BIDS

Ponca Tribe of Oklahoma

Owner

101 White Eagle Drive

Address

580 - 762-8104

Telephone

Ponca City, OK 74601

Address

Separate sealed BIDS for the construction of:

Potable Water Well, Well House, Well Electric, 400 L.F. 4" Water Line, Connection to Existing System, Well Interior and Exterior Piping and all appurtenances

will be received by the Ponca Tribe of Oklahoma at the Administration Building, 20 White Eagle Drive, Ponca City, OK 74601 until 11:00 am, local time on the 31st day of March, 2026. or may be delivered until 11:00 am at the Administration Building, 20 White Eagle Drive, Ponca City, OK 74601 where they publicly opened and read aloud.

The CONTRACT DOCUMENTS may be examined at the following locations:

Ponca Tribe of Oklahoma, Administration Building, 20 White Eagle Dr., Ponca City, OK

Brown Engineering, 3916 West Lakeview, Stillwater, OK, 405/372-4848

Southwest Construction News , Bid News

Copies of the CONTRACT DOCUMENTS may be obtained at the office of: Brown Engineering located at P.O. Box 579 Stillwater, OK 74076 (405) 372-4848 upon payment of \$200.00 for each set or \$50.00 for each digital set. Any BIDDER, upon returning the CONTRACT DOCUMENTS after bids are opened and in good condition, and any non-bidder upon so returning the CONTRACT DOCUMENTS will be refunded \$ 0.00.

March 10, 2026

Date

/s/ Skyler Matthews

Signature

Project Manager

Title

INFORMATION FOR BIDDERS

BIDS will be received by the Ponca Tribe of Oklahoma (hereinafter called the "OWNER"), at Administration Offices, 20 White Eagle Dr., Ponca City, OK 74601 until 11:00 am March 31, 2026 or be hand delivered to the Ponca Tribe of Oklahoma at the Administration Offices, 20 White Eagle Dr., Ponca City, OK 74601 until 11:00 am, March 31, 2026 and then at said office publicly opened and read aloud.

Each BID must be submitted in sealed envelope, addressed to: Ponca Tribe of Oklahoma at 20 White Eagle Dr., Ponca City, OK, 74601. Each sealed envelope containing a BID must be plainly marked on the outside as BID for Potable Water Well Improvements and the envelope should bear on the outside the BIDDER'S name, address, and license number if applicable, and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at Attn: Skyler Mathews, 20 White Eagle Dr., Ponca City, OK 74601.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one Copy of the BID form is required.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Bids received more than ninety-six (96) hours before time specified and Bids received after the time set for opening Bids will not be considered and will be returned unopened. No BIDDER may withdraw a BID within 60 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the BID schedule by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done.

The OWNER shall provide to BIDDERS prior to BIDDING, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

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

Each bid must be accompanied by a bid bond payable to the OWNER for five percent of the total amount of the bid. A certified check may be used in lieu of the bid bond. No bid security is required if bid is \$50,000.00 or less. As soon as the bid prices have been compared, the OWNER will return the bonds of all except the three lowest responsible bidders. The bid bond of the successful bidder will be retained until the Performance Bond, Statutory Bond, Maintenance Bond, and Certificate of Insurance have been executed and approved, after which it will be returned. The bid security of the two remaining unsuccessful Bidders will be returned after the successful bidder has entered into a contract and has furnished the required bonds and insurance.

A Performance Bond, Statutory Bond and Maintenance Bond each in the amount of 100 percent of the Contract Price with a corporate surety approved by the OWNER will be required for the faithful performance of the Contract.

Attorneys-in-fact who sign Bid Bonds and Performance Bonds must file with each Bond a certified and effective dated Copy of their Power-of-Attorney.

The OWNER shall award a contract to the lowest responsible bidder or bidders within sixty (60) calendar days after bid opening. The OWNER may extend the award period not to exceed fifteen (15) calendar days by formal recorded action and for good cause.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond, Statutory Bond, Maintenance Bond and Certificate of Insurance within ten (10) calendar days from the date when Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Agreement and Bond forms. In the of failure of the Bidder to execute the Agreement, the OWNER may consider the Bidder in default in which case the Bid Bond accompanying the proposal shall become the property of the OWNER.

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

The Notice to Proceed shall be issued by the OWNER within ten (10) calendar days of the execution of the Agreement, approval of Bonds and approval of the Certificate of Insurance. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the OWNER AND CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on the part of either party.

The OWNER may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the

OWNER that such BIDDER is properly qualified to carry out the obligations of the AGREEMENT and to complete the WORK contemplated therein.

A conditional or qualified BID will not be accepted.

Award will be made to the lowest responsible BIDDER.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout.

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

The successful bidder will be required to meet all requirements of the Underground Facilities Damage Prevention Act when engaged in work within public rights-of-way.

When alternate BIDS are taken, they will be listed in numerical order with the highest priority being number one, second, number two, etc.

When alternates are used, the low BIDDERS will be selected by the lowest and best BID considering all BIDS which include the selected alternate BIDS.

The alternates will be listed in consecutive priority order to remain within the funds available for the project.

The low BIDDER shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when required to do so by the OWNER.

Inspection trips for prospective BIDDERS will leave from the:
Administration Building on March 24, 2026 at 10:00 am

The Engineer is	<u>Brown Engineering, PC</u>
The Engineer's address and phone number is	<u>P.O. Box 579, Stillwater, OK 74076-0579</u> <u>(405) 372-4848</u>
The Engineer's contact person is	<u>Mike Brown</u>
The Engineer's Email is	<u>mike@brownengineering.net</u>

BID PROPOSAL

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of Oklahoma doing business as" _____ * *. To the Ponca Tribe of Oklahoma (hereinafter called "OWNER") .

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all MATERIALS for the construction of

Potable Water Well, Well House, Well Electric, 400 L.F. 4" Water Line, Connection to

Existing System, Well Interior and Exterior Piping and all appurtenances

in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract within ten (10) calendar days of the date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 60 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$ 500.00 for each consecutive calendar day thereafter as provided in Standard Requirements.

No BIDDER may withdraw a BID within 60 days after the actual opening thereof. Each BID must be accompanied by a BID BOND payable to OWNER for 5% of the amount bid.

BIDDER acknowledges receipt of the following ADDENDUM: _____

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the unit prices or lump sum given in the Bid Schedule.

* Insert "a corporation", "a partnership", or "an individual" as applicable

BID SCHEDULE

No	Description	Unit	Total Qty.	Unit Price	Total Price
1	Drilling of Well	L.S.	1	_____	_____
2	Electrical and Control System	L.S.	1	_____	_____
3	Interior and Exterior Piping	L.S.	1	_____	_____
4	Well House	L.S.	1	_____	_____
5	4" PVC Water Line Complete in Place	L.F.	400	_____	_____
6	4" Gate Valves	Each	1	_____	_____
7	Blow-Off	Each	1	_____	_____
8	Plugging of Existing Well	L.S.	1	_____	_____
	Total Bid			_____	_____
	Total Bid in Words			_____	_____

Respectfully submitted,

Signature

Firm Name

Title

Address

Employer I.D. No

Address

(SEAL) - if BID is by a corporation

Telephone No.

ATTEST:

Secretary/Witness

Date

BUSINESS RELATIONSHIP AFFIDAVIT

STATE OF OKLAHOMA)
)
COUNTY OF _____) ss.

_____, of lawful age, being first duly sworn, on oath says that (s)he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the nature of any partnership, joint venture, or other business relationship presently in effect or which existed within one (1) year prior to the date of this statement with the architect, engineer, or other party to the project is as follows:

Affiant further states that any such business relationship presently in effect or which existed within one (1) year prior to the date of this statement between any officer or director of the bidding company and any officer or director of the architectural or engineering firm or other party to the project is as follows:

Affiant further states that the names of all persons having any such business relationships and the positions they hold with their respective companies or firms are as follows:

(If none of the business relationships hereinabove mentioned exist, affiant should so state.)

Subscribed and sworn to before me this ____ day of _____, 20__.

My Commission
Expires: _____

Notary Public

Commission Number _____

NOTE: This form is to be submitted with the BID.

NONCOLLUSION AFFIDAVIT

STATE OF OKLAHOMA)
) ss
COUNTY OF _____)

_____, of lawful age, being first duly sworn, on oath says that (s)he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the bidder has not been a party to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any state official or employee as to quantity, quality or price in the prospective contract, or any other terms of said prospective contract; or in any discussions between bidders and any state official concerning exchange of money or other thing of value for special consideration in the letting of a contract.

SUBSCRIBED AND SWORN to before me this ____ day of _____, 20__.

Notary Public

My Commission Expires:

Commission Number _____

NOTE: This form is to be submitted with the BID.

PAYROLL AFFIDAVIT

I _____, of lawful age, being first duly sworn, on oath says that (s)he is the agent authorized by the bidder to submit the attached bid. Affiant further states that (s)he has submitted the required payroll information to the State Department of Labor. Affiant further states that (s)he is in compliance with the requirements of Title 40 O.S., 1981, Sections 196.1 through 196.12 and any amendments thereto.

SIGNATURE

Subscribed and sworn to before me this ____ day of _____, 20 ____.

NOTARY PUBLIC

My Commission Expires: _____

Commission Number _____

NOTE: This form is to be submitted with the bid.

CLAIM OR INVOICE AFFIDAVIT

STATE OF OKLAHOMA)
) ss
COUNTY OF _____)

The undersigned (engineer or supervisory official), of lawful age, being first duly sworn, on oath says that this (invoice, claim, or contract) is true and correct. Affiant further states that the (work, services or materials) as shown by this invoice or claim have been (completed or supplied) in accordance with the plans, specifications, orders, or requests furnished to the affiant. Affiant further states that (s)he has made no payment, given, or donated or agreed to pay, give, or donate, either directly or indirectly, to any elected official, officer, or employee of the State of Oklahoma, of money or any other thing of value to obtain payment or the award of this contract.

Supervisory Official

Subscribed and sworn to before me this ____ day of _____, 20__.

Notary Public

My Commission Expires:

Commission Number _____

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____
as Principal, and _____ as Surety, are hereby held firmly bound unto the
Ponca Tribe of Oklahoma as OWNER in the penal sum of _____ for the payment
of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this ___ day of _____, 2026. The Condition of the above obligation is such that whereas
the Principal has submitted to _____ a certain BID, attached hereto and hereby
made a part hereof to enter into a contract in writing, for the construction of:

Potable Water Well, Well House, Well Electric, 400 L.F. 4" Water Line, Connection to
Existing System, Well Interior and Exterior Piping and all appurtenances

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract
attachment hereto (properly completed in accordance with said BID) and shall furnish a BOND for faithful
performance of said contract, and for the payment of all persons performing labor furnishings materials in connection
therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this
obligation shall be void. Otherwise the same shall remain in force and effect; it being expressly understood and agreed
that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this
obligation as herein stated. The Surety, for value received, hereby stipulates and agrees that the obligations of said
Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER
may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of
them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their
proper officers, the day and year first set forth above.

(L.S.)

Principal

ATTEST: (If by Corporation)

Surety

Name

AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 2026 between Ponca Tribe of Oklahoma, hereinafter called "OWNER" and _____ doing business as (a partnership) or (a corporation) (an individual) hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The CONTRACTOR will commence and complete the construction of :

Potable Water Well, Well House, Well Electric, 400 L.F. 4" Water Line, Connection to Existing System, Well Interior and Exterior Piping and all appurtenances

2. The CONTRACTOR will furnish all of the materials, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the PROJECT described herein.

3. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within 10 calendar days after the date of the NOTICE TO PROCEED and will complete the same within 60 calendar days unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS.

4. The CONTRACTOR agrees to perform all the WORK described in the CONTRACT DOCUMENTS and comply with the terms therein for the sum of \$ _____ or as shown in the BID SCHEDULE.

5. The term "CONTRACT DOCUMENTS" means and includes the following:

- (A) Advertisement for Bids
- (B) Information for Bidders
- (C) Bid Proposal
- (D) Bid Schedule
- (E) Business Relationships Affidavit
- (F) Noncollusion Affidavit
- (G) Bid Bond
- (H) Agreement
- (I) Standard Requirements
- (J) Statutory Bond
- (K) Performance Bond
- (L) Maintenance Bond
- (M) Certificate of Insurance
- (N) Notice of Award
- (O) Notice to Proceed
- (P) Change Order
- (Q) Drawings prepared by Brown Engineering, P.C. Numbers 1 through 5, and dated March 2026
- (R) Specifications prepared or issued by Brown Engineering, P.C. dated March 2026
- (S) ADDENDA:
 - No. _____, dated _____
 - No. _____, dated _____
 - No. _____, dated _____
 - No. _____, dated _____

No. _____, dated _____

6. The OWNER will pay to the CONTRACTOR in the manner and at such times as set forth in the Standard Requirements such amounts as required by the CONTRACT DOCUMENTS.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

8. It is understood that the following are also required of the Contractor in performance of this contract:

- a. Liquidated damages for failure to complete the work within the time specified shall be assessed at the rate of \$500.00 per day for each additional calendar day until the work is completed.
- b. Contractor shall comply with the Underground Facilities Damage Prevention Act (63 O.S. 42.1 et seq.).

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in (four) copies each of which shall be deemed an original on the date first above written.

OWNER: Ponca Tribe of Oklahoma

Print or Type

By: _____

Signature

Name: _____

Print or Type

Title: _____

Print or Type

(SEAL)

ATTEST:

By: _____

Signature

Name: _____

Print or Type

Title: _____

Print or Type

CONTRACTOR: _____

Print or Type

By: _____

Signature

Name: _____

Print or Type

Title: _____

Print or Type

(SEAL)

ATTEST:

By: _____

Signature

Name: _____

Print or Type

Title: _____

Print or Type

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____
(Corporation, Partnership, or Individual)

hereinafter called PRINCIPAL, and:

(Name of Surety)

(Address of Surety)

hereinafter called SURETY, are held and firmly bound unto:

Ponca Tribe of Oklahoma

(Name of Owner)

101 White Eagle Dr., Ponca City, OK 74601

(Address of Owner)

hereinafter called OWNER, in the total aggregate penal sum of _____/100-----
Dollars (\$_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents. THE CONDITION OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the _____ day of _____, 2026, a copy of which is hereto attached and made a part hereof for the construction of:

Potable Water Well, Well House, Well Electric, 400 L.F. 4" Water Line, Connection to

Existing System, Well Interior and Exterior Piping and all appurtenances

NOW, THEREFORE, if the PRINCIPAL shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the SURETY and if the PRINCIPAL shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

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

PROVIDED, FURTHER, that it is expressly agreed that the bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the contract as so amended. The term "Amendment, wherever used in this bond, and whether referring to this bond, the contract or the loan documents shall include any alteration, addition, extension, or modification of any character whatsoever.

IN WITNESS WHEREOF, this instrument is executed in 4 counterparts, each which shall be deemed an original, this the _____ day of _____, 2026.

ATTEST:

By: _____
(Signature)

Principal: _____
(Print or Type)

Name: _____
(Print or Type)

By: _____
(Signature)

Title: _____
(Print or Type)

Name: _____
(Print or Type)

(SEAL)

Title: _____
(Print or Type)

ATTEST:

By: _____
(Signature)

Surety: _____
(Print or Type)

Name: _____
(Print or Type)

By: _____
Surety's Agent (Signature)

Name: _____
(Print or Type)

By: _____
Attorney-in-Fact (Signature)

Name: _____
(Print or Type)

NOTE: Date of bond must not be prior to date of contract. If contractor is partnership, all partners should execute bond.

STATUTORY BOND

KNOW ALL MEN BY THESE PRESENTS:

That we _____ as Principal, and _____ a Corporation organized under laws of _____, as Surety, are held and firmly bound unto the State of Oklahoma, in the amount of _____/100----- Dollars (\$ _____) for the payment of which we hereby bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

Dated _____, 2026.

Whereas, the said Principal did on _____, 2026 enter into a certain contract with Ponca Tribe of Oklahoma for construction of :

Potable Water Well, Well House, Well Electric, 400 L.F. 4" Water Line, Connection to Existing System, Well Interior and Exterior Piping and all appurtenances

WHEREAS, this bond is given in compliance with OKLAHOMA STATUTES ANNOTATED, 1941, Title 61, Sections 1 and 2, as amended.

NOW THEREFORE, the condition of the above obligation is such, that if the Principal shall pay all indebtedness incurred for labor or material or rental of machinery or equipment furnished in the construction of said public building or in making said public improvements, then this obligation shall be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals the day first written above.

By: _____

By: _____
Surety's Agent (Signature)

Name: _____
(Print or Type)

By: _____
Attorney-in-Fact (Signature)

Name: _____
(Print or Type)

NOTE: Attach a certified copy of the Power of Attorney.

MAINTENANCE BOND

WHEREAS, the undersigned, _____, has executed a certain Contract dated the ____ day of _____, 2026, designated and known as Ponca Tribe of Oklahoma for the construction of:

Potable Water Well, Well House, Well Electric, 400 L.F. 4" Water Line, Connection to Existing System, Well Interior and Exterior Piping and all appurtenances

including all of the work mentioned and described in said Contract, and to be performed by the undersigned strictly and punctually in accordance with the terms, conditions, plans and specifications thereof,

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____, as Principal, and _____ as Su rety, are jointly and severally, firmly held and bound unto the Ponca Tribe of Oklahoma (hereinafter "OWNER") in the sum of _____ /100----- Dollars (\$) _____) lawful money of the United States of America, same being the approximate cost of the Contract herein referred to, for the payment of which sum well and truly to be made, we hereby bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The Condition of this Bond is such that the said Principal and Surety herein name do hereby agree and bind themselves unto and guarantee the "OWNER" that the said improvements, including materials, workmanship and all work done under said contract were such that the same shall endure without need of any repair whatsoever for a period of one (1) year from and after the formal acceptance of said project by resolution of the duly appointed governing body of the "OWNER" and that at the expense of said Principal and/or Surety, that such work performed under said Contract shall be kept and maintained in a first-class condition for a period of one (1) year as herein provided, and that all trenches, excavations or ditches that may sink or settle, shall promptly be refilled without any notice being given, and that all breaks or failures occurring or arising from any cause whatsoever within said period of one (1) year, shall be promptly repaired and at all times during the said period of one (1) year, maintained by said Principal and/or Surety, without notice being given; and it being further agreed that upon the neglect, failure or refusal of the Principal to make any needed repairs or backfills upon said project or any work connected therewith within ten (10) calendar days to _____, that the said Principal and Surety shall jointly and severally be liable to the Ponca Tribe of Oklahoma for the costs and expenses of making such repairs or backfills, or making good defects or imperfections.

NOW, THEREFORE, if the said Principal and surety shall faithfully and securely keep and perform all of the obligations herein provided to be kept and performed by them, or either of them, then this obligation shall be null and void and of no force and effect, otherwise to be and remain in full force and effect at all times.

Signed, sealed and delivered this ____ day of _____, 2026.

ATTEST:

By: _____
(Signature)

Principal: _____
(Print or Type)

Name: _____
(Print or Type)

By: _____
(Signature)

Title: _____
(Print or Type)

Name: _____
(Print or Type)

(SEAL)

Title: _____
(Print or Type)

ATTEST:

By: _____
(Signature)

Surety: _____
(Print or Type)

Name: _____
(Print or Type)

By: _____
Surety's Agent (Signature)

Name: _____
(Print or Type)

By: _____
Attorney-in-Fact (Signature)

Name: _____
(Print or Type)

(Attach a certified copy of the Power of Attorney)

INSURANCE REQUIREMENTS

Name of Insured Ponca Tribe of Oklahoma

Description of Work Water Well Drilling with Well house and appurtances

Location of Work Ponca Tribe of Oklahoma

<u>Kind of Insurance</u>	<u>Minimum Coverage</u>	<u>Expected Dates Coverage Needed</u> <u>From . To</u>
Workmen's Compensation	Legal Amount	
General Public Liability and Property Damage, Including Vehicle Coverage		
Bodily Injury - Each Person	\$500,000	_____
Bodily Injury - Each Accident	\$500,000	_____
Property Damage - Each Person	\$200,000	_____
Property Damage - Aggregate Limit	\$200,000	_____
Builder's Risk (if required)	Full Coverage	_____

Note: This covers all motor driven vehicles such as cars, trucks, graders, etc.

In the event of any material change or cancellation of said policies, the company will give fifteen (15) day written notice to Ponca Tribe of Oklahoma, Owner.

Statements such as "will endeavor" and "but failure to notify owner shall impose no obligation or liability of any kind upon the company" shall not be allowed.

Coverage shall be indicated by checking all boxes applicable. Insurance shall cover any hazards involved with the planned construction. Special coverage for blasting operations shall be listed separately on the certificates.

The Owner shall be listed as the certificate holder.

STANDARD REQUIREMENTS

1. Filling in Bid Proposal Form

Each proposal shall be made on the forms accompanying these instructions, and all blank spaces in the form shall be filled, numbers shall be stated both in writing where applicable and in figures, the signatures shall be in longhand and the completed form shall be without interlineation, alteration or erasure.

Proposals shall not contain any recapitulation of work to be done.

Proposals shall be addressed to and delivered to the Owner at the address given in the "Information for Bidders" enclosed in a sealed opaque envelope. Place on the envelope the name of bidder, project name, project number (if given) and date of bid opening. Bidders shall acknowledge addendums including dates, if any.

Bids received more than ninety-six (96) hours before bid opening as well as bids received after the time set for opening bids, will not be considered and will be returned unopened.

2. Alternates

Bidder shall state in his proposal the amount to be deducted from or added to the basic bid, for all alternates as specified in the specifications.

3. Bid Security to be Furnished by Each Bidder with His Bid

Each proposal must be accompanied by a certified check or a bid bond in an amount equal to 5% of the total amount of the proposal as guarantee that, if awarded the contract, the bidder will execute the contract and furnish bonds and insurance as required in these Standard Requirements. The successful bidder's check or bid bond will be retained until (s)he has entered into a satisfactory contract and furnished bonds and insurance as required in these Standard Requirements. The Owner reserves the right to hold the bid security of the three lowest bidders until the successful bidder has entered into a contract and has furnished the required bonds and insurance. No Bid Security is required if bid is \$7,500.00, or less.

Should the successful bidder fail to enter into a contract and furnish the required bonds and insurance within ten (10) calendar days after the contract has been awarded, then there shall be forfeited to the Owner the cost of republication of notice to bidders, all actual expenses incurred by reason of bidder's default and the difference between the low bid of the defaulting bidder and the amount of the bid of the bidder whom the contract is subsequently awarded, but not to exceed the amount of said check or bond.

4. Scope of Work

The work contemplated under this contract includes all labor, materials, transportation, equipment and service necessary for, and reasonably incidental to the completion of all construction and mechanical work in connection with the project described in the specifications and the accompanying drawing(s).

5. Special Notice

The competency and responsibility of bidders and of their proposed subcontractors will be considered in making the award. The Owner reserves the right to reject any or all bids, and at its discretion, to waive any irregularities in the bid form.

6. Examination of Site & Conditions

Before submitting a proposal, bidders must carefully examine the drawings and specifications, visit the site of the work and fully inform themselves as to all existing conditions and limitations. They shall include in the proposal, a sum to cover the cost of all items contemplated by the contract.

7. Interpretation of Proposed Contract Documents

If a bidder finds discrepancies in, or omissions from, the drawings or documents, or if he is in doubt as to their meaning he shall at once notify the Owner. Any request for interpretation of drawings or documents, request for approval of materials when certain manufacturer's material or its approved equal are called for, apparent omissions or discrepancies shall be presented to the Owner's Consulting Engineer.

8. Contract Security

The contractor shall furnish the following surety bonds when the contract is awarded:

- (A) Performance Bond - 100% of Contract
- (B) Statutory Bond - 100% of Contract
- (C) Maintenance Bond - 100% of Contract

Forms will be furnished by the Owner's Consulting Engineer. If a contract is \$7,500.00 or less, no bonds are required.

9. Contractor's Liability and Builders All Risk Insurance

The contractor shall furnish the following insurance when the contract is awarded:

- (A) Workmen's Compensation: The contractor shall carry on his work in accordance with the requirements of the Workmen's Compensation Law of the State of Oklahoma, and shall not reject the provisions thereof during the life of this contract.
- (B) Public Liability and Property Damage: He shall also protect himself by liability insurance against any and all claims for damages to persons or property which may arise out of operations under this contract, whether such operations be by himself or a subcontractor or by anyone directly employed by either of them. Certificates of such insurance shall be filed with the Owner and shall be subject to its approval as to adequacy of protection. The public liability insurance shall have limits of not less than \$100/300,000 and the property damage insurance not less than \$50/100,000.
- (C) Builders Risk: Provide Builders Risk Insurance only if called for in other sections of the specifications.

10. Contract Changes - Change Orders to the Contract

- (A) All proposals for changes in work shall be submitted by the Contractor in a lump sum amount. (Must be broken down as shown in Section 10, paragraph d.)
- (B) In considering proposals for change involving added work, omitted work, or any combination thereof, check of estimates in detail will be made by the Owners representative, utilizing unit prices where specified or agreed upon, with the view of arrival at equitable adjustment.
- (C) When necessity to proceed with a change does not allow sufficient time to properly check a proposal or because of failure to reach an agreement, the Owner may order the Contractor to proceed on the basis of price to be determined at the earliest practical date, but not to be more than the increase or less than the decrease proposal.
- (D) With each proposal for a change involving an increase or a decrease in the amount of the contract, the Contractor shall submit separately an itemized breakdown that will include, but not be limited to, the following:
 - (1) All materials with cost per item and extension.
 - (2) All labor with number of hours per operation, cost per hour and extension.
 - (3) Itemize the following:

- a. All Insurance Cost
- b. Bond Cost
- c. Social Security Taxes
- d. Workmen's Compensation
- e. Employee Fringe Benefits
- f. Overhead Cost
- g. Profit

(E) Proposals and breakdown should be submitted as promptly as possible.

11. Labor

The Contractor shall pay the prevailing wage and comply with all State and Federal Laws in the employment and payment of labor.

12. Payroll Records

In compliance with Senate Bill 132 as passed by the Thirtieth Oklahoma Legislature, the Contractor and each subcontractor shall keep an accurate record showing the names and occupation of all workmen employed by them, in connection with the public work, and showing also the actual wages paid to each of the workmen, which record shall be open at all reasonable hours to the inspection of the Owner.

13. Affidavits

For contracts under \$7,500.00, an affidavit must be submitted to the Owner with the final estimate for payment stating that all indebtedness incurred by the Contractor or his subcontractors who perform work in the performance of such contract for labor, materials and repairs to and parts for equipment used and consumed in the performance of said contract, has been paid in full.

14. Permits

The Contractor shall procure all necessary permits, pay for the same, and shall obtain all official licenses for the construction of the work and for temporary obstructions, enclosures, openings of streets for pipes, walls, etc., arising from the construction and completion of the work as mentioned in the specifications. He shall be responsible for all violations of the law for any cause in connection with the construction of the work caused by obstructing streets or sidewalks or otherwise, and he shall give all requisite notice to public authorities.

15. Modifications of Proposal

No oral or telephone proposals for modifications will be considered. However, telegraphic will be considered when bids are in due form and telegram is received not less than one hour before bid opening schedule. Successful bidder may be required to enter into a formal contract; however, in the absence of such a requirement, it is agreed by the bidder that this bid, together with a Notice of Award of Contract in the form of a Purchase Order, signed by the Owner will constitute a contract binding both parties thereto.

16. Documents

All drawings, specifications, and other contract documents shall be returned to the Owner in an unmutilated condition, without any marks or annotations, not more than seven (7) days after bids are opened.

17. Interpretation of Documents

The documents forming the contract are complementary and what is called for by one shall be as binding as if it were called for by all. They are intended to include all detail of labor and material reasonably necessary for the proper execution of the work. Should there be any discrepancy between the specifications and the plan, the specifications shall have precedence. Should there be any discrepancy between the special provisions and the "Standard Requirements", the special provisions shall apply.

18. Definition of Terms

In the Contract Documents the following terms shall be understood as herein below defined:

- (A) "Owner" means a political subdivision of the state that is eligible to receive a loan or grant from the state's Financial Assistance Program. Eligible entities include counties, towns and municipalities, rural water districts, irrigation districts, rural sewage districts, public works authorities, water conservancy districts and school districts.
- (B) "Contractor" means the individual, firm or corporation awarded the general contract for the work contemplated. The term contractor is mentioned herein as masculine singular merely for convenience and without special significance.
- (C) "Project" means any engineering undertaking which qualifies for a loan or grant from the state's Financial Assistance Program. Eligible projects include water supply reservoirs, storage tanks, water treatment systems, water distribution systems, wastewater collection systems, wastewater treatment systems and storm sewer pipes.
- (D) "Engineer" means the Owner's consultant that prepares contract documents for the work contemplated.
- (E) "Government" or "State" (referred to in earlier text) means the State of Oklahoma acting through the Oklahoma Water Resources Board.
- (F) "Bidder" means any person, firm, or corporation submitting a Bid for the project.
- (G) "Bid" means the offer or proposal of the Bidder submitted on the prescribed forms which consist of the Bid Proposal and Bid & Schedule. The Bid shall set forth the prices for work to be performed.
- (H) "Work" means all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in the Project.

19. Materials and Workmanship

The intent of the plans and specifications is to provide for the construction and completion in every detail of the work described therein, and it is understood that the Contractor will furnish all labor and materials, tools, equipment, transportation and necessary supplies such as may be required to execute the contract in a satisfactory and workmanlike manner and in accordance with the plans, specifications, and terms of the contract. Unless otherwise specified, all materials shall be new. All materials shall be of the best of the several kinds called for and it is intended that only the best methods and materials, as recognized by usage in first class work, shall be used. All workmanship shall be of the highest quality in every particular. Only workmen skilled in their respective lines shall be employed in order to achieve the above results. The Contractor shall at all times maintain strict discipline and good order among his employees.

Inspections, tests, or approvals by the Engineer or others shall not relieve the CONTRACTOR from the obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

20. Time for Completion and Liquidated Damages

Time is of the essence on this contract. The Contractor shall at all times carry on the work diligently and without delay and shall punctually fulfill all requirements herein made of him.

The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time,

taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount for liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.

The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER:

- (A) To any preference, priority or allocation order duly issued by the OWNER.
- (B) To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and
- (C) To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs (A) and (B) above.

21. Royalties and Patents

The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save harmless from loss on account thereof. The Contractor shall protect from damage all water, sewer, gas, steam or other pipes or conduits, all hydrants and all other property that is liable to become displaced or damaged by the execution of the work, and when so ordered the Contractor shall suspend any work that may be subject to damage by climatic conditions.

22. Inspection

A representative of the Owner shall be present at all time that work is in progress. Any work completed without the inspector on site or improperly done shall be removed and replaced at the Contractors expense. The Contractor shall notify the Owner at least two days prior to commencing work. If work progress is delayed due to weather or material shortages, two days notice will be given in advance of returning to work, unless otherwise authorized by the Owner.

23. Correction of Work After Final Payment

Neither the final certificate of payment nor any provision in the Contract Documents shall relieve the Contractor of responsibility for faulty materials or workmanship and; unless otherwise specified, he shall remedy any defect due thereto and pay for any damages to other work resulting therefrom, which may appear within a period of one (1) year from the date of acceptance of the completed building or installation. The Owner shall give notice of observed defects with reasonable promptness.

24. Superintendents

The Contractor shall keep on this work, during its progress, a competent superintendent, who shall represent the Contractor in his absence. Important directions to the superintendent shall be confirmed in writing by the Contractor.

25. Owner's Rights

If the Contractor should be adjudged as bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough

properly skilled workmen or proper materials to carry on this work as required by the contract, or if he should fail to make prompt payment to subcontractors for materials, or labor, or persistently disregard Laws, Ordinances or the instructions of the Owner's representatives or otherwise be guilty of substantial violation of any provision of the contract, then the Owner may without prejudice to any other right or remedy and after giving the Contractor seven (7) days written notice, terminate the agreement with the Contractor and take possession of the premises and of all materials and appliances thereon and finish the work by whatever method it may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be certified by the Engineer or Owner's representative.

26. Corrections of Work Before Final Payment

The Contractor shall promptly remove from the premises all materials condemned by the Owner's representative as failing to conform to the contract, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute his own work in accordance with the contract and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

27. Use of Premises

The Contractor shall confine his apparatus, storage of materials, and operation of his work to the limits indicated by the Law, Ordinances, Permits or directions of the Owner, and shall not unreasonably encumber the premises with his materials. The Contractor shall enforce the Owner's instructions regarding signs, advertisements, fires, and smoking.

28. Protection

The Contractor shall protect from damage all buildings, trees, shrubs, lawns, and landscape work, and shall provide guards and covering for them. Any such property damage shall be repaired or replaced at the Contractor's expense. Smoking on certain parts of the site premises shall be prohibited and signs to that effect shall be posted conspicuously. Fires shall not be built on the premises except with the express consent of the State.

29. Cutting, Patching and Excavation

The Contractor shall do all cutting, fitting or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors shown upon or reasonably implied by the Drawings and Specifications for the completed structure, and he shall make good after them as the Owner's representative may direct.

The Contractor shall do all cutting of walls and pavements that may be necessary to install the work and shall, after the equipment is installed, restore such surfaces to an approved condition.

All excavating necessary to the execution of this contract shall be done by the Contractor, who shall also furnish all labor necessary to backfill properly all excavation as the equipment is installed and inspected.

30. Payment to Contractor

Partial payment shall be due the Contractor each month during the course of construction for work performed during the preceding calendar month. The Contractor shall submit to the Owner an application for each payment and, if required, receipts or other vouchers showing his payment for material and labor, including payment to subcontractors. Such applications shall be submitted by the thirtieth (30th) of each month and the Contractor shall submit to the Engineer, a schedule of values of the various parts of the work, aggregating the total sum of the contract.

31. Retainage

Ten percent (10%) of all monies earned by the Contractor, as approved by the Engineer will be retained by the Owner until at least 50% of the project is completed. With satisfactory progress being made as determined by the Owner, and upon approval of the Surety Company, the retainage will then be reduced to 5% of the amount earned to date.

Interest shall be paid to the Contractor at the rate of three-fourths percent (3/4%) per month on the final payment if the payment is delayed more than thirty days after the contract is completed, accepted and all required materials, certificates and other required documentation have been furnished to the Owner by the Contractor.

32. Protection of Workmen & Property

The Contractor shall erect and maintain good and sufficient guards, barricades and signals at all unsafe places at or near the work, and shall in all cases, maintain safe passageways at all road crossings, crosswalks, and street intersections; and shall do all other necessary things to prevent accident, injury or loss of any kind.

33. Responsibility for Damages

The Contractor shall be responsible for all damage to property, injury to persons, and loss, expense, inconvenience, and delay that may be caused by or result from the carrying out of the work to be done under this contract, or from any act, omission, or neglect of the Contractor, his subcontractors or employees.

The Contractor shall indemnify and save harmless the Owner, Engineer and the Government from all suits or actions of every name and description brought forth on account of damage or injury, loss, expense, inconvenience, or delay received or sustained by any person or damage caused to any property, which damage, injury, loss, expense, inconvenience or delay may have been caused by or may have resulted from the carrying out of the work to be done under this contract, or from any act, omission, or neglect of the Contractor, his subcontractor or his employees; provided however, that the Owner shall promptly call to the attention of the Contractor any claim filed with the Owner for any such injury or damage, and if suit or action be commenced to recover for any such claim or damage, that Owner shall, before time for answer expires or before default has been entered, furnish the Contractor or his surety with a copy of the complaint. In case there should be any suits or actions, so much of the money due to the Contractor under and by virtue of the contract as shall be considered necessary by the Engineer, may be retained by the Owner until such suits or actions shall have been settled or until the interests of the Owner, or of the persons concerned, have been otherwise satisfactorily protected.

34. Personal Liability of Public

In carrying out the provisions hereof, or in exercising any power or authority granted to him by the contract, there will be no liability upon the employees of the Owner personally or officials of the Government it being always understood that in such matters they act as the agents and representatives of the Owner.

35. Hours of Labor

The Law of the State of Oklahoma prohibits the employment of labor for more than eight (8) hours in any one day or for more than forty-eight (48) hours in any one week, except in cases of emergency when other competent help is not available, and in such case the Contractor is required to pay all said employees time and a half wages for all overtime.

36. Liability for Claims

The Contractor shall promptly, as due, make payments to all persons supplying labor or materials for the prosecution of the work provided for in this contract, and shall also pay all contributions or amounts due the State Industrial Accident Fund and the Unemployment Compensation Fund from such Contractor or subcontractor in connection with the performance of this work.

The Contractor shall not permit any lien or claim to be filed or prosecuted against the Owner or Government on account of any labor or materials furnished. Should the Contractor fail, neglect or refuse to make prompt payment of any claim for labor or services, furnished by any person in connection with this contract as said claim becomes due, whether said services and labor be performed for said Contractor or subcontractor, then in such event, the Owner may pay such claim to the person furnishing such labor or services and charge the amount thereof against funds due or to become due the Contractor by reason of this contract, but the payment of any such claim in the manner herein authorized shall not relieve the Contractor or his surety from his or its obligation with respect to any unpaid claims.

37. Medical Care

The Contractor shall promptly, as due, make payment to any persons, co-partnership, association or corporation furnishing medical, surgical and hospital care or other necessary care and attention incident to sickness and injury of the employees of such Contractor of all sums which the Contractor agrees to pay for such services and all moneys which the Contractor may deduct from the wages of his employees for such services, and any contract entered into pursuant thereto, and all moneys collected or deducted from the wages of said employees pursuant to any laws, contract or agreement for the purpose of providing or paying for such services.

38. Assignment

The Contractor shall not assign the contract or sublet it as a whole without written consent of the Owner nor shall the Contractor assign any moneys due or to become due to him hereunder, without previous consent of the Owner.

39. Purchase of Materials

Preference shall be given to materials and products manufactured in the State of Oklahoma. (61 O.S. 1981, Sec. 9 & 10)

40. Prosecution of the Work

Contractor shall commence work on this project within ten (10) days after receiving the Notice to Proceed. The work shall be continuously carried to completion subject to the provisions of the contract. The progress of the work shall be at a rate sufficient to complete the contract within the time specified unless otherwise agreed with the Owner.

41. Cleaning

The Contractor shall keep the work site clean at all times and shall remove all rubbish daily. Upon completion of the work, the Contractor shall remove all rubbish from the site and all tools, equipment and surplus materials, and shall leave the site "broom clean". Under no circumstances shall the Contractor dispose of anything on any property, both private or public, without the written consent of the landowner and prior approval of the Owner. All trash and waste materials shall be disposed of at the proper landfill facilities. In case of dispute, the Owner may remove the materials or trash and charge the cost to the Contractor.

42. Taxes

Without additional expense to the Owner the Contractor shall be liable for all applicable Federal, State and local taxes. Rural Water Districts are exempt from State and Federal Taxes.

43. Salvage

All material removed from a renovation project shall be coordinated with the Owner. If the Owner wants to keep the salvaged material, then the Contractor shall move it to the area designated by the Owner. If the Owner does not want the salvaged material, then the Contractor shall remove it from the premises and dispose of it.

44. Ownership of Drawings

All shop drawings, miscellaneous drawings or documents prepared by the Contractor, subcontractor, or material supplier to be used in the construction of the project described in the specifications shall become the property of the Owner. All documents, drawings, shop drawings, etc., shall be, upon request, delivered to the Owner at any time during the progress of the project.

45. Subcontracting

The contractor may utilize the services of specialty subcontractors on those parts of the work which, under normal contracting practices, are performed by specialty subcontractors. The contractor shall not award work to subcontractor(s) in excess of fifty (50) percent of the contract price without prior written approval of the owner. The contractor shall be fully responsible to the owner for the acts and omissions of his subcontractor(s), and of persons either directly or indirectly employed by them as he is for the acts and omissions of persons directly employed by him.

The contractor shall cause appropriate provisions to be inserted in all subcontracts relative to work to bind subcontractor(s) to the contractor by the terms of the contract documents insofar as applicable to the work of subcontractor(s) and to give the contractor the same power as regards terminating any subcontract that the owner may exercise over the contractor under any provision of the contract documents. Nothing contained in this contract shall create any contractual relation between any subcontractor and the owner.

NOTICE OF AWARD

TO:

PROJECT Description:

Potable Water Well, Well House, Well Electric, 400 L.F. 4" Water Line, Connection to
Existing System, Well Interior and Exterior Piping and all appurtenances

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____, 2026 and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount: \$_____.

You are required by the Information for Bidders to execute the Agreement and furnish the required Contractor's Performance Bond, Statutory Bond, Maintenance Bond and Certificate of Insurance within ten (10) calendar days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER's acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this **NOTICE OF AWARD** to the OWNER.

Dated this ___ day of _____, 2026.

Ponca Tribe of Oklahoma

Owner

By: _____
Signature

Name: _____
(Print or Type)

Title: _____
(Print or Type)

ACCEPTANCE OF NOTICE

Receipt of the above **NOTICE OF AWARD** is hereby acknowledged by _____ this the _____ day of _____, 2026.

Contractor

By: _____
Signature

Name: _____
(Print or Type)

Title: _____
(Print or Type)

NOTICE TO PROCEED

Date _____

To: _____

Contractor

Address

Address

Project: Potable Water Well, Well House, Well Electric, 400 L.F. 4" Water Line, Connection to
Existing System, Well Interior and Exterior Piping and all appurtenances

You are hereby notified to commence **WORK** in accordance with the Agreement dated: _____, 2026, on or before _____, 2026 and you are to complete the **WORK** within 60 consecutive calendar days thereafter. The date completion of all **WORK** is therefore _____, 2026.

Ponca Tribe of Oklahoma
Owner

By: _____
Signature

Name: _____
(Print or Type)

Title: _____
(Print or Type)

ACCEPTANCE OF NOTICE

Receipt of the above **NOTICE OF PROCEED** is hereby acknowledged by _____ th is the _____ day of _____, 2026.

Contractor

By: _____
Signature

Name: _____
(Print or Type)

Title: _____
(Print or Type)

RELEASE OF CLAIMANTS

Date:

Project: Potable Water Well, Well House, Well Electric, 400 L.F. 4" Water Line, Connection to
Existing System, Well Interior and Exterior Piping and all appurtenances

Dear Sir:

I hereby acknowledge receipt of _____
/100----- Dollars (\$ _____) in full payment of my contracted dated _____,
2026 for improvement work which I did for you and which is described in my contract.

I Certify that I have paid in full for all materials purchased and all labor employed in the performance of this contract and that there are no claims against me as an employer under this contract on account of injuries sustained by workmen employed by me thereunder. I hereby release you from any claims arising by virtue of this contract.

WARNING

The making of any false statement or misrepresentation herein may be a crime punishable under Title 18 U.S.C. §1001 which provides in part: "Whoever, in any matter within the jurisdiction of any department or agency of the United States knowingly and wilfully...makes false representation, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than \$10,000.00 or imprisoned not more than five years, or both."

Sincerely,

Contractor

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Michael D. Brown, P.E.

SECTION 10010 - COORDINATION AND MEETINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Coordination
- B. Field Engineering
- C. Alteration Procedures
- D. Cutting and Patching
- E. Preconstruction Conference
- F. Progress Meetings

1.2 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of demolition.
- B. Coordinate completion and cleanup of Work of separate Sections in preparation for Substantial Completion.

1.3 FIELD ENGINEERING

- A. Maintain a complete and accurate log of any deviations from the plans as work progresses.
- B. Verify location of control points prior to starting work.
- C. Promptly notify Engineer of any discrepancies discovered.
- D. Contractor shall locate and protect control and reference points. Contractor shall report immediately to Engineer whenever any control or reference point is lost or destroyed or requires relocation.

1.4 ALTERATION PROJECT PROCEDURES

- A. Remove, cut, and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original specified condition.
- B. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.

1.5 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Execute Work by methods which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.

- C. Cut rigid materials using masonry saw or core drill.
- D. Identify any hazardous substance or condition exposed during the Work to the Engineer for decision or remedy.

1.6 PRECONSTRUCTION CONFERENCE

- A. Engineer will schedule a conference after Notice of Award.
- B. Attendance Required: Owner, Engineer and Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Designation of personnel representing the parties in Contract, and the Engineer.
 - 5. Procedures for processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
 - 6. Scheduling.

1.7 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

END OF SECTION

SECTION 10011 - SUBMITTALS

PART 1 - GENERAL

1.8 SECTION INCLUDES

- A. Submittal procedures.
- B. Demolition progress schedules.
- C. Shop drawings.

1.9 SUBMITTAL PROCEDURES

- A. Transmit each submittal to Engineer.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- C. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail numbers, and specification Section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed by authorized Contractor personnel, certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents. Application of the stamp with signature or initials filled in shall be conclusive as to the making of such certification.
- E. Schedule submittals to expedite the Project, and deliver them to Engineer at business address. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations.
- G. Provide space for Contractor and Engineer review stamps.
- H. Revise and resubmit submittals as required, identify all changes made since previous submittal by specific notation or color highlighting on the drawings or product data.
- I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.10 SHOP DRAWINGS

- A. Submit as project requires.

END OF SECTION

SECTION 10012 - QUALITY CONTROL

PART 1 - GENERAL

1.11 SECTION INCLUDES

- A. Quality assurance/control
- B. References

1.12 QUALITY ASSURANCE/CONTROL

- A. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances codes, or specified requirements indicate higher standards or more precise workmanship.
- B. Utilize workers qualified to produce workmanship of specified quality.

1.13 REFERENCES

- A. Conform to reference standard by date of issue current on date for receiving bids.
- B. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

END OF SECTION

SECTION 10013 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.14 SECTION INCLUDES

- A. Closeout Procedures.
- B. Final Cleaning.
- C. Project Record Documents.

1.15 RELATED SECTIONS

- A. Section 01300 - Submittals

1.16 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- B. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- C. Make all submittals not previously made.

1.17 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean site; sweep paved areas, rake clean landscaped surfaces.
- C. Remove waste and surplus materials from the site.

1.18 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
 - 1. Contract Drawings.
 - 2. Specifications
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Reviewed shop drawings.
- B. Record Documents and Shop Drawings: Legibly mark each item to record actual demolition including:
 - 1. Measured horizontal and vertical locations of underground pipelines and appurtenances, referenced to permanent surface improvements.
- C. Submit documents to Engineer.

END OF SECTION

SECTION 10027 - CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

The Contractor shall furnish all labor, equipment, and materials to complete all concrete work and related items indicated on the drawings and described in these specifications.

1.2 SHOP DRAWINGS

- A. Submit five (5) copies of shop drawings for reinforcing steel to Engineer for approval. Obtain approval of drawings prior to fabricating any material or proceeding with the work.
- B. Shop drawings for reinforcing steel shall indicate bending diagrams; assemble diagrams; splicing and laps of rods; shapes, dimension and details of bar reinforcing and accessories. Drawings shall be prepared in accordance with the "Manual of Standard Practice for Detailing Reinforced Concrete Structures", ACI 315. Scaled dimensions from structural drawings shall not be used in determining the lengths of reinforcing rods.

1.3 QUALITY ASSURANCE

- A. The Engineer shall have access to and the right to inspect all batch plants, cement mills, and supply facilities of suppliers, manufacturers, subcontractors, and contractors providing products included in these Specifications.
- B. Batch plant equipment shall be either semi-automatic or fully automatic.
- C. Concrete samples for field control shall be as follows:
 - (1) Slump per ASTM C143 (2) Test cylinders per ASTM C31 and C39Samples shall be collected at the following locations:
 - (1) Pumped Concrete; at the discharge end of the line.
 - (2) Ready-mix; at the discharge and of the chute.
 - (3) Job-Site Mixing;

PART 2 - MATERIALS

- 2.1 Portland Cement: ASTM C150-60, Type I.
- 2.2 Fine Aggregate: Clean hard natural sand, or manufactured sand, or a combination of both and conforming to ASTM C33-59.
- 2.3 Coarse Aggregate: Except as otherwise specified, aggregate shall be hard, durable, uncoated crushed stone, conforming to ASTM C33-61T.

- A. Maximum size aggregate allowed is 1/5 of narrowest dimensions between top of slab and forms or between forms of the concrete member or 3/4 of minimum clear spacing between reinforcing bars, or as recommended in ACI Standard No. 613-54.
 - B. For concrete having an exterior surface exposed, 95 to 100% shall pass a 1½ inch sieve; 35 to 70% shall pass a ¾ inch sieve; 10 to 30% shall pass a 3/8 inch sieve and over 5% shall pass a No. 4 sieve. Percentages are by weight.
- 2.4 Mixing Water: Clean and free from oil, acid and injurious amounts of vegetable matter, alkalies and other impurities.
- 2.5 Metal Reinforcement: Reinforcing steel shall meet the following specifications:
- A. Reinforcing Bars: Bars shall be deformed in accordance with ASTM A305-56T or ASTM A408-58T and formed of either grade 40 A615 billet or grade 50 A616 rail steel. Reinforcement shall be clear and free from loose rust, scale or other coatings that will reduce bond.
- 2.6 Metal Accessories: Include all spacers, chairs, bolsters, ties, and other devices necessary for properly placing, spacing, supporting and fastening reinforcement in place. Accessories shall conform to requirements of the Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice for Reinforced Concrete Construction".
- 2.7 Expansion Joint Fillers: Asphalt impregnated fiberboard conforming to ASTM D 1751-601 for interior work and self expanding cork board conforming to ASTM D 1752-60T for exterior work. Joint fillers shall extend full depth of slab or joint and be of thickness and lengths indicated on drawings. Remove top ¾ inch and fill with Joint Seal.
- 2.8 Joint Seal: Furnish and install DURASEAL-U traffic grade two-component polyurethane sealant as manufactured by Grace or approved equal for all construction, contracting and expansion joints in concrete slabs and for joints between concrete and masonry. Install in strict accordance with the manufacturers printed instructions.
- 2.9 Non-Shrinking Cement Grout: Cement grout for bedding plates to receive heavy equipment, column bases, and for other locations noted on the drawings shall be non-shrinking grout. The mix and setting characteristics shall be as recommended by the manufacturer for the purpose intended. Mix and place in strict accordance with the manufacturer's instructions.
- 2.10 Admixtures
- A. All concrete shall have air-entraining admixture conforming to ASTM C260, except that it shall be nontoxic after 30 days and shall contain no chlorides.
 - B. Pozzolan shall be used in combination with cement for all hydraulic and below grade structures. The pozzolan shall be Class C or Class F fly ash conforming to ASTM C618.
 - C. Water-reducing admixtures shall conform to ASTM C494, Type A.

2.11 Form Material

- A. Form surfaces for exposed surfaces shall be in new and undamaged condition and may be plywood, hard plastic finished plywood, or steel of sufficient strength and surface smoothness to produce the specified finish.
- B. All joints in forms shall be taped, gasketed, plugged, and/or caulked with an approval material so that Joints will remain watertight and withstand placing pressures without bulging outward or creating surface patterns.
- C. Form surfaces that have been damaged may be used for non-exposed surfaces, or where finish is of no real concern as determined by the Engineer.
- D. Positive spacers shall be provided for all wall forms.

2.12 Concrete Strength: Concrete shall have the minimum compressive strength at 28 days as shown below for various features unless otherwise directed by the Engineer.

<u>Feature</u>	<u>Strength (PSI)</u>
Footings and piers	3,500
Thrust blocking	2,500
Valve and pipe supports in vaults or buildings	3,000
Valve and pipe supports in trenches	2,500
Vaults	3,500

2.13 Mixing Concrete

- A. Ready-Mixed Concrete. Ready-mixed concrete shall be mixed and delivered to the project in accordance with ASTM specifications C 94-61, using alternate No. 1 or No. 2 as applicable to the responsibility specified for the mix design. In addition the ready-mixed concrete producer shall furnish duplicate delivery tickets with each load of concrete delivered to the project.

The delivery tickets shall indicate the delivery date and time dispatched; name and location of project; name of contractor; name of ready mixed concrete producer; truck number; number of cubic yards of cement in load, class of concrete; the cement content in bags per cubic yard of concrete; type and brand name of cement; admixtures in concrete, if any; maximum size of aggregate and the amount of water added at job, if any.

- B. Hand Mixing: Hand mixing of concrete will be permitted only for small placements or in the case of emergency, and then only on the authorization of the Engineer. When hand mixing is permitted, it shall be done on a watertight platform. The fine aggregate and cement shall first be mixed until a uniform color is attained and then spread over the mixing board in a thin layer. The coarse aggregate shall be thoroughly saturated with water, and it shall be spread over the fine aggregate and cement in a uniform layer and the whole mass turned as the additional water is added. After all ingredients have been added, the mass shall be turned at least six times, or more, to make the mixture uniform in color and smooth in appearance. Hand mixed batches shall not exceed a two-bag batch in volume.

- C. Job-Site Mixing: If mixed on site, equipment shall include suitable charging hopper and water measuring facilities. Concrete will be mixed until homogenous, and each batch mixed will be completely discharged prior to mixing the next batch in the drum.

PART 3 - EXECUTION

- 3.1 Construction of Forms: Construct forms to slopes, lines and dimensions shown, plumb and straight and sufficiently tight to prevent leakage; securely brace and shore forms to prevent displacement and to safely support construction loads. Provide access opening for cleaning and inspecting forms and reinforcing prior to depositing concrete. Do not coat forms with material that will stain or cause injury to exposed concrete surfaces or to plaster applied direct to concrete. Keep wood forms wet as necessary to prevent shrinkage. Forms for exposed, concrete beams, girders, columns and pilasters shall provide for a 1 inch radius or flat bevel on external corners. Construct forms for beams, girders and lintels so that sides may be removed without disturbing bottom of form or its support. All grade beams shall have side forms.
- 3.2 Form Surface Preparation: All form, surfaces in contact with the concrete shall be thoroughly cleaned of all previous concrete, dirt, and other surface contaminants prior to placement.
- 3.3 Inserts and Fastening Devices for Other Work
 - A. Provide for installation of inserts, conduit, pipe sleeves, drains, hangers, metal ties, shelf angle supports, anchors, bolts, angle guards, dowels, thimbles, anchor slots, metal ringlets, nailing strips, blocking, grounds and other fastening device required for attachment of other work. Properly locate in cooperation with other trades and secure in position before concrete is poured. Where openings are left in concrete for the passage of ducts, the openings shall be made slightly larger than the duct size as directed by the Engineer. Where boxes are required for floor type door closures and electrical work they shall be accurately located and where required the slab shall be cut-out to receive the boxes prior to placing the cement floor topping. All boxes shall have a minimum of 3 inches of reinforced concrete under bottom of box. Do not install sleeves in any concrete beam, joist or column except after approval of the Engineer.
 - B. Sufficient time between erection of forms and placing of concrete shall be given to the various trades to permit the proper installation of their work. See drawings and other sections of the specifications for extent, location and details of items to be embedded or placed in concrete.
 - C. All sleeves, chases, inserts, hangers etc. which are provided and placed in the forms by the various trades shall be maintained in position and protected until the concreting is completed. Hangers where required shall be anchored to the main reinforcing bars.
- 3.4 CONSTRUCTION JOINTS
 - A. Construction joints shall be formed as indicated on the drawings, or as approved or directed by the Engineer. Dowels and keys shall be used where indicated or required.
 - B. The rate and method of placing concrete and the arrangement of construction joint bulkheads shall be such that the concrete between construction joints shall be placed in a continuous operation.

- C. Joints in reinforced slabs and beams shall be perpendicular to the axis or surface of the member jointed and at that point, the joint shall be located at the point of minimum shear.

3.5 DEPOSITING CONCRETE

- A. Preparation: Before placing concrete, all debris, water and ice shall be removed from the places to be occupied by the concrete. Wood forms shall be thoroughly wetted (except in freezing weather) or oiled, and the reinforcement cleaned of ice or other coatings. Formwork and the placement of reinforcement, pipes, sleeves, conduit, hangers, anchors and other inserts shall be inspected and approved by the Engineer before any concrete is deposited.
- B. Placing: The placing or depositing of all concrete shall be done in accordance with requirements of The American Concrete Institute Building Code and as modified herein. Concrete shall be rapidly handled from mixer to forms and deposited as nearly as possible in its final position to avoid segregation due to rehandling or flowing. Concrete shall be spaded and worked by hand and vibrated to assure close contact with all surfaces of forms and reinforcement and leveled off at proper grade to receive finish. All concrete shall be placed upon clean, well-thawed, damp surfaces, free from water, and never upon soft mud or dry porous earth. Concrete in bearing walls and columns shall be placed and allowed to settle two hours before placing concrete superimposed thereon. Aluminum pipe or other aluminum conveying devices will not be permitted.
- C. Vibration: Concrete shall be placed with the aid of mechanical vibrating equipment. Vibration shall be applied directly to the concrete unless otherwise approved by the Engineer. The intensity of vibration shall be sufficient to cause flow or settlement of the concrete into place.

Vibration shall be applied at the point of deposit and in the area of freshly placed concrete. It shall be of sufficient duration to accomplish thorough compaction and complete embedment of reinforcement and fixtures, but shall not be long enough to cause segregation of the mix. To secure even and dense surfaces, free from aggregate pockets or honeycomb, vibration shall be supplemented by hand spading in the corners and angles of forms and along form surfaces while the concrete is plastic under the vibratory action. Caution must be exercised when using vibrators and hand spades to prevent any injury to the inside face of the forms or any movement of the reinforcement.

- D. Hot Weather Placement: Every effort shall be made to maintain a concrete temperature below 90 degrees F at time of placement. Ingredients may be cooled before mixing to prevent excessive concrete temperature.

Provisions shall be made for windbreaks, shading, fog spraying, sprinkling, or wet cover, when necessary.

Water-reducing and/or set-retarding admixtures shall be used in such quantities as especially recommended by the manufacturer to assure that the concrete is workable.

- E. Cold Weather Placement: Concrete shall not be placed when the ambient temperature is below 40 degrees F, or approaching 40 degrees F and falling. Concrete shall not be placed against frozen earth or ice, or against forms and reinforcement with frost or ice present.

Concrete placed shall be cured and protected for a minimum of 7 consecutive calendar days.

3.6 CONCRETE CONTROL TESTS

- A. Make test cylinders from concrete as mixed and at the direction of the Engineer. A minimum of six test cylinders shall be made for footings, six for grade beams and six for concrete floor; more or less tests may be made if ordered by the Engineer.
- B. Test specimen shall be taken by the Engineer and tested by an approved laboratory at Contractor's expense and in accordance with ASTM Specifications for "Compression Tests of Concrete". Results of tests shall immediately be submitted to the Engineer.
- C. Where results of strength tests indicate that concrete in place does not meet specification requirements or there is evidence that quality of concrete is below specification requirements, samples of concrete shall be obtained and tested in accordance with ASTM C 42 at the Contractor's expense. Where test results indicate that in-place concrete does not meet specification requirements, measures as prescribed by the Engineer shall be taken to correct the deficiency, at no additional expense to the Owner. Furnish four (4) copies of results of each test to the Engineer.
- D. During cold weather placement, test cylinders shall be protected from temperatures below 40 degrees F for seven consecutive calendar days.
- E. During hot weather placement, test cylinders shall be wrapped in wet burlap bags during the first 24 hours of curing, thence under water for 6 consecutive days.

3.7 PROTECTION AND CURING

- A. Protect concrete against frost and rapid drying and keep moist for at least six (6) days after placing; during this period, concrete shall be maintained above 70 degrees F for at least three (3) days or be 50 degrees F for at least five (5) days. Concrete from which forms are removed within six (6) days after concreting, and cement finishes shall be sprayed during the curing period as frequently as drying conditions may require. Cover cement finishes with mats, waterproof paper or other approved membrane within 24 hours after finishing and maintain in good condition until directed.
- B. The methods and recommended practice as described in ACI Standard 604-56 shall be followed for winter concreting and ACI Standard 605-59 shall be followed for hot weather concreting.
- C. Admixtures intended to accelerate the hardening of the concrete or to produce higher than normal strength at early periods will not be permitted unless specified or prior approval is obtained from the Engineer.
- D. The use of salt, chemicals or other foreign materials shall not be mixed with the concrete for the purpose of preventing freezing.
- E. Records shall be kept by the Contractor to show the date of placements, the mix used and the air temperature at time of concreting for the various portions of the work. These records shall be available to the Engineer when requested.

3.8 REMOVAL OF FORMS

- A. Forms shall be removed in accordance with requirements of the ACI Building Code Requirements for Reinforced Concrete No. 318-56, Chapter 5, without damage to concrete and in a manner to insure complete safety of the structure. Leave shoring in place until concrete member will safely support its own weight plus any live loads that may be placed upon it.
- B. Upon removal of forms, the Engineer shall be notified by the Contractor in order that an inspection of the newly stripped surfaces may be made prior to patching.
- C. Freshly stripped surfaces shall not be pointed up or touched in any manner before having been inspected by the Engineer.
- D. Forms for elevated structural slabs or beams shall remain in place until the concrete has reached the specified 28-day compressive strength as determined by test cylinders.

3.9 BACKFILL AGAINST WALLS

- A. Do not place backfill against walls until concrete has obtained 28-day compressive strength as determined by test cylinder.
- B. Where backfill is to be placed on both sides of the wall, the backfill shall be placed simultaneously on both sides to prevent differential pressures.

3.10 PUMPING OF CONCRETE

- A. Pumping of concrete will be permitted only with the Engineer's approval.
- B. The Contractor shall have adequate equipment on site during pumping to provide redundancy to insure completion of the concrete placement without cold joints in the event of breakdown of primary placing equipment.
- C. The minimum hose diameter shall be 4 inches.

END OF SECTION

SECTION 10104 - MASTER METER

1.1 GENERAL DESCRIPTION

Meters furnished under these specifications shall be the product of a manufacturer with at least ten (10) years experience in meter manufacturing for the American Market. Meters shall be new, first line quality, turbine type for cold water service.

Meter sizes shall be inclusive and shall comply with the Class II AWWA Standard C701 latest revision and the minimum specifications herein. They shall be designed for use with potable water below 120 degrees F.

1.2 REGISTRATION ACCURACY

All meters shall meet the following flow requirements:

Size	Min Flow GPM @ 95%	Normal Flow GPM 98.5% - 101.5%	Continuous Flow GPM
1-1/2"	3	4-200	160
2"	3	4-200	160
3"	4	5-750	600
4"	7	10-1250	1000
6"	15	20-2500	2000
8"	25	30-3000	2200
10"	55	65-4800	2500
12"	95	110-6800	3400

1.3 MAIN CASES

The body main case shall be of bronze composition of a high tensile strength on 1-1/2" to 6" sizes and epoxy coated cast iron on 8"-12" sizes and be capable of resisting distortion under pressure up to one hundred and fifty (150) pounds per square inch. All meters shall have the size and direction of flow indicated on the case and shall be designed for easy removal of all interior parts without disturbing the connections to the pipeline.

1.4 REGISTER HOUSINGS AND LIDS

The register housing and lid shall be constructed of a suitable engineering polymer or bronze and provide full protection of the register assembly. Lids shall overlap the register for protection. Register assemblies shall be secured to the main case in a tamper resistant fashion to prohibit unauthorized removal. Seal screws, tamperproof screws, or locking devices are acceptable.

1.5 REGISTERS

The registers shall be permanently hermetically sealed in a vacuum purged or dry nitrogen gas filled copper or stainless steel can. Similar size, type and registration of registers shall be interchangeable. The register glass shall be tempered to resist breaking, scratching, abrasion. Register face plates shall be stamped with the date of manufacture. All meters must be available with pulser type remote as well as absolute encoder registers as set forth in AWWA C-706 and C-707 Standards latest revisions respectively. Registers shall read in U.S. Gallons.

1.6 MEASURING CHAMBERS

The measuring elements or chambers for all meters shall be of copper alloy containing not less than 85% copper or of suitable engineering polymer and shall be separate from the case and easily detached and removed therefrom.

Rotor spindles shall be of tungsten carbide steel supported by radial bearings made of PTFE or graphite compounds. Replaceable thrust bearings shall be provided.

1.7 ROTORS

The measuring impellers, vanes or rotors for all meters shall be polypropylene, nylon, hard rubber or other suitable engineering polymer and shall be mounted on a horizontal axis in the center of the measuring element with rotations of the turbine transmitted to the register by means of magnets.

Straightening vanes of corrosion resistant material as required shall precede the rotor.

1.8 STRAINERS

Meters shall be provided with separate external bronze case strainers of the stainless steel plate type on sizes 2"-6" sizes and cast iron on 8"-12" sizes. They shall be rigid, easily removable, and have an effective straining area at least double that of the meter main case inlet. Strainer connections shall conform to the main case and shall be accompanied by gaskets, bolts and nuts.

1.9 WARRANTIES

All meters shall carry the following published warranties:

Meters shall be guaranteed to be free from defects in materials and workmanship and to meet AWWA New Meter Accuracy Standards for five (5) years from date of shipment.

In addition, all direct reading register assemblies shall be guaranteed to perform accurately for a period of ten (10) years from date of purchase.

END OF SECTION

SECTION 10106 - GENERAL CONSTRUCTION INFORMATION

1.1 RIGHT OF WAY AND FENCES

The Right of Way in some cases has been obtained from private land owners but in most cases is standard street right of way in town. The contractor shall not deliberately damage private property in the construction of water lines. He shall construct the lines with a minimum of inconvenience to the private property owner and in no case shall the owner be deprived from the use of his driveway or land.

When it is necessary to cross fences, the Contractor shall carefully remove the fence and upon completion of the ditch or lines, he shall replace the fence in as equal or better condition. If necessary, he shall build wire gates in order to protect the owners livestock and shall keep gates closed at all times. If necessary to cut the fence, the splice shall be made with the same type of wire as the original fence.

In general, when pipe lines are constructed within Highway Right of Way, the lines shall be placed within 4 feet of the Right of Way and never in the Highway Barrow ditch along the Highway paved shoulder.

1.2 BARRICADES AND WARNING SIGNS

Where work is carried on in or adjacent to any street, alley, road, highway or public place, the Contractor shall, at his own expense, furnish and erect such barricades, fences, lights and danger signals, shall provide watchmen and take such other precautionary measures for the protection of persons or property and of the work as are necessary. From sunset to sunrise, the Contractor shall furnish and maintain at least two (2) lights at each barricade. A sufficient number of barricades shall be erected to keep vehicles from being driven on or into any work under construction. The Contractor shall furnish watchmen in sufficient numbers to protect any new work. Failure to comply with this requirement will result in the Engineer shutting down the work until the Contractor shall have provided the necessary protection. Work along State or Federal Highways shall be signed, barricaded, and protected according to ODOT regulations and as directed by ODOT Representatives.

1.3 HIGHWAY AND ROAD CROSSINGS

All highway and road crossing materials shall be furnished and installed as indicated on the Plans.

1.4 CASING

Steel casing for the highway, street and railroad crossings shall be the sizes and lengths shown on the Plans. Generally, 18" steel casing and smaller shall be 1/4" wall thickness. All casing, unless indicated elsewhere, shall be standard mill pipe, sound, clean, free from large amounts of pitting, used pipe. A neoprene seal shall be installed on each end of the casing. For highway crossing, a two inch vent shall be installed from the end of the casing immediately inside the seal) and brought to the surface, three feet above the ground surface on the R/W line. An insect screen will be secured to the end of the vent and a sign attached.

1.5 CONNECTIONS TO EXISTING LINES

The contractor shall connect new lines to existing lines as indicated on the drawings. The drawings represent the best available information the size, type and location of existing system components. The Contractor shall verify the type and size of pipe and the configuration before ordering fittings. The contract will be adjusted (increased or decreased) where the drawings do not accurately depict the actual field conditions, however there shall be no additional compensation made to the Contractor because the incorrect fittings were ordered. Except as noted, the Contractor may either cut in a tee and valve or use a tapping sleeve and valve where appropriate.

1.6 DRIVEWAY CROSSINGS

Drives shall be replaced equal to that which existed prior to construction. Concrete and asphalt drives shall be sawed, and where practical, concrete drives shall be removed and replaced to the nearest construction joint. Backfill material beneath paved drives shall be hydraulically settled clean river sand, and/or clean class A crushed stone.

1.7 SURVEYING AND STAKING

The new water line is to be located far enough away from the existing highways so that the line will not be located under pavement in the event the highways are widened in the future, and deep enough so that the right of way work for future highway construction will not expose the line.

In areas where the line is located in highway right of way, the line must be laid as close as possible to the right of way four (4) feet inside the right of way and with a minimum of three (3) feet of cover.

The plans contain sufficient reference and information to permit the Bidders to locate the line accurately enough for bidding purposes. The Owner will work with the Contractor as construction progresses to determine the precise location of the lines and to adjust the alignment as may be required.

It will be the responsibility of the Contractor to provide construction staking throughout the limits of the project, if required.

1.8 CLEANUP AND RESTORATION OF DISTURBED AREAS

In embankment areas within State Highway right of way where excavation is required to construct the water line, the Contractor shall furnish embankment protection to prevent any sliding failures that may occur.

All backfill in State Highway right of way shall be compacted to 90% Standard Proctor Density.

Where water lines and appurtenances are located in public right of way that is maintained by the City, County or State, the Contractor shall remove all surface debris and smooth the area with a small bulldozer or box blade as may be appropriate.

Where construction disturbs yards or other areas that are privately maintained, the Contractor shall make an extra effort to restore these areas as neatly as possible to pre-construction condition within 10 to 15 days after the installation of the line. It will not be necessary to restore ground cover, however, rocks, large clods, and other undesirable debris shall be removed from the construction

area and every effort shall be made to restore the topsoil removed to permit construction. Disturbed areas shall be hand raked to break up any large clods and blend the disturbed area with the surrounding area.

1.9 STREET, ROAD OR HIGHWAY CROSSING

Where required by the State, County, or Local authority having jurisdiction there over the traffic be maintained over any construction work in a public street, road, or highway, and such traffic cannot be maintained on the highway, and such traffic cannot be maintained on the alignment of the original roadbed or pavement, the Contractor shall, at his own expense, construct and maintain detour around any construction work requiring such detour during the time that it is necessary to obstruct traffic over such street, road, or highway.

Such detour shall include a bridge, if necessary, across the site of the pipe trench and all necessary barricades, guard rails, approaches, suitable lights, signals, signs and other devices and precautions necessary for the protection of the work and safety of the public in accordance with the authority having jurisdiction over the street, road, or highway. All signs, lighting, and signals shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

All public streets, highways and roads which are closed to traffic, under authority of proper permit, shall be protected in accordance with the requirements of the authority by means of effective barricades on which shall be placed acceptable warning signs, highway or street on each side of the blocked portion of such public thoroughfare.

All barricades and obstructions shall be illuminated by means of yellow flashing lights at night. All lights used for this purpose shall be kept lit at all times.

Materials stored upon or alongside public streets and highways shall be so conducted as to cause the minimum obstruction and inconvenience to the traveling public.

All barricades, signs, yellow lights and other protective devices shall be installed and maintained in conformity with applicable statutory requirements.

1.10 RIGHT OF WAY

Any right of way used by the Contractor beyond that specified herein or shown on the plans shall be at the Contractor's expense and he shall make arrangements with the property owner before entering upon any property he may desire to use beyond the right of way provided under this project.

County roads, State Highways and City Street right of way shall be used as is necessary, in the opinion of the Engineer, or the Owner's Representative for the proper conduct of the work. Permission must first be obtained from the governing authority.

1.11 PROTECTION OF WORKERS AND PERSONNEL

The Contractor shall take such action as may be required for protection of workers in accordance with current OSHA rules and regulations, and such action as may otherwise be required to protect

and facilitate work within excavations. The Contractor may provide sheeting and shoring or cut walls of excavations back on suitable slopes, as may be appropriate.

1.12 CULVERTS, DITCHES, CURBS, SIDEWALKS, DRIVEWAYS, ETC.

After the pipeline has been installed and the backfilling completed, the Contractor shall replace in kind, to line and grade, all street and highway culverts, ditches, sidewalks, driveways, curbs, and all other structures that may have been removed or otherwise damaged in any way by operations in the performance of this contract. All gutters and drainage ditches shall be carefully restored to their original condition.

END OF SECTION

SECTION 10200 - WATER PIPE AND FITTINGS

PART 19 - GENERAL

1.1 DESCRIPTION

The work of this section consist of furnishing and installing PVC and Ductile Iron pipe and fittings at the locations shown on the plans and in accordance with these specifications.

1.2 QUALITY ASSURANCE

- A. PVC Pipe: Pipe shall be as manufactured by Manville, Clow or approved equal. The contractor shall furnish an affidavit from the manufacturer that pipe meets the requirements of these specifications. All pipe shall be marked showing the following:

Manufacturer's Name or Trademark
Nominal Pipe Size and Size Base
Material Code
SDR Number
Pressure Rating
ASTM Designation
NSF Certification

- B. Ductile Iron Pipe: Pipe shall be as manufactured by U.S. Steel, Clow or approved equal. All pipe shall be marked showing the following:

Manufacturer's Name or Trademark
Pipe Class
Pipe diameter (nominal)
Date of manufacture

- C. Fittings: Fittings for PVC and Ductile Iron Pipe shall be manufactured by Clow, U.S. Pipe.

1.3 PRODUCT HANDLING

- A. Handle pipe carefully to insure delivery at the project site in sound, undamaged condition. The Owner or engineer will reject damaged pipe on-site. The contractor shall replace damaged pipe at no additional expense to the Owner.
- B. Pipe shall not be stored directly on the ground. Adequately support piping to prevent warpage. Use and maintain protective covers where pipe may be damaged by direct sunlight.

PART 2 - MATERIALS

2.1 PVC PIPE

Polyvinyl Chloride (PVC) pipe shall conform to the provisions of ASTM D-2241 for pressure rated pipe or AWWA C-900. The size shall be as shown on the Plans. All joints shall be integrally formed, rubber gasket, push-on type. Minimum pressure ratings shall be as follows:

Nominal Size ASTM D-2241 or AWWA C-900

Pipe Size	Pressure
2"	200 psi
4"	200 psi
6"	200 psi
8"	200 psi
10"	200 psi
12"	200 psi

2.2 DUCTILE IRON PIPE

Ductile iron pipe shall conform to AWWA C151 (ANSI A21.51). Pipe shall be Class 50 for 6-inch and larger, and Class 52 for pipe less than 6-inch. Pipe joints shall be as follows:

Joints for buried service shall be mechanical or slip-on. Gasket shall be of the same manufacturer as the pipe.

Joints for building or vault service shall be flanged per AWWA C115 (ANSI A21.15), Class 250.

All pipe shall have a cement mortar lining per AWWA C104 (ANSI A21.4), minimum 1/16-inch thick.

2.3 FITTINGS

Fittings for PVC and Ductile Iron pipe shall conform to the provisions of AWWA C110. All fittings shall have the same joints as adjacent pipe and adequate for 250 psi working pressure. All fittings shall have a cement mortar lining per AWWA C104 (ANSI A21.4), minimum 1/16-inch thick.

2.4 TRACER WIRE

Trace wire shall be 14 ga. and standard for the industry.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPE IN TRENCHES

A. General Requirements for All Pipe

- (1) Pipe and fittings shall be installed on the grades and lines shown on the plans. Thoroughly clean pipe interiors of foreign matter before installation. When work is not in progress, securely close open ends of pipe and fittings. All pipe and fittings shall be new and free of blemishes.

- (2) Thrust blocks: Install thrust blocks at all tees, elbows, bends, crosses, reducers, and dead ends as shown on the plans or as recommended by the pipe manufacturer.
- (3) Inspection: Inspect pipe for defects before lowering into trench. Defective, damaged, or unsound pipe will be rejected.
- (4) Pipe Cutting: Cutting for closure or other reasons shall be done neatly by methods which will not damage pipe, lining or coating. Sharp edges shall be smoothed to prevent damage to gaskets.

3.2 INSTALLATION OF PIPE IN VAULTS OR BUILDINGS

A. General Requirements for All Pipe

- (1) Pipe and fittings shall be installed on the lines shown on the Plans. Thoroughly clean pipe interiors of foreign matter before installation. Inspect pipe for defects before installation. Defective, damaged or unsound pipe will be rejected.
- (2) Pipe shall be run parallel with or at right angles to the adjacent walls or floors, except when not possible due to conflicts with other facilities.
- (3) Pipe Cutting: Cutting for closure or other reasons shall be done neatly by methods which will not damage pipe, lining or coating.
- (4) Joints: All pipe shall have flanged joints unless otherwise shown on the plans or approved by the Engineer.
- (5) Provisions for maximum flexibility are not always shown and the Contractor may add flexible joints where required, and approved by the Engineer.
- (6) All pipe shall be carefully aligned and shall be installed in a neat manner. The bolts in the flange joints shall be drawn up uniformly and tightly around the flange without overstraining the flanges. All joints shall be made watertight.
- (7) Pipe Embedded in Concrete: All pipe and fittings embedded in concrete shall be accurately located and shall be securely held in place to prevent displacement when concrete is placed. Such embedded items shall be thoroughly cleaned of rust, grease.
- (8) Cleanup: After the pipe has been installed, tested, and disinfected the contractor shall thoroughly clean all parts of the building or vault. All pipe shall be cleaned of grease, metal cuttings and other debris.

END OF SECTION

SECTION 10201 - GATE VALVES

PART 1 - GENERAL

1.1 DESCRIPTION

The contractor shall furnish all labor, equipment and materials to install gate valves and appurtenances at locations shown on the plans or directed by the Engineer.

1.2 SUBMITTALS

Furnish three sets of shop drawings or catalog cuts and complete maintenance data.

1.3 QUALITY ASSURANCE

Valves and appurtenances shall be manufactured by Mueller, M & H, Clow, Pratt, Crane, Darling, Walworth, DeZurik, or approved equal.

PART 2 - MATERIALS

2.1 GENERAL

- A. All valves shall have the name of the manufacturer and the size of the valve cast on the body or bonnet or shown on a permanently attached plate in raised letters.
- B. Valves for vault or building service shall be complete with all necessary operating handwheels, chain wheels, extension stems, floor stands, worm and gear operators, operating nuts, chains, and wrenches which are required for proper completion of the valve installation.
- C. Valves for buried service shall be complete with gravel or concrete support pad, and two-piece valve box set in a 16-inch x 16-inch x 6-inch thick concrete pad. Concrete shall be 3000 psi at 28 days.

2.2 VALVES

- A. Vault or Building Service: The valve shall be iron body, bronze mounted with flanged ends, resilient seat gate, o-ring sealed, rising bronze stem and conforming to AWWA C500. Design working pressure shall be 150 psi. The valve shall open counterclockwise and be operated by handwheel, unless otherwise noted.
- B. Buried Service: The valve shall be iron body, non-rising stem, resilient seat gate, o-ring sealed stuffing box, with mechanical joint ends. The valve shall open counterclockwise and have a 2-inch square operating nut.

2.3 T-HANDLE OPERATING WRENCHES

Operating wrenches shall be 4-feet total length as manufactured by Mueller, Clow or approved equal.

2.4 VALVE BOXES

The box shall be of sufficient length to reach from the pipe to at least one-inch above the final ground surface elevation.

The box shall be two-piece sliding type, cast iron, with 5/8-inch shaft. Extension pieces, if required, shall be the manufacturer's standard type. The word WATER or "W" shall be cast into the top of the lid, as appropriate for the service. Units shall be Mueller, Claw, or approved equal.

2.5 VALVE OPERATORS

- A. All valve operators shall open by turning counterclockwise.
- B. Valve operators shall be self-locking type to prevent creeping.

2.6 EXTENSION STEMS FOR VALVE OPERATORS (Buried Service)

Where the depth of the valve is such that its centerline is more than 4 feet below grade, operating extension stems shall be provided to bring the operating nut to a point 6-inches below the surface of the ground and/or box cover. Extension stems shall be constructed of steel and shall be complete with 2-inch square operating nut.

2.7 EXTENSION BONNETS FOR VALVE OPERATORS

Bonnet and stem shall be constructed of steel and given manufacturer's standard paint system. Bonnets shall be as supplied by Pratt, Allis Chalmers, or approved equal.

2.8 FLOOR STANDS AND EXTENSION STEMS

Floor stands shall be non-rising stem, indicating type, complete with all necessary steel extension stems, couplings, handwheels, stem guide brackets, and special yoke attachments as required by the values and recommended and supplied by the stand manufacturer. Stem guides shall be spaced so that the stem L/R ratio does not exceed 200. Provide all necessary anchor bolts in Type 316 stainless steel. Floor stands shall be cast iron. All equipment shall be as supplied by Clow Corporation, Mueller Co. or approved equal.

2.9 VALVE SUPPORT PAD

All buried valves shall be supported by a concrete or gravel pad. The pad shall be at least 6-inches thick measured from the bottom of the valve. The horizontal dimensions of the pad shall be 6-inches greater than the largest centerline. Concrete shall be at least 3000 psi at 28 days. Gravel shall be clean, durable, and well-graded from 1/4-inch to one-inch.

PART 3 - EXECUTION

3.1 BURIED VALVES

Install valves in the line at locations indicated on the plans, unless otherwise directed, and set plumb on concrete or gravel pad. All foreign matter shall be removed from the valve interior prior to installation.

3.2 VALVES IN VAULTS OR BUILDINGS

Install in the lines as indicated on the drawings, unless otherwise directed. The valve shall be oriented to provide easy access to the handwheel. All foreign matter shall be removed from the interior prior to installation.

3.3 PRESSURE TEST

Gate valve test shall be a part of the test on the companion water line(s).

3.4 DISINFECTION

Gate valve disinfection shall be with the part of the disinfection of the companion water line(s).

END OF SECTION

SECTION 10203 - CHECK VALVES

PART 1 - GENERAL

1.1 DESCRIPTION

The work of this section consists of furnishing and installing check valves in vaults or buildings at the locations indicated, and as detailed on the plans.

1.2 QUALITY ASSURANCE

The valve shall conform to AWWA A508. Valves shall be as manufactured by Mueller, M & H, Clow, Apco, or an approved equal.

1.3 SUBMITTALS

Furnish catalog cuts, and complete maintenance data.

PART 2 - MATERIALS

2.1 CHECK VALVE

The check valve shall have a cast-iron body, with bronze trim and fittings. Connections shall be flanges that are faced and drilled to an ANSI B16.1, 125-pound template. The valve disc hinge pin shall be stainless steel and extend to a spring and lever control outside the body. The spring connection shall allow for tension adjustment.

PART 3 - EXECUTION

3.1 HANDLING

All valves shall be transported and stored in a manner which will protect them from damage.

3.2 INSTALLATION

The valve shall be installed in a vault or building as detailed on the plans. The manufacturer's recommended procedures for installation will be followed.

END OF SECTION

SECTION 10207 - HYDROSTATIC TESTING OF POTABLE LINES

PART 1 - GENERAL

1.1 DESCRIPTION

The work of this section shall consist of testing water lines and related valves and fittings.

1.2 QUALITY ASSURANCE

- A. Flow meters shall record the actual volume plus or minus 2 percent.
- B. Test gauges shall be ANSI B40.1, Grade 2A. Dial range shall be twice the required test pressure.

1.3 JOB CONDITIONS

- A. Testing shall not be performed until each system has been flushed and cleaned.
- B. Potable water lines shall be pressure tested before disinfecting.

PART 2 - MATERIALS

Not Applicable

PART 3 - EXECUTION

3.1 GENERAL

- A. Provide test equipment including test pumps, gauges, instruments, and other equipment required.
- B. Water shall be furnished by the owner.
- C. All testing shall be performed in the presence of the Engineer or Inspector.
- D. Test time will be accrued only while full test pressure is on system.
- E. For buried service, lines shall be tested after backfill and proper compaction of trenches.

3.2 PROCEDURE

- A. Test shall be in accordance with AWWA C601.
- B. The pipe shall be slowly filled with water. All air shall be eliminated by installing taps, if necessary, at the highest elevation and afterwards tightly plugged.
- C. Raise the internal pressure by pumping in water to 150 psi for a duration of two hours.

- D. Maintain the test pressure by pumping in metered quantities of makeup water. Leakage should not exceed ten gallons per inch diameter per mile of pipe per 24 hours.

Leakage is defined as the quantity of water supplied into the new pipe, or valved section of it, necessary to maintain the specified test pressure.

- E. Maintain test pressure within 5 psi for the 2 hour duration.

3.3 ACCEPTANCE

- A. No pipe installation shall be accepted until the leakage does not exceed the amount specified in 3.2 D above.
- B. Replace leaking fittings, valves, lengths, of pipe or other appurtenances.
- C. Do not use paints, asphalts, tars, or other types of pipe compounds to eliminate leaks.

END OF SECTION

SECTION 10208 - DISINFECTION OF POTABLE LINES

PART 1 - GENERAL

1.1 DESCRIPTION

The work of this section consist of disinfecting all portions of the water system, including interior and buried piping, valves, stops, and any portion of the existing connecting system that might have become contaminated during construction activities.

1.2 SUBMITTALS

Submit plan for gathering, transporting, and disposing of chlorine solutions and surplus materials after use.

1.3 QUALITY ASSURANCE

All mains and appurtenances shall be disinfected in accordance with ODEQ's rules for Public Water Supply Operation OAC 252:630.

PART 2 - MATERIALS

2.1 CHLORINE COMPOUNDS

Chlorine-bearing compounds such as calcium hypochlorite or sodium hypochlorite may be used. These compounds must be able to produce approximately 65 percent available chlorine.

2.2 CHLORINE SOLUTIONS

Mixtures of liquid chlorine and water or gaseous chlorine and water may be used. Mixtures shall be applied by means of a solution-feed chlorinating device.

PART 3 - EXECUTION

Water with 50 to 100 parts per million of chlorine shall be allowed to stand 24 hours and develop a residual of at least 10 parts per million of chlorine.

END OF SECTION

SECTION 10500 - WELL CASING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section covers standards applicable to permanent casings for water wells. Selection of temporary casings used only for construction is left to the contractor unless otherwise specified by the purchaser.

1.2 CASING DIAMETER

- A. Casings shall meet the following minimum diameter requirements.

Maximum Horizontal Dimension on Pump Assembly (inches)	Minimum Inside Diameter of Well Casing (inches)
4	5
5	6
6	8
8	10
10	12
12	14
14	16
16	18

1.3 CASING WALL THICKNESS

- A. Plastic well-casing thickness, shall conform with the requirements stated in ASTM F480.

PART 2 - MATERIALS

2.1 CASING MATERIAL

- A. All casing material shall be new and shall conform to one the standards listed below:

- 1. Manufacturing Standards for Single-Ply Carbon-Steel Well Casing:

ANSI/AWWA C200

API Spec. 5L

ASTM A53

ASTM A139

2. Manufacturing Standards for Alternative Single-Ply Well-Casing Materials:

Casing Material

Mfg. Standard

Carbon Steel

ASTM A211

High-strength, low-alloy steel

ASTM A714

Stainless steel

ASTM A409

Plastic

ASTM F480

2.2 JOINTS

A. Casing Joints shall be of the types listed below:

Casing Material Type of Joint Standard

Steel

Welded or threaded

AWWA C206

Plastic

Threaded or solvent-welded

ASTM F480

Two-ply

Welded

AWWA C206

2.3 DRIVE SHOES

A. Special steel drive shoes shall be heat-treated (Rockwell C Hardness 33-32) SAE 1040 steel ring or equivalent.

PART 3 - EXECUTION

3.1 WELL-CASING INSTALLATION

A. The method of well-casing installation shall be at the option of the drilling contractor, provided the installation meets the requirements of the Section Titled "Plumbness and

Alignment", and the installation process does not alter the shape, size, configuration or strength of the casing.

3.2 SEATING OR SEALING OF WELL CASING

- A. Seating in Rock - In consolidated rock formations, if steel casing is used, the casing shall be seated by driving it into the surface of the consolidated formation until a seal is obtained. If plastic casing is used, its seating into the rock must conform to "Sealing in Open Hole" for a length of at least 5 ft. at the point where the casing terminates in the rock.
- B. Sealing in Open Hole - An open hole shall be maintained at least 3 inches greater in diameter or 1.5 inches greater in annular space than the outside diameter of the casing being seated or sealed. The casing shall be cemented into place in accordance with "Grouting and Sealing".
- C. Seating or Sealing casing in tubular-type wells - Seating or sealing of the casing in a well constructed by the telescoping-screen-type construction in an unconsolidated formation shall be accomplished by the compaction and settlement of the earth around the casing only, and shall be allowed as a method of construction only when the depth of the well has in excess of 50 feet. of casing.
- D. If this method of construction is desired for casings with shallower depths (less than 50 feet), then a two casing construction shall be used.

3.3 COMPLETION OF WELL SITE

- A. At all times during the progress of the work, the contractor shall use reasonable precautions to prevent either tampering with the well or the entrance of foreign material or surface water into the well.
- B. Temporary capping of well - On completion of the well, the contractor shall install a suitable threaded, flanged, or welded cap or compression seal to prevent any surface pollutants from entering the well.

END OF SECTION

SECTION 10501 - WELL SCREENS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section covers standards for screens to be used for water wells.

PART 2 - MATERIALS

The well screen and its fittings should be fabricated of the same material. This material shall be AISI Type 304 stainless steel. The contractor shall submit three copies (3) screen-strength specifications, as well as supporting drawings and data to the engineer for approval.

PART 3 - EXECUTION

3.1 SCREEN SELECTION

The Contractor will be required to take formation samples to be analyzed by the screen manufacturer to determine the screen slot and gravel pack size. The Contractor shall submitted the manufacturer's analysis to the Engineer for Approval.

3.2 SCREEN CONSTRUCTION

Unless a specific type of construction is dictated by strength requirements, well screens shall be constructed by one of the following methods:

- A. Wire-wound, continuous-slot screens - Continuous-slot well screens shall be of all welded construction.
 - 1. Special shaped wire shall be helically wound around an array of equally spaced longitudinal rods and welded at each point of intersection.
 - 2. The inlet-slot openings between adjacent turns of the outer wire shall widen inwardly so as to be nonclogging.
 - 3. Screen end fittings shall be made of the same material as the screen body and shall be securely welded to each screen section.

19.1.4 Screens shall have sufficient diameter to provide adequate specific capacity and low aperture velocity. The entrance velocity must not exceed 0.1 ft/s.

3.3 SCREEN JOINTS AND SPACERS

- A. Joints between screen sections and blank casing spacers shall be welded or threaded and shall be watertight, straight, and as strong as the screen.

- B. Spacers between screen sections shall be of the same material as that used for the casing if greater than 5 ft in length. If less than 5 ft in length, they shall be made of the material as the screen.
- C. The joint between the well screen and the casing shall be made by any one of the following methods.
 - 1. A nonmetallic seal of neoprene or rubber made to fit the casing surrounding the screen shall be attached to the screen or screen casing to effect the seal, and the screen or screen casing shall extend at least 2 ft into the exterior.
 - 2. The space between the screen casing and the casing shall be filled with neat cement to form a seal at least 1.5 inches in length.

END OF SECTION

SECTION 10502 - GRAVEL PACK

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section covers gravel pack material in the annular space between the screen (and casing) and the bore hole for the purpose of stabilizing the aquifer material.

PART 2 - MATERIALS

- A. The minimum thickness of gravel-pack material shall be 4 inches. The maximum gravel pack thickness shall be 12 inches. Use gravel pack that is well rounded, 95% siliceous material. Install gravel pack in one uniform continuous operation throughout each screened interval.
- B. Gravel-pack material shall be placed in the annular space adjacent to the well screens and shall extend above the screen at least 20 ft.
- C. The gravel pack material shall have an average specific gravity of not less than 2.5. Not more than 1 percent, by weight, of the material shall have a specific of 2.25 or less. Thin, flat or elongated pieces, the maximum dimension of which exceeds three times the minimum, shall not be in excess of 2 percent, by weight. Not more than 5 percent of the gravel shall be soluble in hydrochloric acid. The material shall be washed and free of shale, mica, clay, dirt, loam, and organic impurities of any kind. The material shall contain no iron or manganese in a form or quantity that will adversely affect the quality of the well water.
- D. Tests for gradation of gravel pack material shall be performed according to the method of testing specified in ASTM C136.
- E. Samples of gravel pack, including sieve analysis, shall be approved by the engineer in advance of delivery and placement. Methods of sampling shall be according to ASTM D75.
- F. The material may be delivered in bags or in bulk. Materials delivered in bags shall be protected from weather until installed. Materials delivered in bulk shall be stored on a surface covered with a plastic sheet having a minimum thickness of 2 mil. Gravel pack material that comes in contact with the ground shall not be used, and all materials shall be protected from contamination until installed.

PART 3 - EXECUTION

3.1 METHOD OF INSTALLATION

- A. Gravel shall be placed to ensure continuity of gravel pack without bridging, voids or segregation.

3.2 GRAVEL PACK SIZE

- A. See section 10501 screen selection.

END OF SECTION

SECTION 10503 - GROUTING AND SEALING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section covers grouting and sealing requirements in construction of water supply wells.
- B. The well shall be sealed to prevent the entrance of water from any source other than from the aquifers selected. The annular space around the conductor and/or well casing, from surface to designated depth, shall be grouted and shall not be less than 1.5 inches.

PART 2 - MATERIALS

- A. Cement Grout - Cement conforming to ASTM C150, with not more than 6 gallons of water per 90-lb. Sack of cement, must be used for 1- ½ inch annular openings. Additives used to increase fluidity are subject to DEQ approval.
- B. Concrete Grout - Equal parts of cement conforming to ASTM Standard C150, and sand, with not more than 6 gallons of water per 90-lb. Sack of cement may used for annular openings larger than 1- ½ inches. Where annular opening larger than 4 inches is available, gravel not larger than ½ inch in size may be added.

PART 3 - EXECUTION

3.1 METHOD OF PLACEMENT

- A. Grouting or sealing shall be performed to ensure a complete seal of the annular space between the casing and bore hole.
- B. Provide sufficient annular opening to permit a minimum of 1 ½ inches of grout around permanent casings, including couplings.
- C. When completing a gun perforated well with an annular opening less than 4 inches, install grout under pressure by means of a grout pump from the bottom of the annular opening upward in one continuous operation until the annular opening is filled.
- D. Concrete grout used in an annular opening of 4 or more inches and less than 100 feet in depth, may be placed by gravity through a pipe installed to the bottom of the opening in one continuous operation until filled..
- E. Clay seals may be placed by gravity when the annular opening exceeds 6 inches and the depth is less than 100 feet.
- F. Provide the casing with sufficient guides welded to the casing to permit unobstructed flow and uniform thickness of grout.

END OF SECTION

SECTION 10504 - PLUMBNESS AND ALIGNMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The completed well shall be constructed round, plumb, and true to line as defined in this section. Tests for plumbness and alignment shall be made after completed construction of the well. All testing shall be in accordance with the current AWWA Standard Specifications.
- B. Plumbness - The maximum allowable horizontal deviation of the well from the vertical shall not exceed two thirds of the smallest inside diameter of that part of the well being tested per 100 ft of depth.
- C. Alignment - The alignment must be satisfactory for the successful installation and operation of the permanent pumping equipment.
 - 1. Alignment shall be tested by lowering a section of pipe or a dummy 40 ft in length into the well. The section of pipe or dummy shall move freely throughout the tested interval. The outside diameter of the pipe or dummy shall not be more than 0.5 inches smaller than the diameter of that part of the casing or hole being tested. If a dummy is used, it shall consist of a rigid spindle with a minimum of three truly cylindrical rings, each ring being a minimum of 12 inches wide. The rings shall be located one at each end and one in the center.
- D. Alternate-Alignment Tolerance - Alternate-alignment tolerance may be required for shallower wells after consideration of depth, formations, casing straightness, well diameter versus pump diameter, and local experience.
 - 1. The maximum allowable horizontal distance between the actual well centerline and a straight line representing the proposed pump centerline (this line being constructed to minimize the horizontal distance between the two center lines) shall not exceed one half of the difference between the inside diameter of the casing or hole in that part of the well being tested, and the desired maximum outside diameter of the proposed pump to be installed.

END OF SECTION

SECTION 10505 - WELL DEVELOPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The section consists of the application of appropriate techniques designed to bring the well to its maximum production capacity with attendant optimization of well efficiency, specific capacity, stabilization of aquifer material, and control of suspended solids.

1.2 DEVELOPMENT PROCEDURE

A test pump shall be used for developing the well.

- A. Test Pump Capacity - The pump and prime mover shall have a capacity in excess of the anticipated lift and final production capacity of the well. The pump shall be set to a depth in excess of the anticipated pumping level.
- B. Adjustable Flow Rates - The development equipment and method used shall permit adjustable pumping flow rates.
- C. Discharge Piping - The discharge piping provided shall be of sufficient diameter and length to conduct water to a point designated by the purchaser, and shall include orifices, meters, or other devices that will accurately measure the flow rate.
- D. Completing Development - Development shall continue until the following conditions have been met:
 - 1. Sand content shall average not more than 5 mg/L for a complete pumping cycle of 2 hour duration when pumping at the designated capacity.
 - 2. No less than 10 measurements shall be taken at equal intervals to permit plotting of sand content as a function of time and production rate and to determine the average sand content for each cycle.
 - 3. There shall be no increase in specific capacity during at least 24 hours of continuous pumping and surging.

1.3 MEASUREMENT OF OPERATING PARAMETERS DURING DEVELOPMENT

- A. Discharge Rate - The device used to measure the pump discharge rate shall have a minimum accuracy of 95%.
- B. Water Elevations - Water elevations in the well shall be measured to the accuracy specified by the engineer at each of the various pumping rates.

1.4 DEVELOPMENT RECORDS

- A. Quantity of Gravel - For gravel pack wells the quantity of gravel added during development shall be recorded.

- B. Data To Record - The following data shall be included in the work record:
- a. quantity and description of material brought into the well
 - b. static and pumping water levels
 - c. methods of measurement
 - d. duration of each operation
 - e. observation of results
 - f. production rates and specific capacity
 - g. sand content as a function of production rate and time
 - h. sand content as a function of production rates and specific capacity
 - i. other pertinent information as requested by the engineer.

END OF SECTION

SECTION 10506 - PERFORMANCE TESTING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The section covers all performance test to be performed on the water supply wells.
- 2. Determine well capacity with the pumping rate at maximum anticipated draw-down, pumping rate must be at least 1.5 times the quantity anticipated.
- 3. Test pump the well at 1.5 times the design pumping rate for at least 24 hours or until the draw-down has stabilized for a minimum of 6 hours.
- 4. Test pumping shall be at a rate of 200 gpm

1.2 TESTING METHODS

- A. Step Drawdown Tests - A step drawdown test shall be conducted to determine pumped well capacity and to obtain data from which to design the permanent production pump.
 - 1. The well shall be pumped at progressively increasing fractions of the maximum discharge capacity as determined during the final development phase.
 - 2. The length of each discharge step shall be long enough to plot a straight line trend of drawdown versus logarithm of time since pumping begin.
- B. Constant Rate Tests - After the step drawdown test, a constant rate test shall be conducted at a designated capacity to determine time drawdown characteristics of the pumped well and any observation wells.
 - 1. The pumping well shall be pumped at a constant rate until a straightline trend is observed on a plot of water level versus of the logarithm of time.
 - 2. Recovery time of the pumping well and any observations wells to be used in the test should be such that a straight line trend is observed in all of the wells on a plot of water level versus the logarithm of time.

1.3 WATER LEVEL MEASUREMENTS

- A. Water level measurements shall be obtained before, during and after the pumping test in order to acquire background information (static water levels), the effects of pumping (pumping water levels), and a profile of the recovery of the water level from the pumping level to the original state. The measurement frequency of water levels during pumping shall be such that adequate definition of the time drawdown data is made available.

1.4 PUMPING TEST INTERRUPTION

- A. The contractor shall conduct any pumping tests specified by the engineer without any interruptions or fluctuations that may affect the accuracy of the required pumping results.

1.5 RECORDS AND REPORTS

- A. The contractor shall maintain all records and shall submit to the engineer accurate written reports regarding water levels, pumping rates, time intervals, and other pertinent details on the testing of the production well and all observation wells used in the test period.

END OF SECTION

SECTION 10507 - WELL DISINFECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The section covers disinfection of water supply wells. All disinfection will be accordance with current AWWA Standard Specifications after the completion of work and placement of permanent pumping equipment.

1.2 DISINFECTION PROCEDURE

- A. The chlorine solution used for disinfecting the well shall be of such volume and strength and shall be so applied that a concentration of at 50 mg/L of available chlorine shall be obtained for the entire water depth of the well, and this solution shall remain in the well for a period of at least 24 hours. The chlorine solution shall be prepared and applied to produce a contaminant-free sample.
- B. If the samples continue to show bacteriological contamination, the contractor shall prepare and apply to the entire depth of the well a total volume of the chlorine solution equal to at least four time s the volume water in the well and shall allow this solution to remain in the well for a period of at least 24 hours.

END OF SECTION

SECTION 10508 - WATER QUALITY TESTING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The section covers water quality testing of water supply wells. Water quality shall be determined by analyses of water samples collected from the well. The analyses shall be performed by a laboratory acceptable to the appropriate regulatory agency.
2. Test every new, modified, or reconditioned ground water system for applicable physical, chemical and radiological characteristics by collecting representative groundwater samples at the conclusion of test pumping for submittal to a certified laboratory or the State Environmental Laboratory and report the results to the DEQ. Contact the State Environmental Lab to coordinate the proper submittal of samples for laboratory analysis.

1.2 SAMPLING PROCEDURE

The procedures outlined in the latest edition of the US Environmental Protection Agency Manual of Methods of Chemical Analysis of Water and Wastes¹ shall be followed.

- A. Field Tests - Water temperatures, pH, and dissolved gases shall be determined on samples collected and analyzed in the field.
- B. Samples for Local Regulation Tests - Water samples shall be taken at the end of the pumping test for chemical analyses as required by the purchaser or local regulations.

END OF SECTION

¹Manual of Methods for Chemical Analysis of Water and Wastes, EPA 625/6-74-003, Ofce. Technology Transfer, USEPA, Washington, D.C. (1974).

SECTION 10510 - WATER WELL PUMPS

PART 1 -GENERAL

1.1 DESCRIPTION

- A. This section covers requirements for the water supply pumps at the well.

PART 2 PRODUCTS

2.1 PUMPS

- A. The pump shall be of GRUNFOS make or approved equal
- B. The pump shall be capable of producing 50 GPM and 185 foot total head
- C. The pump shall be of stainless steel construction.
- D. Lightning protection shall be provided for the pump.
- E. The contractor shall be responsible for providing the type of Electrical Service required for the pump at the site.
- 6. The Contractor will be responsible for connecting the well to the control system in the south well house by underground cable and providing the necessary controls compatible with the existing system.

Where submersible pump is used:

- 1. Effectively seal the top of the casing against entrance of water under all conditions of vibration or movement of conductors or cables.
- 2. Firmly attach the electric cable to the riser pipe at 20 foot intervals or less.
- 3. Pumps with mercury seal are not permitted.

END OF SECTION

SECTION 10511 - WATER LEVEL MEASUREMENTS

Water level measurements shall be obtained before, during, and after the pumping test in order to acquire background information (static water levels), the effects of pumping (pumping water levels), and a profile of the recovery of the water level from the pumping level to the original state. The measurement frequency of water levels during pumping shall be such that adequate definition of the time-draw down data is made available.

All draw down gauges shall at a minimum meet the following:

Provide an accurate drawn-down gauge, air pipe, direct measurement tube, or other access for measuring the water level in the well.

Make the connection between the air tube and the pump base water tight when an air pipe passes through the pump base.

Extend tubes for direct measurement of water levels 24 inches above the well floor slab, and tightly cap with a bolted flange or a screwed cap.

Provide corrosion resistant water level measurement equipment.

END OF SECTION

SECTION 10512 - DECOMMISSIONING OF TEST HOLES, PARTIALLY COMPLETED WELLS AND ABANDONED COMPLETED WELLS

GENERAL

The recommendations contained in this specification pertain to wells and test holes in consolidated and unconsolidated formations. Each sealing job should be considered as individual in nature, and methods and materials should be determined only after carefully considering the objectives outlined in the specification.

SECTION 2.2 WELLS IN UNCONSOLIDATED FORMATIONS

Normally, test holes, partially completed wells, and abandoned completed wells extending only into consolidated formations near the surface and containing water under water-table conditions can be adequately sealed by filling with concrete, grout, bentonite, or sealing clay. In the event that the water-bearing formation consists of coarse gravel and producing wells are located nearby, care must be taken to select sealing materials that will not affect the producing wells. Concrete may be used if the producing wells can be shut down for a sufficient time to allow the concrete to set without the cement washing out. Clean, disinfected sand or gravel may also be used as fill material opposite the water-bearing formation. The remainder of the well, especially the upper portion, should be filled with concrete, cement grout, bentonite, or sealing clay to exclude surface water. The latter method, using clay as the upper sealing material, is especially applicable to large-diameter abandoned wells.

In gravel-packed, gravel-envelope, or other wells in which coarse material has been added around the inner casing to within 20 ft to 30 ft (6.1 m to 9.1 m) of the surface, the sealing outside the casing is very important. Sometimes this sealing may require removal of the gravel or perforation of the casing, to ensure that the well or hole is sealed to a minimum depth of 50 ft (15.2 m) from the surface.

SECTION 2.3 WELLS IN CREVICED FORMATIONS

Test holes, partially completed wells, and abandoned completed wells that penetrate limestone or other creviced or channelized rock formations lying immediately below the surface deposits should preferably be filled with concrete or grout, to ensure permanence of the seal. The use of clay or sand in such wells is not desirable because fine-grained fill material may be displaced by the flow of water through crevices or channels. If limited vertical movement of water in the formation will not affect the quality or quantity of water in nearby producing wells, alternate layers of coarse stone and concrete may be used for fill material through the water-producing horizon. Otherwise only concrete or grout should be used. The portion of the well between a point 10 ft to 20 ft (3.0 m to 6.1 m) below and a point 10 ft to 20 ft (3.0 m to 6.1 m) above the creviced formation should be sealed. Clay or sand may be used to fill the upper part of the well to within 50 ft (15.2 m) of ground level. The upper 50 ft (15.2 m) should be sealed with concrete, grout, bentonite, or sealing clay.

SECTION 2.4 WELLS IN NONCREVICED ROCK FORMATIONS

Test holes, partially completed wells, and abandoned completed wells' encountering noncreviced sandstone or other water-bearing consolidated formations below the surface deposits may be satisfactorily sealed by filling the entire depth with clay, provided there is no movement of water in the well. Disinfected clean sand may also be used through the sandstone up to a point 10 ft to 20 ft (3.0 m to 6.1 m) below the bottom of the casing. The upper portion of this type of well should be filled with concrete, grout, bentonite, or sealing clay

to provide an effective seal against entrance of surface water. If there is an appreciable amount of upward flow, pressure grouting or pumping of concrete is advisable,

SECTION 2.5 MULTIPLE AQUIFER WELLS

Some special problems may develop in sealing wells extending into more than one aquifer. These wells should be filled and sealed in such a way that the comingling of water from one aquifer to another is prevented. If no appreciable movement of water is encountered, filling with concrete, grout, or alternate layers of these materials and sand will prove satisfactory. When velocities are high, the procedures outlined in Section 2.6 are recommended. If alternate concrete plugs or bridges are used, they should be placed in known non-producing horizons or, if locations of the non-producing horizons are not known, at frequent intervals. Sometimes when the casing is not grouted or the formation is non-caving, it may be necessary to break, slit, or perforate the casing to fill any annular space on the outside.

SECTION 2.6 WELLS WITH ARTESIAN FLOW

The sealing of test holes, partially completed wells, and abandoned completed wells that have water moving between aquifers or to the surface requires special attention. Frequently, the movement of water may be sufficient to make sealing by gravity placement of concrete, grout, bentonite, or sealing clay impractical. In such wells, large stone aggregate (not more than one third of the diameter of the hole) or a well packer will be needed to restrict the flow and thereby permit the gravity placement of sealing material above the formation producing the flow. If pre-shaped or precast plugs are used, they should be several times longer than the diameter of the well to prevent tilting. Because it is very important in wells of this type to prevent circulation between formations or loss of water to the surface or to the annular space outside the casing, it is recommended that pressure grouting or pumping of concrete, using the minimum quantity of water that will permit handling, be used. In wells in which the hydrostatic head producing flow to the surface is low, the movement of water may be arrested by extending the well casing to an elevation above the artesian-pressure surface. Previously described sealing methods suitable to the geologic conditions can then be used.

SECTION 2.7 SEALING MATERIALS

A number of materials can be used for sealing wells satisfactorily. They include concrete, grout, bentonite, sealing clay, sand, or combinations of these materials, and are mentioned in this appendix. Each material has certain characteristics and distinctive properties; therefore, one material may be especially suited for doing a particular job. The selection of the material must be based on the construction of the well, the nature of the formations penetrated, the material and equipment available, the location of the well with respect to possible sources of contamination, the pH of the water and its affect on the sealing material, and the cost of doing the work and must be approved by the engineer.

Generally, concrete is used for filling the upper part of the well or water-bearing formations, for plugging short sections of casings, or for filling large-diameter wells. It may be cheaper to use than grout and it makes a stronger plug or seal. However; concrete will not penetrate thin seams, crevices, or interstices. Furthermore, proper care must be taken during the placement of concrete to ensure that the aggregate does not separate from the cement.

Grout is far superior for sealing small openings, for penetrating any annular space outside of casings, and for filling voids in the surrounding formation. When applied under pressure, it is strongly favored for sealing wells under artesian pressure or for wells that penetrate more than one aquifer.

Clay, as a heavy mud-laden or special clay fluid applied under pressure, has most of the advantages of grout. Its use is preferred by some competent authorities, particularly for sealing artesian wells. Others feel that it may, under some conditions, eventually be carried away into the surrounding formations.

Clay in a relatively dry state clay and sand, or sand alone may be used advantageously as sealing materials, particularly under water-table conditions where diameters are large, depths are great, formations are caving, and where there is no need to penetrate openings in casings, liners, or formations, or to obtain a watertight seal at any given spot.

Frequently, combinations of these material& are necessary. The more expensive materials are used when strength, penetration, or water-tightness are needed. The less expensive materials are used for the remainder of the well. Grout is now being mixed with bentonite clays and various aggregates to achieve superior results and lower costs.

END OF SECTION